



# United States Department of the Interior





FISH AND WILDLIFE SERVICE  
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In reply refer to:  
81420-2010-F-0834-01

## MEMORANDUM

SEP 28 2010

To: Jason Phillips, Program Manager  
San Joaquin River Restoration Program  
Bureau of Reclamation  
Sacramento, California

From: Susan Moore   
Field Supervisor   
U.S. Fish and Wildlife Service  
Sacramento Fish and Wildlife Office  
Sacramento, California

Subject: San Joaquin River Restoration Program's Water Year 2011 Interim Flows Project in Kern, Kings, Mariposa, Stanislaus, San Joaquin, Alameda, Contra Costa, Fresno, Madera and Merced Counties, California

This letter is in response to your June 17, 2010, interagency memorandum received on June 17, 2010, requesting concurrence with your determination that your above-referenced project may affect, but is not likely to adversely affect, the following federally-listed species or adversely modify the following critical habitats: California tiger salamander (*Ambystoma californiense*) and critical habitat, blunt-nosed leopard lizard (*Gambelia sila*), conservancy fairy shrimp (*Branchinecta conservatio*) and critical habitat, Colusa grass (*Neostapfia colusana*) and critical habitat, delta smelt (*Hypomesus transpacificus*; DS) and critical habitat, Fresno kangaroo rat (*Dipodomys nitratooides exilis*), giant garter snake (*Thamnophis gigas*), Greene's tuctoria (*Tuctoria greenei*) and critical habitat, hairy orcutt grass (*Orcuttia pilosa*) and critical habitat, Hoover's spurge (*Chamaesyce hooveri*) and critical habitat, Least Bell's vireo (*Vireo bellii pusillus*), longhorn fairy shrimp (*Branchinecta longiantenna*) and critical habitat, palmate-bracted bird's-beak (*Cordylanthus palmatus*), riparian brush rabbit (*Sylvilagus bachmani riparius*), San Joaquin kit fox (*Vulpes macrotis mutica*), San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*) and critical habitat, San Joaquin (riparian) woodrat (*Neotoma fuscipes riparia*), fleshy (=succulent) owl's-clover (*Castilleja campestris* ssp. *Succulent*) and critical habitat, vernal pool fairy shrimp (*Branchinecta lynchi*) and critical habitat, vernal pool tadpole shrimp (*Lepidurus packardii*) and critical habitat, and valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*; VELB) and critical habitat. Our primary concern and mandate is the protection of federally-listed species pursuant to the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The findings and recommendations in this consultation are based on: (1) the U.S. Bureau of Reclamation's (BOR) June 17, 2010, memorandum requesting concurrence with a not likely to adversely affect determination for the above-referenced species and critical habitat, (2) BOR's Biological Assessment for the Water Year 2011 Interim Flows Project (proposed project) dated June 2010, (3) the May 1, 2007, *San Joaquin River Restoration Program Implementing the Stipulation of the Settlement in Natural Resources Defense Council, et al., v. Kirk Rodgers, United States Bureau of Reclamation, et al.*, Program Management Plan (Settlement), (4) the Environmental Assessment and Finding of No New Significant Impact/Supplemental Environmental Assessment for Water Year 2011 Interim Flows Project dated September 21, 2010, (5) BOR's document to National Marine Fisheries Service (NMFS) dated September 10, 2010, entitled *Response and Errata in Response to the National Marine Fisheries Service's July 23, 2010, Letter Regarding the Water Year 2011 Interim Flows Project Biological Assessment*, (6) the National Oceanic and Atmospheric Administration's letter dated July 23, 2010, and received September 14, 2010, to the San Joaquin River Restoration Program for the project's sufficiency review, (7) the adult blunt-nosed leopard lizard survey report titled *Summary of Habitat Assessment and Surveys for Blunt-nosed Leopard Lizard (Gambelia sila) along the Eastside Bypass, Merced County, California* dated July 22, 2010, (8) the juvenile blunt-nosed leopard lizard survey report titled *Summary of Surveys for Hatchling Blunt-nosed Leopard Lizard (Gambelia sila) along the Eastside Bypass, Merced County, California*, (8) electronic mail correspondence, discussions and meetings between the U.S. Fish and Wildlife Service (Service) and BOR clarifying avoidance measures and proposed project details through the biweekly Environmental Compliance and Permitting Working Group, (9) the *Seepage Monitoring and Management Plan for Water Year 2010 Interim Flows: Water Year 2010 Interim Flows Project Final Environmental Assessment/Initial Study*, which carries forward into WY 2011, and (10) other information available to the Service. The Service is an Implementing Agency in this San Joaquin River Restoration Program and has been working closely with BOR since early 2008 on the project planning and recommendations for avoidance and minimization measures for federally-listed species.

The Service has reviewed the Biological Assessment (BA) and other information sources. This is a similar, but augmented, action over the Water Year (WY) 2010 Interim Flows, which was determined to be not likely to adversely affect the above-referenced list of federally-listed species, as well as not likely to adversely modify designated Critical Habitat for these species. Due to 1) the Eastside Bypass (ESB) being a flood conveyance channel with high flows every two to three years within historic inundation levels, 2) this is a one-year action, 3) the strictly temporal nature of the flows in the proposed action for WY 2011, 4) the lack of significant alterations to the landscape (i.e., construction), and 5) recovery from increased inundation anticipated within a year's time, any potential detrimental effects to the above-referenced list of federally-listed species will be reduced to an insignificant or discountable level; in the case of VELB, there may even be a potential net beneficial effect. Additionally, DS are either likely to be outside the proposed project area or protected from potential flow changes by the Coordinated Operations of the Central Valley Project and State Water Project in California [Operations, Criteria and Plan (OCAP) biological opinion (Service, 2008)]. Because the purpose of the proposed project is to collect data and the proposed project flows are equivalent or less than current and historic flood flows that occurred in the channel, the Service concurs with your determination that the proposed project, as described with its proposed avoidance and minimization measures, may affect, but it not likely to adversely affect the above-referenced list of federally-listed species, nor adversely modify the above-referenced list of designated critical habitats, with the exception of blunt-nosed leopard lizard. The remainder of this biological opinion will address the concerns of the proposed project upon the blunt-nosed leopard lizard.

## **Consultation History**

*January 4, 2010.* Agency meeting with Service and NMFS. Discussed approach to Act compliance for WY 2011 Interim Flows Project, including the recommendation to include information acquired post-WY 2010 BA.

*January 26, 2010.* Agency meeting with Service and NMFS. The WY 2011 Interim Flow (IF) Supplement and new BA were discussed and updates were provided. Update was provided that a new BA would be prepared for WY 2011.

*February 12, 2010.* Agency meeting with Service and NMFS. The WY 2011 IF Supplement and new BA were discussed and updates were provided.

*March 10, 2010.* Service meeting with NMFS. Discussed approach to environmental assessment related to Act issues.

*March 16, 2010.* Agency meeting with Service and NMFS. The WY 2011 IF Supplement and new BA were discussed with updates.

*April 1, 2010.* Service meeting with NMFS. Discussed comments on the Administrative Draft Environmental Assessment (EA).

*April 11, 2010.* Service meeting with NMFS. Discussed comments on approach to preparation of the BA.

*April 14, 2010.* Service meeting with NMFS. Discussed comments on approach to preparation of the BA.

*May 3, 2010.* NMFS meeting. Discussed recommendations on how to address information acquired post-WY 2010 BA: water quality monitoring information, water quality plan, NMFS OCAP biological opinion specific to the Vernalis Adaptive Management Program (VAMP) and export requirements.

*May 18, 2010.* Agency meeting with Service and NMFS. The WY 2011 IF Supplement and BA were discussed with updates.

*June 9, 2010.* Received BOR's Request for Extension of San Joaquin River Restoration Program WY 2010 Interim Flows Blunt-Nosed Leopard Lizard Survey Protocols for WY 2011 Interim Flows.

*June 17, 2010.* The Service received BOR's Initiation Letter titled, "Section 7 Endangered Species Consultation and Request for Concurrence with Findings in the San Joaquin River Restoration Program's Water 2011 Interim Flows Biological Assessment" and the "Water Year 2011 Interim Flows Project Final Biological Assessment" dated June 2010.

*July 8, 2010.* Service conference call with BOR and the Department of Water Resources (DWR) to discuss blunt-nosed leopard lizard survey updates. No lizards have been found to-date.

*July 23, 2010.* The Service received the “Summary of Habitat Assessment and Surveys for Blunt-Nosed Leopard Lizard (*Gambelia sila*) along the Eastside Bypass, Merced County, California” dated July 22, 2010. This provided a summary of surveys to the present date.

*July 20, 2010.* The Service, the NMFS, DWR, BOR, the U.S. Army Corps of Engineers (Corps), and Entrix representatives have a conference call to discuss the Programmatic Consultation, but also provide updates on the WY 2011 Project.

*July 30, 2010.* The Service and BOR meet to discuss blunt-nosed leopard lizard surveys and project updates.

## **BIOLOGICAL OPINION**

### **Description of the Proposed Action**

#### Project Setting and Background

The proposed project, as described, is to increase the release of water in the San Joaquin River from Friant Dam during two separate time frames, for one year (WY 2011) in accordance with the Settlement and in a manner consistent with Federal, State, and local laws, and future agreements with downstream agencies, entities, and landowners. The release of interim flows during WY 2011 will be made according to the Settlement and the Act, as limited by downstream channel capacities and potential material adverse effects from groundwater seepage, and consistent with Federal, State, and local laws, and any agreements with downstream agencies, entities, and landowners. These releases would allow data to be collected to better evaluate flows, temperature, fish needs, biological effects and seepage losses, as well as water recirculation, recapture, and reuse opportunities. The proposed project would release Interim Flows to the San Joaquin River from Friant Dam during WY 2011 from October 1, 2010, through December 1, 2010 (first release) and from February 1, 2011, through September 30, 2011 (second release), in accordance with the flow schedule presented in Exhibit B (Appendix 1) of the Settlement (Figure 1; Table 1). No Interim Flow releases specific to the proposed project would occur between December 2, 2010, and January 31, 2011. There will be a maximum release of 1,650 cubic feet per second (cfs) from Friant Dam, which allows for a flexible flow schedule in the spring and fall (Table 2). This will also allow for a small pulse that attenuates to less than 1,300 cfs.

