Memorandum

To: Operations Manager, Bureau of Reclamation, Central Valley Operations Office, Sacramento, California


Subject: Formal and Early Section 7 Endangered Species Consultation on the Coordinated Operations of the Central Valley Project and State Water Project and the Operational Criteria and Plan

This is in response to the Bureau of Reclamation’s (Reclamation) March 22, 2004, request for formal consultation with the U.S. Fish and Wildlife Service (Service) on the coordinated operations of the Central Valley Project (CVP) and State Water Project (SWP) and the Operating Criteria and Plan (OCAP) in California. The OCAP describes the coordinated operations of the CVP and SWP. Reclamation and the California Department of Water Resources (DWR) operate the CVP and SWP through the Coordinated Operations Agreement (COA) (Reclamation 2004). The COA is the federal nexus for consultation on SWP operations under section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act). Your request was received in our office on March 22, 2004. This document represents the Service's biological opinion on the effects of the action to the threatened delta smelt (Hypomesus transpacificus) and its critical habitat in accordance with the Act.

Reclamation also requested consultation on the endangered riparian brush rabbit (Sylvilagus bachmani riparius), the endangered riparian woodrat (Neotoma fuscipes riparia), the endangered salt marsh harvest mouse (Reithrodontomys raviventris), the endangered California clapper rail (Rallus longirostris), the threatened giant garter snake (Thamnophis gigas), the threatened California red-legged frog (Rana aurora draytonii), the threatened valley elderberry longhorn beetle (Desmocercus californicus dimorphus), the endangered soft bird’s beak (Corylanthus mollis ssp. mollis) and the endangered Suisun thistle (Cirsium hydrophilum var. hydrophilum). The Service concurs with Reclamation’s determination that the coordinated operations of the CVP and SWP and the OCAP for formal and early consultation are not likely to adversely affect these species.
No additional effects are expected to the threatened bald eagle (*Haliaeetus leucocephalus*) as a result of implementation of the formal or the early consultation beyond those analyzed in the Service’s *Formal Endangered Species Act Consultation on Effects of Implementing Long Term Operational Criteria and Plan for Central Valley Project Reservoirs* for the bald eagle dated February 12, 1993 (Service file # 1-1-93-F-10). Therefore, the Service opinion dated February 12, 1993 still applies for effects to the bald eagle.

This biological opinion is based on information provided in Reclamation’s biological assessment dated June 30, 2004, the CH2M Hill Trinity document dated November 5, 2003, and all associated enclosures. A complete administrative record is on file at the Sacramento Fish and Wildlife Office (SFWO).

This biological opinion covers formal and early consultation for the operations of the CVP and SWP. The formal consultation effects described in this biological opinion cover the proposed 2020 operations of the CVP including the Trinity River Mainstem ROD (Trinity ROD) flows on the Trinity River, the increased water demands on the American River, the delivery of CVP water to the proposed Freeport Regional Water Project (FRWP), water transfers, the long term Environmental Water Account (EWA), the operation of the Tracy Fish Facility, and the operation of the SWP-CVP intertie. The effects of operations of the SWP are also included in this opinion and include the operations of the North Bay Aqueduct, the Suisun Marsh Salinity Control Gates, the Skinner Fish Facility and water transfers.

Early consultation effects include the effects of operations of components of the South Delta Improvement Program (SDIP). These operations include pumping of 8500 cubic feet per second (cfs) at the SWP and Banks Pumping Plant (hereafter referred to as 8500 Banks), permanent barrier operations in the South Delta, the long term EWA, water transfers, and CVP and SWP operational integration. There are two separate effects sections in this biological opinion, one for Formal Consultation and one for Early Consultation. In addition, there is an incidental take for formal consultation and a preliminary incidental take for early consultation.

**Early Consultation Process**

This biological opinion includes an effects determination and take statement for the formal consultation items described above. This biological opinion also includes a preliminary effects determination and take statement for the early consultation items described above. An Early Consultation as stated in the regulations “is designed to reduce the likelihood of conflicts between listed species or critical habitat and proposed actions and occurs prior to the filing of and application for a Federal permit or license.” The early consultation will result in a preliminary biological opinion except that the incidental take statement provided for the early consultation does not constitute authority to take listed species. Once the South Delta Action Specific Implementation Plan (ASIP) is completed, the Service will re-examine the project description and effects in the ASIP and in this opinion. If the project description and effects to the delta smelt are the same as in the early consultation effects section of this biological opinion, the Service will formalize the early consultation portion of this biological opinion. If there are additional effects or project elements that are not addressed in the early consultation section of this biological opinion, Reclamation and DWR will reinitiate on this biological opinion to cover
smelt effects described in the South Delta ASIP.