The WY 2010 action was a proposed release of 1,300 cfs in the ESB. Due to groundwater recharge, seepage, and adaptive implementation, this resulted in a flow of only 800 cfs through the ESB. The WY 2011 change in inundation level, therefore, is 1,300 minus 800 cfs. For project planning purposes, approximately half of the area receiving the proposed flows was modeled by DWR (south of the Mariposa Bypass) at 800 and 1,500 cfs and found to have identical inundation effects, resulting in an estimated 72 acres of temporary effects. The other half, north of Mariposa Bypass, was modeled at 350 and 1,500 cfs. Calculations of acreage inundated by WY 2011 extrapolated to the ESB were calculated to temporarily impact 27.0625 acres. This results in a total of 99.06 acres temporarily impacted by WY 2011.

### **Interim Flow Releases Under the Proposed Action**

WY 2011 Interim Flows would be reduced or diverted as needed to avoid causing substantial adverse conditions in downstream reaches. The proposed project also involves recapture of WY 2011 Interim Flows at specified locations along the San Joaquin River, in the Delta, or both to the maximum extent possible, and transferring this water back to the Friant Division Long-Term Contractors. The maximum downstream extent of WY 2011 Interim Flows that could be recaptured would be at the SWP Banks Pumping Plant (Banks) and the CVP Jones Pumping Plant (Jones) in the Delta. The temporal and longitudinal magnitude and timing of flow releases will be in accordance with the average flow release schedule presented in Exhibit B of the Settlement.

Channel capacities established for the WY 2010 flows will remain in effect and will limit releases. Maximum releases will allow for flows that: 1) attenuate to less than 1,300 cfs at the Chowchilla Bifurcation Structure, and 2) combined with Arroyo Canal deliveries for a total flow of less than 1,500 cfs below Mendota Dam.

The maximum flow releases out of Friant Dam for the first and second releases is proposed to be 700 cubic feet per second (cfs) and 1,660 cfs, respectively. The proposed project flows are constrained by existing channel capacity of Reach 2B (Table 3), which was determined to be 1,300 cfs. Additionally, there are estimated maximum, regulated, non-flood flows under the proposed action in a wet year (Table 4). Data collected during the 1999 pilot flows determined seepage rates for these upper reaches, which are the bases for the seepage data discussed in the Settlement. Additionally, the Settlement includes in the Interim Flows the water release required for existing water rights holders (i.e., riparian releases). Therefore, the initial release of 1,660 cfs from Friant Dam would be reduced by at least 360 cfs due to seepage and the required water contractors in the upper reaches, prior to reaching Reach 2B. The purpose of the proposed project is to collect data and the proposed project flows are equivalent or less than current and historic flood flows that occurred in the channel.

Daily Interim Flow releases from Friant Dam would be based on the Restoration Year type (water year type per Exhibit B) and associated flow schedule per Exhibit B and other applicable Settlement provisions, including recommendations by the Restoration Administrator (RA). The actual daily WY 2011 Interim Flow releases (the resulting hydrograph; Figure 2) would be subject to the application of flexible flow provisions described in Exhibit B and other ramping and flow scheduling changes, as recommended by the RA. WY 2011 Interim Flow releases will be ramped up slowly and incrementally in a stepwise manner, with flows held constant at each new step to allow surface water and groundwater conditions to stabilize before the next increase. As described in Paragraph 15 of the Settlement, the RA makes recommendations to assist BOR in implementing Interim Flows. The WY 2011 ramping schedule and stable flow durations will depend on RA recommendations and real-time flow management decisions based on the monitoring information and to avoid effects.

Additional implementation considerations that could influence the release of WY 2011 Interim Flows include water supply demand, Mendota Dam operations, Sack Dam operations, any agreements with landowners or other Federal, State, and local agencies, effects to special-status species, potential for seepage, and real-time management strategies. It is important to note that while seepage may result in effects on agricultural production on adjacent lands, the effects of seepage for the WY 2011 Interim Flows Project will be adaptively managed and are not anticipated to result in significant environmental effects (San Joaquin River Restoration Program, 2010). The

WY 2011 Interim Flows Project has been formulated to reduce or avoid seepage. Managing to reduce or avoid seepage is inherently challenging due to the temporal delay between the change in river stage and resulting change in groundwater elevations and additional factors, such as adjacent canal seepage, flood irrigation of lands, and heavy rainfall that can affect groundwater elevations. Any seepage that may occur will be limited in area and temporary in nature (i.e., affect one growing season or a few growing seasons) (San Joaquin River Restoration Program, 2010).

### **Recapture and Recirculation**

The proposed project includes potentially recapturing (defined as the point of redirection of Interim Flows downstream of Friant Dam), to the maximum extent possible, at locations along the San Joaquin River and/or in the Delta, consistent with and limited by existing operating criteria, prevailing and relevant laws, regulations, biological opinions, and court orders in place at the time the water is recaptured.

Under the proposed project, the water released under WY 2011 Interim Flows that is available for recapture and recirculation (defined here as the conveyance of recaptured water to the Friant Division long-term water contractors) is estimated to equal to the amount of water that reaches the Mendota Pool at the downstream end of Reach 2B (e.g., the first location where water can be recaptured and recirculated). Flows that reach the Mendota Pool are not the same as those that reach the head of Reach 2B due to channel losses in Reach 2A. Therefore, the overall quantity of water available for recapture and recirculation is somewhat lower due to these losses. The estimated maximum water released for WY 2011 Interim Flows that could be available for recapture and recirculation under the proposed project is shown in Table 2. This table has been updated from the WY 2010 to reflect the current understanding of Interim Flows implementation.

The farthest downstream where WY 2011 Interim Flows could be recaptured would be at the Jones and Banks pumping plants. The proposed project includes potential recapture of Interim Flows at several diversions, including: facilities downstream of the Restoration Reach in the Delta, and in the San Joaquin River at the Banta-Carbona Irrigation District facility and the West Stanislaus Irrigation District facility downstream of the Stanislaus River confluence, and at the Patterson Irrigation District facility between the Tuolumne and Merced River confluences, and facilities within the Restoration Reach including the East Bear Creek Unit of the San Luis National Wildlife Refuge (East Bear Creek Unit) in Eastside Bypass Reach 3, the Lone Tree Unit of the Merced National Wildlife Refuge (Lone Tree Unit) in Eastside Bypass Reach 2, Sack Dam at the downstream end of Reach 3, and the Mendota Pool at the downstream end of Reach 2B. WY 2011 Interim Flows recaptured along the San Joaquin River may provide deliveries in lieu of Delta-Mendota Canal (DMC) supplies. Recirculation would be subject to available capacity within CVP/SWP storage and conveyance facilities, including the Jones and Banks pumping plants, California Aqueduct, DMC, San Luis Reservoir, and related pumping facilities, and other facilities of CVP/SWP contractors. Available capacity is the capacity that is available after satisfaction of all statutory and contractual obligations to existing water service or supply contracts, exchange contracts, settlement contracts, transfers, or other agreements involving or intended to benefit CVP/SWP contractors served through CVP/SWP facilities. Under the proposed project, recapture water would be exchanged for a like amount of CVP water and/or would be recirculated and held in storage in San Luis Reservoir. Reclamation is working with the Friant Division long-term water contractors to prepare a separate

Environmental Assessment to determine possible mechanisms to either exchange or deliver to the Friant Division long-term contractors recaptured water stored in San Luis Reservoir.

Implementing the proposed project could increase flows entering the Delta from the San Joaquin River. Delta export facilities would continue to operate consistent with existing operating criteria, and prevailing and relevant laws, regulations, BOs, and court orders in place at the time the water is recaptured. Water recirculation via the CVP/SWP facilities would be possible using south-of-Delta facilities. No additional agreements would be required to recapture flows in the Restoration Area. However, recirculation of recaptured water to the Friant Division could require mutual agreements between BOR, DWR, Friant Division long-term contractors, and other south-of-Delta CVP/SWP contractors. BOR would assist in developing these agreements. As previously described, recirculation would be subject to availability capacity within CVP/SWP storage and conveyance. Furthermore, implementation of the WY 2011 Interim Flows would remain consistent with the Service Delta Smelt BO on Coordinated Opinions of the Central Valley Project and State Water Project (Service, 2008) and the NMFS Biological and Conference Opinion on the Long-term Operations of the Central Valley Project and State Water Project (NMFS Operations BO) (NMFS, 2009), respectively or as amended by court action.

Continued implementation of the biological opinions would avoid jeopardy of protected species, including Central Valley steelhead on the Stanislaus River and Delta, spring- and winter-run Chinook salmon, green sturgeon, and delta smelt in the Delta, and reduce adverse modification of delta smelt critical habitat.

Recaptured water available for transfer to Friant Division long-term contractors would range from zero to the quantity of water under Interim Flows that reaches the Mendota Pool and would vary based upon the water year type. During a Critical-Low water year, the quantity of water available for recapture and transfer to the Friant Division long-term contractors would be zero, because there are no WY 2011 Interim Flow releases under this water year type. During Wet years, the water available for recapture and transfer to the Friant Division long-term contractors would range between zero and 321 thousand acre-feet (TAF). BOR would identify actual delivery reductions to Friant Division long-term contractors associated with the release of WY 2011 Interim Flows.

Recapturing water downstream of the Restoration Reach could increase fish entrainment risks. Both the Patterson Irrigation District and West Stanislaus Irrigation District facilities are unscreened and would only be utilized for recapture if permits were obtained through the appropriate authorities or if operationally-complaint fish screens were installed. The Banta-Carbona Facility has a state-of-the-art fish screen and the Delta facilities will be operated in compliance with the long-term operations biological opinions and RPAs and other applicable requirements to preclude recapture from increasing entrainment risks. All recapture actions will be conducted in a manner consistent with Federal, State and local laws, and any agreements with downstream agencies, entities, and landowners.

### **Settlement Flow Schedules**

The quantity of water to be released from Friant Dam as WY 2011 Interim Flows in the proposed project is defined by the hydrologic year type classifications provided in Exhibit B, consistent with the Restoration Flow Guidelines, and recent direction by BOR on management of Interim Flows.

The allocated annual quantity will be applied to the hydrographs in Exhibit B and reduced, as appropriate, within the limits of channel capacity, anticipated infiltration losses, and diversion capacities. Reductions in flow could be made in consideration of water supply demands, presence of special-status species, potential seepage and groundwater effects, along with real time management strategies.

For the reasons described in the WY 2010 Final EA/IS, Settlement provisions related to buffer flow and purchased water provisions are not being considered for WY 2011 Interim Flows, and therefore are not included in the proposed project. The timing and magnitude of flow releases, as well as additional flow modifications, would be further defined under guidance provided in the Settlement and recent direction from BOR on the management of Interim Flows.

### **Flow Modifications**

The Settlement defines several potential modifications to flow schedules to help achieve the Restoration Goal. These modifications include flexible flow periods, a spring pulse, buffer flows, and the acquisition and release of additional water. Because chinook salmon will not be reintroduced to the river during WY 2011 and because the purpose of WY 2011 Interim Flows is to collect relevant data, WY 2011 Interim Flows would not include applying buffer flows or releasing additional water.

A report of San Joaquin River Interim Flow Unsteady Hydraulic Modeling was prepared on August 25, 2009. The primary objective of the hydraulic modeling was to identify the appropriate hydrographs that would not exceed a 1,300 cfs threshold at the Chowchilla Bifurcation Structure for flows of no greater than 1,300 cfs into Reach 2B. Results of the hydraulic modeling indicated that all hydrographs at 2,000 cfs, 12 hours and below would not exceed the 1,300-cfs threshold at the Bifurcation Structures. Therefore, a 12-hour, 2,000-cfs pulse flow during the WY 2011 Interim Flows Project spring pulse period is currently part of the proposed project.

BOR will coordinate with NMFS and the Service to ensure that potential adverse effects on listed species will be avoided or minimized. This will be accomplished by continually providing and discussing streamflow, recapture operations, and water quality data summaries and coordinating through the Stream Flow and Water Quality meetings, as outlined in the SJRRP Water Quality Monitoring Plan for the 2009-2013 Interim Flow Release. During periods when WY 2011 Interim Flows pass the confluence of the Merced River, specific streamflow and water quality measurements that will be undertaken include dissolved oxygen, water temperature, pH, turbidity, streamflow, and specific conductivity at locations on the San Joaquin River just upstream and downstream from the confluence with the Merced River and in the Merced River. Monitoring results for additional constituents, including selenium, ammonia, and boron, will be available every two to four weeks and will be reviewed when available.

### **Action Area**

The action area is defined in 50 CFR § 402.02 as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” The project action area includes all areas where flows and water levels could be altered as a result of the WY 2011 Interim Flows under the SJRRP, including the following:



- \* Millerton Lake and the San Joaquin River between Kerkhoff Dam and Millerton Lake
- \* San Joaquin River from Friant Dam downstream to the Delta
- \* Eastside Bypass, downstream from the San Slough Control Structure, and the Mariposa Bypass
- \* Merced, Tuolumne, and Stanislaus Rivers downstream from New Exchequer, Don Pedro, and New Melones Dams, respectively
- \* South and central Delta, defined as the San Joaquin River and its tributaries within the Delta west to its confluence with the Sacramento River

Calculation of the precise acreages affected is not possible to calculate given that the WY 2011 Interim Flows will be strictly temporary and fluctuate through the year based upon the pulse flows through the channel, which varies in depth and width. Additionally, habitat modeling of inundation was attempted for the increase from 800 to 1,300 cfs, however only a portion of the acreage was evaluated due to restricted access by some landowners. A temporary habitat disturbance is defined as a short-term event in which effects do not degrade the habitat beyond its ability to recover within one year of the disturbance or beyond its ability to support listed species and ecosystem functioning within one year following disturbance.

### **Analytical Framework for the Jeopardy/No Jeopardy Determination**

In accordance with policy and regulation, the following analysis relies on four components to support the jeopardy/no jeopardy determination for the blunt-nosed leopard lizard: (1) the *Status of the Species*, which evaluates the species' range-wide condition, the factors responsible for that condition, and their survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the role of the action area in the species' survival and recovery; (3) the *Effects of the Action*, which determines the direct and indirect effects of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the species.

In accordance with policy and regulation, the jeopardy/no jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the species' current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the blunt-nosed leopard lizard in the wild.

The following analysis places an emphasis on consideration of the range-wide survival and recovery needs of the species and the role of the action area in meeting those needs as the context for evaluating the significance of the effects of the proposed Federal action, combined with cumulative effects, for purposes of making the jeopardy/no jeopardy determination. In short, a non-jeopardy determination is warranted if the proposed action is consistent with maintaining the role of habitat and the species' populations in the action area for the survival and recovery of this species.

## Status of the Species

### Blunt-nosed Leopard Lizard

The blunt-nosed leopard lizard was federally listed as endangered on March 11, 1967 (32 FR 4001) and was listed by the State of California as endangered on June 27, 1971. A recovery plan for the blunt-nosed leopard lizard was first prepared in 1980, revised in 1985, and then superseded by the Service's 1998 Recovery Plan (Service, 1998). The recovery strategy requires that the Service (1) determine appropriate habitat management and compatible land uses for the blunt-nosed leopard lizard; (2) protect additional habitat for them in key portions of their range; and (3) gather additional data on population responses to environmental variation at representative sites in their existing geographic range (Service, 1998).

The blunt-nosed leopard lizard is endemic to the San Joaquin Valley of central California (Stejneger, 1893; Smith, 1946; Montanucci, 1965, 1970; Tollestrup, 1979a). This species typically inhabits open, sparsely-vegetated areas of low relief on the San Joaquin Valley floor and in the surrounding foothills (Smith, 1946; Montanucci, 1965). Holland (1986) described the vegetative communities that blunt-nosed leopard lizard are most commonly found in as Nonnative Grassland and Valley Sink Scrub communities. Other suitable habitat types on the Valley floor for this species include Valley Needlegrass Grassland (Holland, 1986), Alkali Playa (Holland, 1986), and Atriplex Grassland (Tollestrup, 1976).

The species is a relatively large lizard in the Iguanidae family with a long, regenerative tail; long, powerful hind limbs; and a short, blunt snout (Smith, 1946; Stebbins, 1985). Though their under surface is uniformly white, the species exhibits tremendous variation in color and pattern on the back (Tanner and Banta, 1963; Montanucci, 1965, 1970), ranging from yellowish or light gray-brown to dark brown. Males are typically larger and weigh more than females; adults range in size from 3.4 to 4.7 inches (Tollestrup, 1982) and weigh between 0.8 and 1.5 ounces (Uptain *et al.*, 1985). Blunt-nosed leopard lizards use small rodent burrows for shelter from predators and temperature extremes (Tollestrup, 1979b). Burrows are usually abandoned ground squirrel (*Spermophilus beecheyi*) tunnels, or occupied or abandoned kangaroo rat tunnels (*Dipodomys* spp.) (Montanucci, 1965). Each lizard uses several burrows without preference, but will avoid those occupied by predators or other leopard lizards. Montanucci (1965) found that in areas of low mammal burrow density, lizards would construct shallow, simple tunnels in earth berms or under rocks. Blunt-nosed leopard lizards feed primarily on insects (mostly grasshoppers, crickets, and moths) and other lizards, although some plant material is rarely eaten or, perhaps, unintentionally consumed with animal prey. They appear to feed opportunistically on animals, eating whatever is available in the size range they can overcome and swallow.

The blunt-nosed leopard lizard was distributed historically throughout the San Joaquin Valley and adjacent interior foothills and plains, extending from central Stanislaus County south to extreme northeastern Santa Barbara County. Today, its distribution is limited to scattered parcels of undeveloped land, with the greatest concentrations occurring on the west side of the valley floor and in the foothills of the Transverse Range. The blunt-nosed leopard lizard prefers open, sparsely vegetated areas of low relief and inhabits Valley Sink Scrub, Valley Saltbush Scrub, valley/plain grasslands, and foothill grasslands vegetation communities.

Adult blunt-nosed leopard lizards often seek safety in burrows, while immature blunt-nosed leopard lizards use rock piles, trash piles, and brush. They use burrows constructed by mammals, such as kangaroo rats, for overwintering and aestivation. Adult blunt-nosed leopard lizards hibernate during the colder months of winter and are less active in the hotter months of late summer. Adults are active above ground from about March or April through September. Hatchlings are active until mid-October or November, depending on weather. Blunt-nosed leopard lizard habitat has been significantly reduced, degraded, and fragmented by roads, agricultural development, petroleum and mineral extraction, livestock grazing, pesticide application, and off-road vehicle use.

Habitat disturbance, destruction, and fragmentation continue as the greatest threats to blunt-nosed leopard lizard populations. Disturbances and modifications of habitats within areas of mineral and petroleum development pose lesser, but continuing, threats as they degrade the habitat. Mortality occurs when animals are killed in their burrows during construction, killed by vehicle traffic, drowned in oil, or fall into excavated areas from which they are unable to escape. Displaced blunt-nosed leopard lizards may be unable to survive in adjacent habitat if it is already occupied or unsuitable for colonization.

Livestock grazing can result in removal of herbaceous vegetation and shrub cover and destruction of rodent burrows used by blunt-nosed leopard lizards for shelter. Unlike cultivation of row crops, which precludes use by blunt-nosed leopard lizards, light or moderate grazing may be beneficial. The use of pesticides may directly and indirectly affect the blunt-nosed leopard lizard. The insecticide Malathion has been used since 1969 to control the beet leafhopper, and its use may reduce insect prey populations. Fumigants, such as methyl bromide, are used to control ground squirrels. Because blunt-nosed leopard lizards often inhabit ground squirrel burrows, they may be inadvertently poisoned.

In recent years, above average precipitation seems to have increased the amount of vegetative cover. This increase in cover may be a factor in the low abundance of adult blunt-nosed leopard lizards seen during the population monitoring at the former Naval Petroleum Reserve in western Kern County in 1995, due to poor quality blunt-nosed leopard lizard habitat (U.S. Department of Energy and Chevron, 1996). It was surmised in the preceding citation (1996) that the dense vegetation may reduce foraging efficiency while simultaneously limiting blunt-nosed leopard lizards' ability to detect and avoid predators.

There has never been a comprehensive survey of the entire historical range of the blunt-nosed leopard lizard; therefore, less is known about this animal's distribution in comparison with giant and Tipton kangaroo rats (Service, 1998). The currently known occupied range of the blunt-nosed leopard lizard is in scattered parcels of undeveloped land and margins of developed land on the Valley floor, and in the foothills of the Coast Range. The blunt-nosed leopard lizard occurs from Merced and Madera Counties in the north, through Fresno, Kings, Tulare, and Kern Counties to San Luis Obispo, Santa Barbara, and Ventura Counties in the south, as shown on Figure 49 of the Recovery Plan.