CONSULTATION HISTORY

On February 12, 1993, the Service issued its biological opinion on the Long Term Operations Criteria and Plan for CVP Reservoirs for the bald eagle, salt marsh harvest mouse and California clapper rail (Service file #1-1-93-F-10).

On May 23, 1993, the Service issued a biological opinion on the Operations Criteria and Plan for the bald eagle, salt marsh harvest mouse and the California clapper rail (Service file #1-1-93-F-32).


On November 2, 1994, the Service issued its Formal Endangered Species Consultation on the Environmental Protection Agency's proposed Water Quality Standards for the San Francisco Bay/Sacramento-San Joaquin Rivers and Delta (Service file #1-1-93-F-61).


Starting in November 2002, the Service, along with other fishery and project agencies met monthly to discuss the development of the biological assessment.

On February 12, 2003, the Service submitted the document Information Needs for Consultations on Delta smelt and Sacramento Splitspiall for the South Delta Improvement Program and the Central Valley Project and State Water Project Operations to Reclamation and DWR which provided information that the Service needed to have included in Reclamation's biological assessment.

On April 25, 2003, the Service submitted the document Additional Information Needs for Consultation on Delta smelt and Sacramento Splitspiall for the Central Valley Project and State
Water Project to Reclamation which requested additional information to be included in the biological assessment.

On May 6, 2003, the Service submitted the document Request for Additional Information to Initiate Formal Consultation for Central Valley Project Water Deliveries to Sacramento County Water Agency in Sacramento County, and East Bay Municipal Utility District in Contra Costa, California to Reclamation.

On July 23, 2003, the Service submitted the document Service Comments on the Bureau of Reclamation’s Draft long-Term Central Valley Project Operations, Criteria and Plan and Biological Assessment.

On September 2003, the Service, along with other fishery and project agencies began meeting weekly to develop the project description and the effects sections of the biological assessment.

On February 13, 2004, the Service received a draft of the biological assessment for the coordinated operations of the CVP and SWP and the OCAP.

On March 15, 2004, the Service received the Reclamation’s March 15, 2004, request for formal and early consultation and transmittal of their biological assessment on the coordinated operations of the CVP and SWP and the OCAP. However, this letter did not include a biological assessment.

On March 22, 2004, the Service received the biological assessment from Reclamation on the coordinated operations of the CVP and SWP and the OCAP. Also on March 22, 2004, the Service received Reclamation’s February 2004, Long-term Central Valley Project and State Water Project Operations Criteria and Plan Biological Assessment for Terrestrial Species. The Service received on March 22, 2004, the Department of Water Resources’ Long Term Central Valley Project Operating Criteria and Plan Biological Assessment for Terrestrial Species Protected Under the State Endangered Species Act.

On May 24, 2004, the Service received an updated version of the biological assessment and the OCAP from Reclamation which included separate effects for the early and formal consultation.

On June 30, 2004, the Service received an updated version of the biological assessment from Reclamation.

BIOLOGICAL OPINION

Description of Proposed Action

Introduction

Reclamation and California Department of Water Resources (DWR) propose to operate the CVP and SWP (collectively the Project) to divert, store, and convey Project water consistent with
applicable law. These operations are summarized in this Biological Assessment (BA) and are described in further detail in the CVP-OCAP.

The Proposed Action

The proposed action is to continue to operate the CVP and SWP in a coordinated manner. In addition to current day operations, several future actions are to be included in this consultation. These actions are: (1) increased flows in the Trinity River, (2) 8500 Banks, (3) permanent barriers operated in the South Delta, (4) an intertie between the California Aqueduct (CA) and the Delta-Mendota Canal (DMC), (5) a long-term EWA, (6) delivery of CVP water to the FRWP, and (7) various operational changes that are identified in this project description. Some of these items will be part of early consultation including 8500 Banks, permanent barriers and the long-term EWA. These proposed actions will come online at various times in the future. Thus, the proposed action is continued operation of the Project without these actions, and operations as they come online.

The actions listed in the preceding paragraph are not being implemented at present; however, they are part of the future proposed action on which Reclamation is consulting. Only the operations associated with the proposed activities are addressed in this consultation; i.e., the activities do not include construction of any facilities to implement the actions. All site-specific/localized activities of the actions such as construction/screening and any other site-specific effects will be addressed in separate action specific section 7 consultations. Table 1 summarizes the differences between current operational actions and future operational actions to be covered by this consultation.
Table 1 Proposed future changes in operational actions for consultation.