Microhabitat use and home range characteristics of blunt-nosed leopard lizards were compared at two sites near Elk Hills in Buena Vista Valley that differed in ground cover (Warrick *et al.*, 1998). These authors reported that blunt-nosed leopard lizard microhabitat use differed significantly between the two study sites. At the more densely vegetated site, blunt-nosed leopard lizards used dry wash areas significantly more than grassland, floodplain, and road habitats. Conversely, at the more sparsely vegetated site, grassland was used more than wash habitat, and hills were used less than all other habitats.

Warrick *et al.* (1998) also compared home range size, core area size, and amount of overlap of ranges between the sites. The average male home range size was 10.48 acres, and the average female home range size was 4.99 acres. Female home ranges and core areas were overlapped extensively by male ranges at an average of 79.8 percent and 50.3 percent, respectively. Female home ranges were found to overlap the ranges of up to four other males, but were not observed to overlap with other females.

The span of seasonal activity for both adults and hatchlings described in the Recovery Plan Results was corroborated by results of a two-plot study on the Elkhorn Plain (Germano and Williams, 2005). This study further postulated that activity levels can be strongly affected by environmental factors – temperature, precipitation and vegetation characteristics. These factors affect lizard behavior by impacting thermoregulation, metabolism, prey densities, and predatory success or mobility. For example, these authors reported that activity was completely absent for 21 months from July 1989 until April 1991 when individuals remained below ground due to dry conditions. In spite of this anomaly, Germano *et al.* (2004) supported the capacity of a 10-day survey to detect the blunt-nosed leopard lizard presence during typical environmental conditions compared to full-season surveys ( $r^2 = 0.96$  for adults,  $r^2 = 0.99$  for hatchlings/juveniles). Notably CDFG's standardized protocol survey methods (CDFG, 2004) require a minimum of 12 days of surveys to assess presence/absence for new ground disturbance during specific ambient air and ground temperature conditions.

Long-term population studies have monitored the population trends in blunt-nosed leopard lizard at Elkhorn Plain (Germano *et al.*, 2004; Germano and Williams, 2005), Semitropic Ridge (Warrick, 2006), Lokern (Germano *et al.*, 2005; Warrick, 2006), Elk Hills (Quad Knopf, 2006), Pixley National Wildlife Refuge (NWR; Williams *in litt.*, 2006), Buttonwillow Ecological Reserve (ER), Allensworth ER (Selmon *in litt.*, 2006), and Coles Levee Ecosystem Preserve (Quad Knopf, 2005). Long-term population studies have not been conducted for blunt-nosed leopard lizards in the Cuyama Valley, the Ciervo-Panoche Natural Area, Merced County, or Madera County, the status of these populations is unknown (Stafford *in litt.*, 2006). These long-term studies show blunt-nosed leopard lizard population instability, especially during years of above average precipitation (Germano *et al.*, 2004; Germano *et al.*, 2005; Germano and Williams, 2005; Germano *in litt.*, 2006; Williams *in litt.*, 2006). Based on population instability and ongoing modification and conversion of existing habitat to agriculture, residential or commercial developments, and for petroleum and mineral extraction activities, overall species abundance is considered to be decreasing across its range. Due to widespread agricultural development of natural habitat in the San Joaquin Valley, the current distribution of blunt-nosed leopard lizards is restricted to less than 15 percent of its historic range (Germano and Williams, 1992; Jennings, 1995).

At the time that the blunt-nosed leopard lizard was listed, the conversion of native habitat to agriculture was considered to be the primary threat to species. Additional threats to the blunt-nosed leopard lizard included habitat fragmentation, mineral development (primarily for oil and gas extraction), inappropriate grazing levels, and agricultural pest control, primarily spraying for the beet leafhopper (Montanucci, 1965).

In Kern County, the blunt-nosed leopard lizard currently occupies scattered parcels of undeveloped land on the Valley floor, and occurs in the foothills of the Coast Range. While the blunt-nosed leopard lizard can occupy grassland used for grazing, it prefers lands with scattered shrubs and sparse grass/forb cover. Habitat for the blunt-nosed leopard lizard has been lost or degraded due to oil development, urban development, row crops, pesticide application, and off-road vehicle use (Service, 1998).

The BLM has conducted surveys and compiled observational data from BLM lands in western Kern, Kings, and Fresno Counties. Currently, the BLM and USGS-Biological Research Division are conducting a five- to ten-year research study in the Lokern Area to evaluate the effects of cattle grazing on blunt-nosed leopard lizard, GKR, San Joaquin antelope squirrel, other small mammals, and the kern mallow (*Eremalche kernensis*) plant.

Extant populations of blunt-nosed leopard lizard are known from the Carrizo Plain, Elk Hills, around Taft, and at various other locations in the vicinity of the project area (Service, 1998). There are numerous records in this vicinity in the California Natural Diversity Database (CNDDDB) and other sources. The McKittrick Valley area is included in one of several larger areas given highest priority for habitat protection for the blunt-nosed leopard lizard. The Lokern and Elk Hills areas have also been targeted for habitat protection for the species (Service, 1998).

Past research on this species reported that collective habitat loss has caused the reduction and fragmentation of populations and decline of blunt-nosed leopard lizards (Stebbins, 1954; Montanucci 1965; Service, 1980, 1985; Germano and Williams, 1993). Since listing, the Service has identified additional potential threats to the blunt-nosed leopard lizard, including landscape leveling and cultivation that causes habitat disturbance, destruction and fragmentation, grazing (under- or over-grazing), mineral development, primarily oil and gas extraction, and agricultural pest control, primarily spraying for the beet leafhopper (Montanucci, 1965). The 1998 Recovery Plan added mortality from vehicle-strikes with roadway traffic and/or ORV to the threat list.

Typical of Central Valley rivers and a semiarid climate, the natural or “unimpaired” flow regime of the San Joaquin River historically varied greatly in the magnitude, timing, duration, and frequency of streamflows, both inter-annually and seasonally. The frequency and distribution of habitat types and microhabitat features present in the San Joaquin River before construction of Friant Dam were substantially different from those currently found in the river. In the unconfined valley reaches, the river flowed through an extensive flood basin that was frequently subject to prolonged inundation, particularly during the spring snowmelt-runoff period. The natural flow regimes of the Merced, Tuolumne, and Stanislaus rivers historically resulted in much greater variation in the magnitude of streamflows than the current, regulated flow regimes.

The lower San Joaquin River and the valley sections of its major tributaries – the Merced, Tuolumne, and Stanislaus rivers – have changed dramatically since the early part of the 19<sup>th</sup> century. These rivers are now largely confined within constructed levees and bounded by agricultural and urban development, flows are regulated by dams and water diversions, and floodplain habitats have been fragmented and reduced in size and diversity (McBain and Trush, 2002). The presence of Friant Dam on the San Joaquin River and a series of dams on the eastside tributaries reduces the frequency of scouring flows, which has resulted in a gradual decline of bare gravel and sandbar surfaces required to recruit growth of new riparian plants.

## **Environmental Baseline**

### *Terrestrial Habitat Types in Project Reaches with Historical Blunt-Nosed Leopard Lizard Occurrences*

#### ***San Joaquin River from Friant Dam Downstream to Merced River.***

**Reach 2.** Reach 2 of the San Joaquin River is characterized by seasonal drying of the channel in

summer and fall. The water table recedes into the porous substrate, creating a pronounced riparian drought nearly every year (McBain and Trush, 2002). In most years, the channel is essentially dry most of the year from Gravelly Ford to the Mendota Pool, except under flood release conditions, when up to 2,000 cfs is passed downstream from the Chowchilla Bifurcation Structure (Jones and Stokes Associates, 1998). Cultivated lands occupy nearly all the lands outside the river bottom.

Riparian vegetation in the upper 10 miles of this reach (Reach 2A) is sparse or absent, because the river is usually dry and the shallow groundwater is overdrafted (McBain and Trush, 2002). Grassland and pasture are relatively abundant in Reach 2A, contributing almost 50 percent to the total natural land cover, excluding urban and agricultural land cover types. The most abundant riparian communities present are riparian and willow scrub habitats. The only significant stand of elderberry savannah mapped in the Restoration Area occurs on the left bank near the Chowchilla Bifurcation Structure at the junction of Reaches 2A and 2B (McBain and Trush, 2002). Invasive species recorded in Reach 2A in 2000 included large stands of blue gum and tree-of-heaven (9 acres) and giant reed (6 acres) (McBain and Trush, 2002). Red sesbania is also widespread in Reach 2A, based on observations made in 2008.

The lower few miles of Reach 2B support narrow, patchy, but nearly continuous vegetation dominated by cattails and tules; a few cottonwoods and willows grow above the waterline.

**Reach 3.** San Joaquin River Reach 3 is characterized by continuous flow from the DMC within a very confined channel, by seasonally low water, and by narrow strips of riparian vegetation along the river's edge. Adjacent lands are mostly in agricultural use, except where the city of Firebaugh borders the river's west bank for three miles. The likely reason that the riparian corridor is narrow is that the upper and middle floodplain elevations have been developed for agricultural and urban uses. A reduction in the frequency of lower flood events also likely resulted in less frequent scouring, which has decreased the abundance of early successional riparian vegetation (i.e., scrub) and riverwash (Jones and Stokes Associates, 1998), while allowing the establishment of riparian forest.

Nearly continuous riparian vegetation of various widths and cover types occurs on at least one side of the channel in this reach. In Reach 3, cottonwood riparian forest is the most abundant native vegetation type, followed by willow scrub, willow riparian forest, and riparian scrub. Small amounts (less than 0.5 acre each) of giant reed and nonnative trees were mapped in Reach 3 (McBain and Trush, 2002).

**Reach 4.** Reach 4A of the San Joaquin River is similar to Reach 3 in that the flow is confined within a narrow channel and agricultural land borders the levees. The flows in this subreach are usually negligible, because of the diversion at Sack Dam, but periodically flood-control flows are conveyed in such a way as to define a channel through the reach (Jones and Stokes Associates, 1998). The floodplain of the Reach 4B is broader, with levees set back from the active channel. The water table is also closer to the surface than in the other reaches within the Restoration Area (McBain and Trush, 2002).

Reach 4A is sparsely vegetated, with a very thin band of vegetation along the channel margin (or none at all). Willow scrub and willow riparian forest occur in small to large stands, and ponds rimmed by small areas of marsh vegetation are present in the channel; however, this reach has the fewest habitat types and lowest ratio of natural vegetation per river mile in the Restoration Area.

Reach 4B upstream from the Mariposa Bypass (Reach 4B1) supports a nearly unbroken, dense, but narrow, corridor of willow scrub or young mixed riparian vegetation on most of the reach, with occasional large gaps in the canopy. Reach 4B1 no longer conveys flows, because the San Slough Control Structure diverts all flows into the bypass system. As a result, the channel in Reach 4B1 is poorly defined and filled with dense vegetation, and in some cases, is plugged with fill material.

Because of its wider floodplain and available groundwater, as well as management of the land as part of the San Luis NWR, Reach 4B2 contains vast areas of natural vegetation compared to the upstream reaches. Grasslands and pasture are the most common vegetation type, but willow riparian forest and emergent wetlands are also relatively abundant. Agricultural land uses are greatly reduced relative to other reaches in the Restoration Area (McBain and Trush, 2002).

### ***Eastside and Mariposa Bypasses***

**Eastside Bypass.** Upland vegetation in the Eastside Bypass is grassland and ruderal vegetation (i.e., nonnative herbaceous of disturbed lands). The reach between the Sand Slough Control Structure and the Merced NWR (approximately 4.5 miles) supports several ponds. For the next 2.2 miles, the bypass passes through the Merced NWR, which encompasses more than 10,000 acres of wetlands, native grasslands, vernal pools, and riparian habitat. Further downstream, the Eastside Bypass passes through the Grasslands Wildlife Management Area, an area of private lands with conservation easements held by the Service, and through the East Bear Creek Unit of the San Luis NWR Complex. Patches of riparian trees and shrubs occur along the banks of the Eastside Bypass in these areas. Side channels and slough (e.g., Duck, Deep, and Bravel sloughs) are present along the lower Eastside Bypass, and some support remnant patches of riparian vegetation.

**Mariposa Bypass.** The Mariposa Bypass is bordered to the south by agricultural land and vernal pool grasslands to the north. Scattered riparian trees are present along the Mariposa Bypass.

### **Blunt-nosed Leopard Lizard Historical and Current Status**

Using the habitat suitability map created in 2009 for most of the proposed action area, site conditions were again ranked and surveys completed in areas that had signed temporary entry permits. Many sites ranked lower in suitability in 2010 than in the previous year. Rank changes were due to thicker and taller vegetation, which was influenced by more rain and less grazing in 2010 (DWR, 2010). However the entire proposed action area was neither surveyed nor accessible for habitat suitability reconnaissance. Properties within the survey area where access was granted generally ranked between 2 and 6 for habitat suitability, with 10 being the best score. Sections of the ESB assessed and surveyed in the summer of 2010 consisted of the Snobird Unit and the East Bear Creek Unit, located in the Service's San Luis National Wildlife Refuge (SLNWR), Merced Co., and the Lone Tree Unit located in the Merced National Wildlife Refuge (MNWR). A habitat assessment was conducted on June 9, 2010, and presence and absence surveys for adult blunt-nosed leopard lizards were conducted from June 14 to July 16, 2010, and for juvenile blunt-nosed leopard lizards between August 9 and September 3, 2010, on potential blunt-nosed leopard lizard habitat assessed in 2009 and ranked 6.

Based off the data and discussions from 2009, the surveys in 2010 were to be conducted only on sections of the ESB that were ranked 4 and above by Stanislaus' Endangered Species Recovery Program (ESRP). However, as in 2009, permission to access all the private property along the ESB was not

attained in 2010; as a result, only sections within SLNWR and MNWR were assessed using the survey methodologies recommended by the Service for the SJRRP (Service, 2009).

The blunt-nosed leopard lizard survey report for WY 2011 (DWR, 2010) summarizes that the overall low to moderate habitat values along the ESB are generally not conducive to the occurrence of blunt-nosed leopard lizards. Survey results supported that with no blunt-nosed leopard lizard sightings or other lizards, and notably few records of various common reptiles throughout 39 total days of surveys, with six surveyors per day.

A limiting factor for our analysis include that not all properties were surveyed. It is possible that the unsurveyed acreage provides suitable habitat for blunt-nosed leopard lizards and may present a missed opportunity for recording the species' presence.

There are no large preserves in Merced or Madera Counties containing significant populations of blunt-nosed leopard lizard. The preserves in western Merced County (e.g., Grasslands Ecological Area consisting of roughly 179,000 acres) are seasonally-flooded and do not support blunt-nosed leopard lizard (Juarez *in litt.*, 2006). The Kerman Ecological Reserve (ER) is located about five miles east of the Mendota Wildlife Area near the southernmost reaches (Reaches 2 and 3) of the San Joaquin River and protects 1,718 acres of Valley Annual Grasslands in northwestern Fresno County. In the Kerman ER Interim Management Plan (Ashford, 1990), protection of Fresno kangaroo rat (*Dipodomys nitratooides exilis*) and blunt-nosed leopard lizard habitat is the principal management focus. Livestock grazing is occasionally permitted to control exotic grasses. Hunting is allowed, but vehicles are restricted to roads. There is, however, no population data available for Kerman ER (Service, 2010).

#### *Factors Affecting the Blunt-nosed Leopard Lizard within the Action Area*

Historical disturbance within the action area includes the systematic and extensive diversion and water management of the San Joaquin River for human use; this includes, but is not limited to, construction of Friant Dam (completed in 1942), New Exchequer Dam, Crocker-Huffman Dam, New Don Pedro Reservoir, New Melones Dam, Hills Ferry Barrier, construction of the Delta-Mendota Canal and the California Aqueduct, the Chowchilla Bifurcation Structure and the Sand Slough Control Structure, as well as the Eastside Bypass and Mariposa Bypass. The construction of such water diversions as Friant Dam and the Chowchilla Bifurcation Structure may have, in fact, artificially increased habitat for the blunt-nosed leopard lizard, providing additional acreage of sandy habitat within segments of the subsequently dried river channel. However, as analyzed below, periodic flow releases and other factors have reduced the habitat value. Additional impacts to the blunt-nosed leopard lizard have occurred from conversion of natural lands to agricultural land use.

Flows in excess of annual refuge deliveries and agricultural returns (i.e., flood operations by Friant Dam and the other tributaries) occur about one in every two years (McBain and Trush, 2002). Flood conveyance operations result in bypass flows, which occur every 3-5 years (Mooney, pers. comm., 2010) and lead to a repetitive reduction in any blunt-nosed leopard lizard population that may have continued to persist there. Land use surrounding the San Joaquin River through this area primarily consists of agriculture, which further results in few or no reservoir locations for blunt-nosed leopard lizards to persist outside of the flow channel. These flood flows, combined with the current land use practices, do not allow for sustaining a large population of blunt-nosed leopard lizards within the action area. Existing conditions solely within the channel generally consist of inadequate habitat conditions for



blunt-nosed leopard lizards and are generally seasonally-saturated or inundated by existing pools of water. The Service acknowledges that, in spite of blunt-nosed leopard lizards being absent from the summer of 2010 surveys and the lack of high-quality habitat for blunt-nosed leopard lizards, the project could result in take of any remnant blunt-nosed leopard lizards residing in the area specifically during hibernation or potential nesting attempts.

For reclusive species like blunt-nosed leopard lizard, survey results do not provide definitive absence of the target species. In spite of the recurring flood flows, current land use practices, reported absence of blunt-nosed leopard lizards in both WY 2010 and WY 2011 surveys, and the low quality, isolated habitat that's quality is likely continuing to decline, the Service has determined that a few blunt-nosed leopard lizards may continue to subsist in very small, remnant locations within the action area. This is land containing historic habitat; however, given that not all land was surveyed, there remains the possibility of take of blunt-nosed leopard lizard. Ultimately, the amount of potential take anticipated at the northern periphery of the known range for the species is not likely to amount in significant effects to the viability of the population.

### **Effects of the Proposed Action**

#### *Removal, Displacement, and Entombment*

Although the bypass is currently subject to periodic flooding, the proposed action will result in increased frequency and duration of flows within the channel from the baseline. WY 2011 Interim Flows are scheduled from October 1 – December 2, 2010, and also from February 1 – September 30, 2011. Blunt-nosed leopard lizard activity is less reliant upon time of year (i.e., day length) as upon temperature, with optimum temperatures facilitating their activity between 23-35°C (77-95°F). Therefore, the risk of entombing blunt-nosed leopard lizards in their hibernation burrows and potential loss of nests during the proposed project is a likely effect within the October to April timeframe. Blunt-nosed leopard lizards may be increasingly susceptible to the alteration of flow regime due to being sluggish during the colder months. The proposed action may directly displace blunt-nosed leopard lizards attempting to nest, as well as wash away nests that have already been established. Destruction of burrows could also affect blunt-nosed leopard lizard survival by reducing the number and distribution of escape refuges.

#### *Habitat Loss and Degradation*

Disturbance may include alteration or reduction in vegetative cover (such as salt uptake by increased seepage, as noted above, or increased invasive species encroachment), but is not limited to vegetation alone. Burrows likely will be collapsed by the proposed action, including burrows actively utilized or those providing refuge from predators. The effects of a temporary disturbance may include the direct loss of individuals, the loss of one or more reproductive cycles of the blunt-nosed leopard lizard, or the loss of one or more generation of young. This, in turn, leads to loss of recruitment of future generations and, therefore, smaller population sizes with reduced gene flow that are less able to withstand stochastic events that may greatly reduce or eliminate remaining individuals. Due to the defined flow schedule of the WY 2011 Interim Flows, all effects associated with the proposed project are considered temporary.

Seepage may lead to increased forb and grass density (including invasive plant species), thereby decreasing habitat for hibernation, foraging, and breeding; the proposed action, therefore, will temporarily require blunt-nosed leopard lizards to relocate outside of the flow channel. However, as

noted above, measures are and will continue to be implemented to minimize seepage effects and are considered to have a minor environmental impact. However, seepage may also mobilize salt into the root zone (San Joaquin River Restoration Project, 2009a), negatively affecting both habitat cover as well as prey base.

Through its *Seepage Monitoring and Management Plan for Water Year 2010 Interim Flows: Water Year 2010 Interim Flows Project Final Environmental Assessment/Initial Study* (SJRRP, 2009b), which carries forward into WY 2011, BOR will be minimizing the effects of seepage on the blunt-nosed leopard lizard through groundwater level monitoring, flow monitoring, visual patrols, and landowner feedback. Additionally, BOR shall monitor invasive plant species along affected portions of the San Joaquin River and bypass system (before and after WY 2011 Interim Flows), as specified in the Invasive Vegetation Monitoring and Management Plan (included as Appendix F in the WY 2010 Interim Flows Supplemental EA), BOR will control and manage invasive plant species.

### **Cumulative Effects**

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section, because they require separate consultation pursuant to section 7 of the Act.

Numerous non-Federal activities continue to eliminate habitat for blunt-nosed leopard lizards in the action area. Loss and degradation of habitat with or without Service authorization continues as a result of urbanization, oil and gas development on private lands, road and utility right-of-way management, flood control and water banking projects that may not be funded, permitted, or constructed by a Federal agency, overgrazing by livestock, and continuing agricultural expansion, including the building of new dairies and stockyards. Unauthorized take is occurring, and the Service continues to request re-initiation of projects when project descriptions have changed markedly since our biological opinions were issued, and Service Law Enforcement continues to investigate potential violations of the Act within the action area.

The Service continues to pursue the creation of large area habitat conservation plans (HCP) through local and county governments and industry groups in order to address effects to listed species in a more comprehensive manner. One large area Habitat Conservation Plan already in place in the action area is the *San Joaquin County Multi-Species and Open Space Conservation Plan*.

Existing habitat is so fragmented in the San Joaquin Valley that extirpation of certain remaining populations of the blunt-nosed leopard lizard appears likely, due to chance fluctuation of small populations, and other factors discussed previously. The cumulative effects of these threats pose a significant impediment to the survival and recovery of this species.

The following list provides the names or descriptors of projects for which the Service has received limited information. The projects, when initially identified by the Service, lacked a Federal nexus and were therefore not considered Federal projects that would be subject to a section 7 consultation under the Act. Some of these projects may eventually become Federal projects, whereas others may be abandoned for reasons unknown to the Service. The list, therefore, provides an example of the projects that are representative of development throughout the San Joaquin Valley. The size of such projects and

the habitat loss consequential to each is often unknown; however, some of the projects listed are known to range in size from less than an acre to 12,864 acres. If HCPs were in place in these counties or around growing urban areas, such as Fresno, they would provide a locally-designed mechanism for complying with the Act and for project proponents to make targeted and effective contributions to the survival and recovery of listed species. Less is known to the Service about unpermitted projects and their effects on the localized blunt-nosed leopard lizards.

#### Fresno County

Carmelita Project (Sand and Gravel Aggregate Production Facility), County of Fresno

#### Madera County

Amendment to Tract 240, Continental Estates/Madera County (S #2010-002)

Area Plan Amendment to the Gunner Ranch West Area Plan to Allow for Fire Station Construction at Alternate Location, Madera County Planning Department (General Plan #2009-009)

Biomass Plant, Madera Power LLC (CUP #87-29)

Church Facility, Daniel Kim (CUP #2009-028)

Dairy, Larry Pietrowski (CUP #2005-030)

Holstein Dairy, Jose Soares (CUP #2005-037)

100-foot Tall Telecommunications Tower, ComSites West LLC (CUP #2007-040)

120-foot Tall Telecommunications Tower, ComSites West LLC (CUP #2007-035)

Three Wineries, Chapel and Banquet Hall, Ronald Patterson (CUP #2009-027)

#### Merced County

According to the Merced Vision 2030 General Plan (General Plan) Draft Environmental Impact Report, the county plans to increase the Specific Urban Development Plan (SUDP) from the current total acres of 20,598.00 to All Land in the New SUDP/Sphere of Influence totaling 33,462.30 acres, resulting in an increase of 12,864.30 acres (Quad Knopf, 2010). The General Plan addresses projects within the 2010-2030 time frame.

#### *Specific Merced County Projects*

CUP09-006 Mid Valley Agricultural Service Site Expansion

Livingston 2025 General Plan

Merced County 2030 General Plan

Minor Modification No. MM09-013 to Conditional Use Permit No. CUP3075 (Calaveras Materials surface mine operation for the La Grange Pit)

Panther Energy Natural Gas Well

Robinson Ranch San Mine and Reclamation Site

Tier 1 Development Agreement – Villages of Laguna San Luis Community Plan

As the human population of central California increases and land continues to be converted to municipal and industrial uses, the amount and quality of habitat suitable for the blunt-nosed leopard lizard will decrease. Between 1970 and 2000, California's total population increased by approximately 71%, while the Central Valley's population increased 200%. Of the Sacramento and San Joaquin Valleys within the Central Valley, the San Joaquin Valley had the greater population growth (California Department of Finance [CDF], 2002). Among counties in the San Joaquin Valley, Stanislaus experienced the greatest increase at 453% from 1940 to 1995. Also during the period 1940 to 1995, the increase in population for Fresno was 322%; for Madera: 356%; and for

Merced: 322% (CDF, 2002). During the period 1988 to 1998, 82,756 acres in the San Joaquin Valley were converted to urban and built-up land uses (California Department of Conservation, 2000). Although not each of the converted acres can be considered habitat, this trend indicates that habitat loss continues to threaten the survival and recovery of listed species.

The cumulative effects of all the future State, Tribal, local, and private actions that are reasonably certain to occur in the action area will continue to have a deleterious effect on the reproduction, numbers, and distribution of the blunt-nosed leopard lizard. The adverse cumulative effects described in this section serve to magnify the adverse effects of the proposed action and diminish any beneficial effects. However, this is a temporary, one-year action with opportunity for recolonization of blunt-nosed leopard lizards within the action area, rendering the effects of this proposed action not likely to jeopardize the future existence of the species.

## **Conclusion**

The population sizes and distribution of the blunt-nosed leopard lizard have appreciably shrunk since it was listed under the Act on March 11, 1967. The cumulative effects of projects that have been implemented without authorization under either sections 7 or 10(a)(1)(B) of the Act, and without appropriate offsetting or compensatory measures are likely to have deleterious effects on these listed species in the foreseeable future. The Service has reviewed the current status of the blunt-nosed leopard lizard, the environmental baseline for the action area, and the temporary effects of the proposed San Joaquin River Restoration Program's Water Year 2011 Interim Flows Project. Additionally, the Service assessed the habitat modeling data that shows the low quality and isolated patches of habitat within the proposed action area, that the area has few contemporary recorded occurrences of blunt-nosed leopard lizard, and that the proposed action area is within the flood conveyance channel. Thus, the Service has determined that the proposed action, as described, is not likely to jeopardize the continued existence of blunt-nosed leopard lizard.

## **INCIDENTAL TAKE STATEMENT**

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by BOR so that they become binding conditions of project authorization for the exemption in section 7(o)(2) to apply. BOR has a continuing duty to regulate the activity covered by this Incidental Take Statement. If

BOR (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

### **Amount or Extent of Take**

#### Blunt-nosed leopard lizard

The Service anticipates that incidental take of the blunt-nosed leopard lizard will be difficult to quantify due to blunt-nosed leopard lizard's small size, its tendency to escape underground into burrows, its dependence on weather and time of the year, and activity patterns; these all serve to bias the discovery of dead individuals, or indeed to make the finding of such individuals unlikely. It is therefore difficult to quantify an exact number of blunt-nosed leopard lizards that will be taken as a result of the proposed action, so in instances when specific take calculations are problematic to produce, the Service may estimate take in numbers of individuals per acre of permanently lost or degraded habitat as a result of the project action, since this reflects a significant adverse biological effect to the species. Therefore, the Service anticipates take incidental to this project as all blunt-nosed leopard lizards inhabiting, using, or moving through the suitable habitat located within the Eastside Bypass between the 800 cfs elevation and the 1,300 cfs elevation level, or approximately 99.06 acres of suitable habitat. Upon implementation of the *Reasonable and Prudent Measures* and *Terms and Conditions*, and the *Conservation Measures* considered herein, incidental take within this acreage in the form of harm and harassment due to habitat loss and disturbance, displacement, and entombment will become exempt from the prohibitions described under section 9 of the Act.

### **Effect of the Take**

In the accompanying biological opinion, the Service has determined that this level of anticipated take is not likely to jeopardize the continued existence of the blunt-nosed leopard lizard.

### **Reasonable and Prudent Measures**

The following reasonable and prudent measures are necessary and appropriate to minimize the effects of the proposed action on the blunt-nosed leopard lizard.

1. In order to maintain an active accounting of project progress, reporting updates must be submitted to the Service at appropriate intervals during project implementation.
2. Seepage monitoring will be conducted by BOR to reduce or avoid effects resulting from groundwater and levee seepage.
3. Manage the spread of invasive plant species.

## Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, BOR shall ensure compliance with the following Terms and Conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

The following Term and Condition implements the above Reasonable and Prudent Measure one:

1. BOR shall submit a progress update every month during implementation. The updates shall detail any changes to the project footprint and to the extent of blunt-nosed leopard lizard habitat directly or indirectly affected by the project, and hence to the level of take; as well as any known effects of implementing the proposed activities on these species.

The following Term and Condition implements the above Reasonable and Prudent Measure two:

2. BOR shall continue to implement the Seepage Monitoring and Management Plan (Plan) for Water Year 2010 Interim Flows, which carries forward into WY 2011. This includes groundwater monitoring, levee patrols, landowner feedback, flow monitoring, and potential management responses to address nonattainment with the seepage management objective (San Joaquin River Restoration Program, 2009a, 2009b). This Plan will be adaptively managed in order to address real-time results during monitoring.

The following Term and Condition implements the above Reasonable and Prudent Measure three:

3. BOR shall monitor the following invasive species along affected portions of the San Joaquin River and bypass system (before and after WY 2011 Interim Flows): red sesbania, salt cedar, giant reed, Chinese tallow, and sponge plant. The spread of these invasive species has the potential to impact existing riparian habitat and sensitive natural communities and water delivery systems. BOR will control and manage these species, as specified in the Invasive Vegetation Monitoring and Management Plan (included as Appendix F in the WY 2010 Interim Flows Supplemental EA).

## Reporting Requirements

1. A post-completion project report detailing compliance with the project design criteria described under the *Description of the Proposed Action* section of this biological opinion shall be provided to the Service within 30 calendar days of completion of the project. The report shall include: (1) dates of project initiation and completion, (2) known project effects on the blunt-nosed leopard lizard, if any, (3) occurrences of incidental take of the blunt-nosed leopard lizard, (4) the amount and timing of any Interim Flows recaptured at the Jones and Banks facilities, and (5) any other pertinent information.
2. New sightings of blunt-nosed leopard lizards or any other sensitive animal species shall be reported to the CNDDDB within 30 calendar days of survey completion. A copy of the reporting form and a topographic map clearly marked with the location in which the animals were observed also should be provided to the Service.

3. BOR should notify the Service via electronic mail and telephone within one (1) working day of the death or injury to a blunt-nosed leopard lizard and/or other listed species that occurs due to project-related activities or is observed at the project site. Notification must include the date, time, location of the incident or of the finding of a dead or injured animal, and photographs of the specific animal. In the case of a dead animal, the individual animal should be preserved, as appropriate, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen or the Service takes custody of the specimen. The Service contacts are the Chief of the Endangered Species Division (Central Valley) at 916/414-6600 and the Resident Agent-in-Charge of the Service's Law Enforcement Division at 916/414-6600. The California Department of Fish and Game contact is Mr. Ron Schlorff at 916/654-4262.
4. Any contractor or employee who, during routine operations and maintenance activities, inadvertently kills or injures a State-listed wildlife species shall immediately report the incident to her or his supervisor or representative. The supervisor or representative must contact the California Department of Fish and Game immediately in the case of a dead or injured State-listed wildlife species. The California Department of Fish and Game contact for immediate assistance is State Dispatch at (916) 445-0045.

### **CONSERVATION RECOMMENDATIONS**

Conservation recommendations are suggestions of the Service regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, or regarding the development of new information. These measures may serve to minimize or avoid further adverse effects of a proposed action on listed, proposed, or candidate species, or on designated critical habitat. They may also serve as suggestions on how action agencies can assist species conservation in furtherance of their responsibilities under section 7(a)(1) of the Act, or recommend studies improving an understanding of a species' biology or ecology. Wherever possible, conservation recommendations should be tied to tasks identified in recovery plans. The Service is providing you with the following conservation recommendations:

1. Restriction of spring flows to 800 cfs elevation level within the Eastside Bypass until after April 1<sup>st</sup> in order to reduce the amount of potential take of blunt-nosed leopard lizards.
2. It is recommended that BOR continue to assist the Service in the implementation of recovery efforts for the blunt-nosed leopard lizard.
3. Sightings of any sensitive animal species should be reported to the California Natural Diversity Database of the California Department of Fish and Game. A copy of the reporting form and a topographic map clearly marked with the location the animals or plants were observed should also be provided to the Service.
4. Develop and implement an outreach plan (Recovery Plan, Priority 2). Outreach is an important component of implementing the blunt-nosed leopard lizard Recovery Plan. For private lands with reported or suspected populations of blunt-nosed leopard lizards, landowners should be apprised of the significance of the populations on their lands and should be provided with information about available conservation mechanisms, such as conservation easements and

incentive programs (Recovery Task 1.2.2). For private lands with potential occurrences of featured species, permission should be sought from cooperative landowners to conduct on-site surveys. If surveys identify populations of blunt-nosed leopard lizards, landowners should be apprised of their significance and offered incentives to continue current land uses that support featured species habitat.

5. Locate, map, and protect existing populations of the blunt-nosed leopard lizard (Recovery Plan Task 2.2.17).
6. Encourage and assist in the development and implementation of mitigation banks separately or in conjunction with large-scale Habitat Conservation Plans (Recovery Plan, Priority 2).
7. Gather additional data on population responses to environmental variation at representative sites in their extant geographic range (Recovery Plan Task 3.2.21).
8. Determine appropriate habitat management and compatible land uses for the blunt-nosed leopard lizard (Recovery Plan Task 4.5.7).

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

#### **REINITIATION—CLOSING STATEMENT**

This concludes the Service's review of the proposed San Joaquin River Restoration Program's Water Year 2011 Interim Flows Project in Kern, Kings, Mariposa, Stanislaus, San Joaquin, Alameda, Contra Costa, Fresno, Madera and Merced Counties, California, and no further coordination with the Service under the Act is necessary at this time. As provided in 50 CFR §402.16, re-initiation of formal consultation is required where there is discretionary Federal involvement or control over the action has been maintained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded, 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this biological opinion (including alterations to the OCAP biological opinion); 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation; otherwise, the project will be out of compliance with this biological opinion. This consultation is specific to this action area and for the proposed project action only as originally described within the request. Any change in the proposed project, as described, will result in withdrawal of this concurrence.



The Service wishes to thank you for your continued efforts and dedication to the conservation of America's wildlife resources. Please contact Ellen McBride, Stephanie Rickabaugh or Michael Welsh at (916) 414-6630 if you have questions regarding this response. Please refer to Service file number 81420-2010-F-0834 in any future correspondence.

Enclosures: Figures, Tables, Appendix

cc:

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**Enclosed Tables**

Table 1. San Joaquin River Reaches and Flood Bypasses in the Restoration Area.

Table 2. Maximum Interim Flow Release from Friant Dam Under the Proposed Action.

Table 3. Estimated Maximum Water Available for Recapture and Recirculation Under the Proposed Action.

Table 4. Example Estimated Maximum Regulated Non-flood Flows Under the Proposed Action in a Wet Year

**Table 1.  
San Joaquin River Reaches and Flood Bypasses in the Restoration Area**

San Joaquin River Reaches and Flood Bypasses in the Restoration Area		Downstream End of Reach or Bypass		Restoration Area Reaches Included in Water Year 2011 Interim Flows Restoration Area
River or Bypass	Reach	Head of Reach or Bypass	Downstream End of Reach or Bypass	
San Joaquin River	1A	Friant Dam	State Route 99	✓
	1B	State Route 99	Gravelly Ford	✓
	2A	Gravelly Ford	Chowchilla Bifurcation Structure	✓
	2B	Chowchilla Bifurcation Structure	Mendota Dam	✓
	3	Mendota Dam	Sack Dam	✓
	4A	Sack Dam	Sand Slough Control Structure	✓
	4B1	Sand Slough Control Structure	Confluence with Mariposa Bypass	
	4B2	Confluence with Mariposa Bypass	Confluence with Bear Creek and Eastside Bypass	✓
	5	Confluence with Bear Creek and Eastside Bypass	Confluence with Merced River	✓
	Chowchilla Bypass	Chowchilla Bifurcation Structure	Confluence with Ash Slough and Eastside Bypass	
Eastside Bypass	Confluence with Ash Slough and Chowchilla Bypass	Confluence with Bear Creek and San Joaquin River	✓	
Sand Slough Bypass	Sand Slough Control Structure	Eastside Bypass	✓	
Mariposa Bypass	Mariposa Bypass Bifurcation Structure	Confluence with San Joaquin River	✓	



**Table 2.**

## Maximum Interim Flow Release from Friant Dam Under the Proposed Action

<b>Start Date</b>	<b>End Date</b>	<b>Maximum Interim Flow Release from Friant Dam Under the Proposed Action (cfs)<sup>1</sup></b>
Oct. 1, 2010	Oct. 31, 2010	575
Nov. 1, 2010	Nov. 10, 2010	575
Nov. 11, 2010	Dec. 1, 2010	575
Dec. 2, 2010	Jan. 31, 2011	0
Feb. 1, 2011	Feb. 15, 2011	375
Feb. 16, 2011	Feb. 28, 2011	1375
Mar. 1, 2011	Mar. 15, 2011	1475
Mar. 16, 2011	Mar. 31, 2011	1475
Apr. 1, 2011	Apr. 15, 2011	1475
Apr. 16, 2011	Apr. 30, 2011	1475
May. 1, 2011	May. 31, 2011	1475
Jun. 1, 2011	Jun. 30, 2011	1475
Jul. 1, 2011	Jul. 31, 2011	1475
Aug. 1, 2011	Aug. 31, 2011	125
Sep. 1, 2011	Sep. 30, 2011	145

1. Includes 5 cfs of riparian releases. Includes both the fall and spring flexible flow periods as described in Exhibit B of the Settlement. Actual releases may be less. Total Interim Flows volume released from Friant Dam will not exceed 389,355 acre-feet in a wet year. WY 2011 may include a small pulse flow of up to 2,000 cfs release from Friant Dam for a 12-hour period.



<b>Table 3.                      Estimated Maximum Water Available for                      Recapture and Recirculation                      Under the Proposed Action</b>				
<b>Start Date</b>	<b>End Date</b>	<b>Example Interim Flow and Riparian Release Amount at the Head of Reach 2B (cfs)*</b>	<b>Riparian Release Amount at Head of Reach 2B (cfs)</b>	<b>Interim Flows at Mendota Pool Available for Transfer (cfs)</b>
Oct. 1, 2010	Oct. 31, 2010	115	5	110
Nov. 1, 2010	Nov. 6, 2010	475	5	470
Nov. 7, 2010	Nov. 10, 2010	475	5	470
Nov. 11, 2010	Dec. 1, 2010	155	5	150
Dec. 2, 2010	Jan. 31, 2011	0**	5	0
Feb. 1, 2011	Feb. 28, 2011	175	5	170
Mar. 1, 2011	Mar. 15, 2011	285	5	280
Mar. 16, 2011	Mar. 31, 2011	1225	5	1220
Apr. 1, 2011	Apr. 15, 2011	1300	5	1295
Apr. 16, 2011	Apr. 30, 2011	1300	5	1295
1-May-11	June 30, 2011	1300	5	1295
Jul. 1, 2011	Aug. 31, 2011	45	5	40
Sep. 5, 2011	Sep. 30, 2011	65	5	60
<b>Total amount of Interim Flows available for Recapture and Recirculation (Acre-feet)</b>				<b>321,055</b>
* Includes 5 cfs of riparian releases that must be maintained past Gravelly Ford.				
** No additional releases are to occur between Dec. 2 - Jan. 31				
Key: cfs = cubic feet per second				
TAF = thousand				
acre-feet				
WY = Water Year				

**Table 4.  
Example Estimated Maximum Regulated Non-flood Flows Under the Proposed Action in a Wet Year<sup>1</sup>**

Begin Date	End Date	Estimated Maximum Flows Consisting of Interim Flows and Water Right Flows at Locations in the Restoration Area (cubic feet per second)										
		Head of Reach 1 <sup>3</sup>	Head of Reach 2A <sup>4</sup>	Head of Reach 2B <sup>5</sup>	Head of Reach 3 <sup>6</sup>	Head of Reach 4A	In Reach 4B1 <sup>7</sup>	In Reach 4B2	In Bypass Systems <sup>8</sup>	Head of Reach 5	Merced River Confluences	
10/1/2010	10/31/2010	350	195	115	715	115	0	115	115	115	115	415
11/1/2010	11/6/2010	700	575	475	1,075	475	0	475	475	475	475	775
11/7/2010	11/10/2010	700	575	475	1,075	475	0	475	475	475	475	775
11/11/2010	12/01/2010	350	235	155	755	155	0	155	155	155	155	555
12/02/2010 <sup>2</sup>	1/31/2011 <sup>2</sup>	120	5	0	0	0	0	0	0	0	0	0
2/1/2011	2/28/2011	350	255	175	775	175	0	175	175	175	175	675
3/1/2011	3/15/2011	500	375	285	885	285	0	285	285	285	285	785
3/16/2011	3/31/2011	1,500	1,375	1,225	1,300	1,225	0	1,225	1,225	1,225	1,225	1,700
4/1/2011	4/15/2011	1,620	1,475	1,300	1,300	1,300	0	1,300	1,300	1,300	1,300	1,700
4/16/2011	4/30/2011	1,620	1,475	1,300	1,300	1,300	0	1,300	1,300	1,300	1,300	1,700
5/1/2011	6/30/2011	1,660	1,475	1,300	1,300	1,300	0	1,300	1,300	1,300	1,300	1,700
7/1/2011	8/31/2011	350	125	45	645	45	0	45	45	45	45	320
9/1/2011	9/30/2011	350	145	65	665	65	0	65	65	65	65	340

**Notes:**

- <sup>1</sup> Example only. Actual Interim Flows may vary depending on a variety of factors. Flows may be lower under other water year types.
- <sup>2</sup> No Water Year 2011 Interim Flows during this period.
- <sup>3</sup> Assumes up to 230 cubic feet per second diverted by instream water right holders (e.g., holding contracts), consistent with Exhibit B of the Settlement.
- <sup>4</sup> Assumes up to 200 cubic feet per second lost through infiltration, consistent with Exhibit B of the Settlement.
- <sup>5</sup> Estimated maximum Water Year 2011 Interim Flows at the head of Reach 2B account for seepage losses experienced in Reach 2A, consistent with Exhibit B of the Settlement.
- <sup>6</sup> Assumes up to 600 cubic feet per second released to Reach 3 from the Mendota Pool for diversions at Sack Dam into the Arroyo Canal.
- <sup>7</sup> The Proposed Action does not include any activity in Reach 4B1.
- <sup>8</sup> Includes Eastside and Mariposa bypasses.
- <sup>9</sup> Assumes accretions from Mud and Salt sloughs in Reach 5, consistent with Exhibit B of the Settlement.



**Enclosed Figures.**

Figure 1. San Joaquin River Reaches and the Flood Bypass System in the Restoration Area

Figure 2. Water Year 2011 Interim Flows.

**Figure 1.**  
**San Joaquin River Reaches and the Flood Bypass System in the Restoration Area**

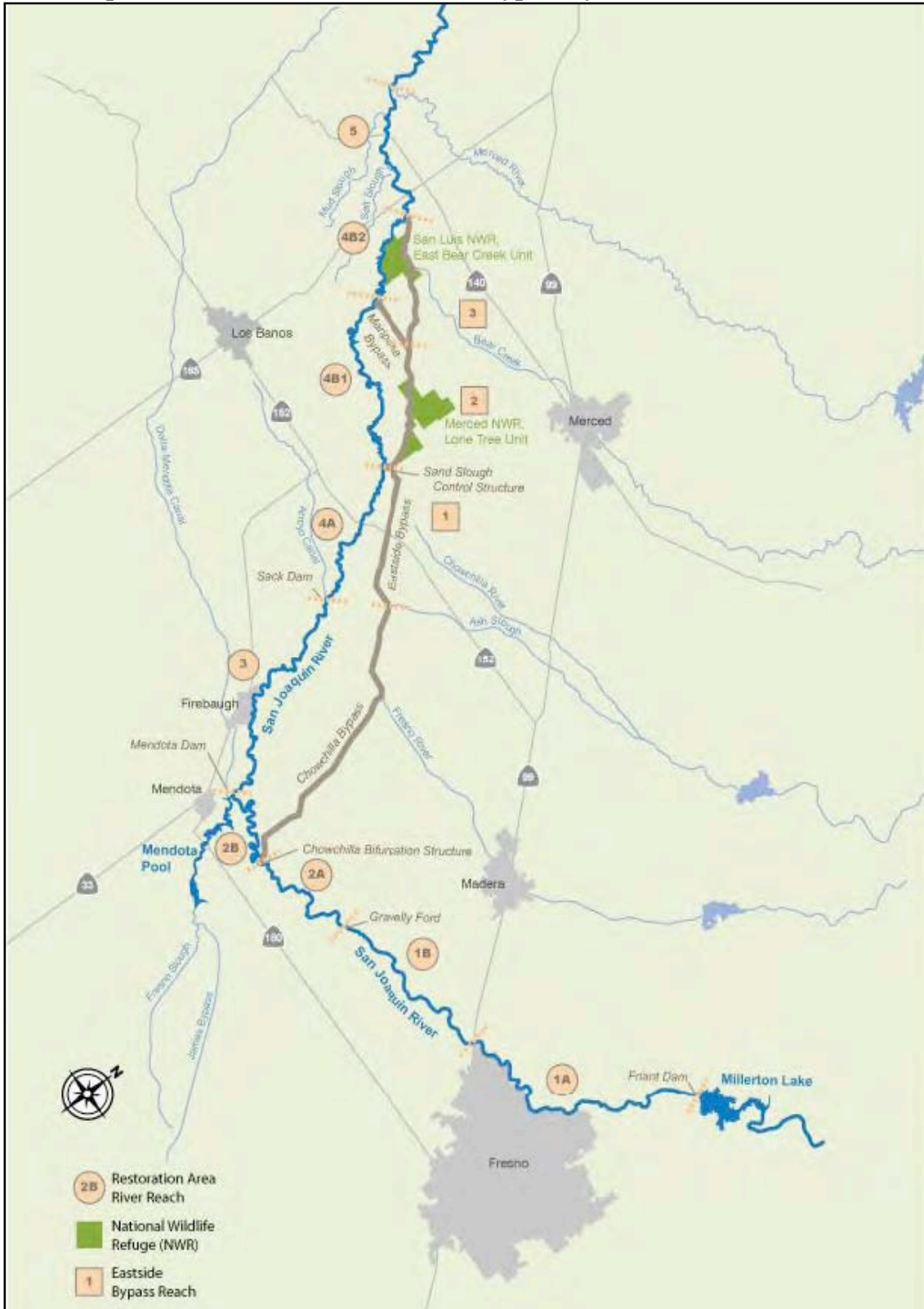
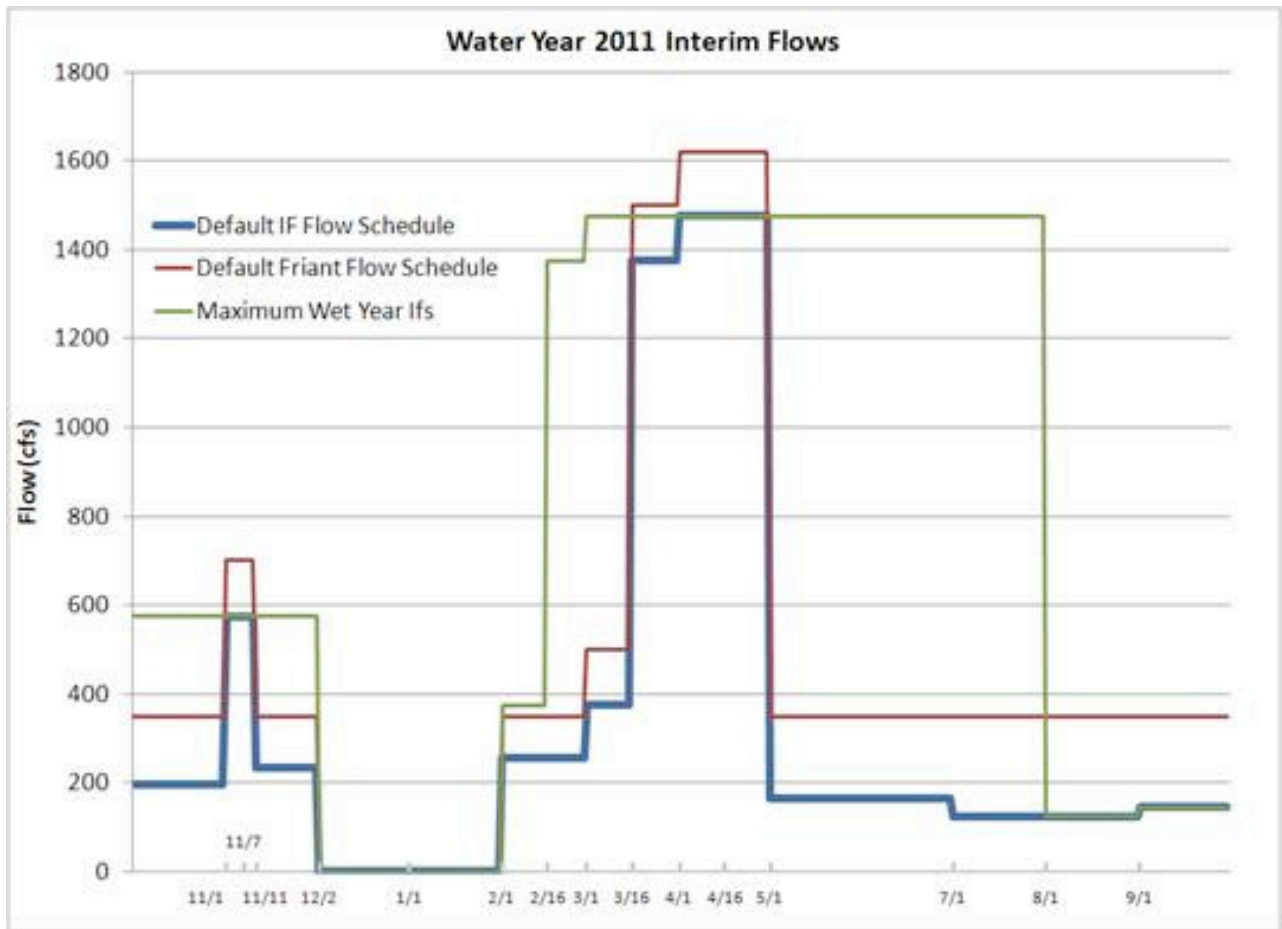


Figure 2.



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