<table>
<thead>
<tr>
<th>Area of Project</th>
<th>Circa 1997</th>
<th>Today 2004</th>
<th>Future 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trinity &amp; Whiskeytown</td>
<td>340,000 af</td>
<td>368,600-452,600 af</td>
<td>368,600-815,000 af</td>
</tr>
<tr>
<td>Shasta/Sacramento River</td>
<td>Red Bluff Diversion Dam (RBDD) 8 months gates out</td>
<td>Same</td>
<td>Same</td>
</tr>
<tr>
<td>Oroville and Feather River</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
</tr>
<tr>
<td>Folsom and American River</td>
<td>Current Demands</td>
<td>Current Demands</td>
<td>Build out of demands and Freeport Regional Water Project</td>
</tr>
<tr>
<td>New Melones and Stanislaus River</td>
<td>Interim Plan of Operations Guidance</td>
<td>Same</td>
<td>Same</td>
</tr>
<tr>
<td>Friant</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
</tr>
<tr>
<td>Sacramento-San Joaquin Delta</td>
<td>2001 Demands</td>
<td>2001 Demands</td>
<td>2020 Demands</td>
</tr>
<tr>
<td>Suisun March</td>
<td>Same</td>
<td>Same</td>
<td>Same</td>
</tr>
<tr>
<td>WQCP</td>
<td>D-1641</td>
<td>D-1641</td>
<td>Same</td>
</tr>
<tr>
<td>CVPIA</td>
<td>May 9, 2003 Decision</td>
<td>May 9, 2003 Decision</td>
<td>Same</td>
</tr>
<tr>
<td>CALFED</td>
<td>None</td>
<td>EWA</td>
<td>Same</td>
</tr>
<tr>
<td>Banks</td>
<td>6680 cfs &amp; Temp Barriers</td>
<td>6680 cfs &amp; Temp Barriers</td>
<td>8500 Banks and Permanent barriers</td>
</tr>
<tr>
<td>Tracy</td>
<td>Max of 4600 cfs in summer</td>
<td>Max of 4600 cfs in summer</td>
<td>Intertie</td>
</tr>
</tbody>
</table>
juveniles, and 5 Central Valley steelhead total (juveniles plus adults) annually. This incidental take is expected to account for the extrapolated loss due to predation in front of the pumps and the pumps themselves. Expanded losses (entrainment losses plus losses due to predation in front of the pumps) based on DFG monitoring from 1994 to 1996, is anticipated to be approximately 257 juvenile Sacramento River winter-run Chinook salmon, 2,215 juvenile Central Valley spring-run Chinook salmon, and 738 juvenile Central Valley steelhead. However, these losses are expected to be reduced due to integrated operations with screened diversions at Old River and Mallard Slough where the majority of pumping is planned. In addition, changes in diversions at Rock Slough from winter to summer months is expected to further reduce anticipated losses.

Incidental take of Central Valley steelhead at the CVP Tracy pumping facility can be combined with the incidental take at the SWP Harvey Banks pumping facility and will be based on yearly observations of unmarked steelhead at the CVP’s Tracy and SWP’s Skinner fish collection facilities during the period of October 1 through September 30. The combined cumulative salvage of unmarked juvenile and adult Central Valley steelhead at the CVP and SWP Delta pumping facilities is not expected to exceed one percent of the previous years estimated juvenile steelhead production, based on Chippew Island Trawl data. The juvenile production estimate (JPE) for Central Valley steelhead will be developed by NOAA Fisheries in consultation with DFG and FWS. For the year 2004-2005, until a suitable JPE is developed, the combined cumulative salvage at the CVP and SWP pumping facilities is not expected to exceed 3,000 juvenile steelhead.

An unquantifiable amount of take is also anticipated as a result of the interrelated and interdependent effects of hatchery operations conducted as mitigation for the CVP and/or SWP. These effects primarily stem from the competition for space and hybridization between natural or wild spawners and hatchery produced salmon and steelhead. As these activities will be addressed in more detail under separate ESA section 7 consultations, this biological opinion does not exempt take associated with the Trinity River Hatchery (Trinity River), Coleman National Fish Hatchery (Sacramento River), Feather River Hatchery (Feather River), or the Nimbus Fish Hatchery (American River).

Reclamation and DWR have proposed to operate CVP and SWP facilities in accordance with either plans, agreements, or specific criteria outlined in this biological opinion. Total upstream plus Delta losses above the current baseline, due to the proposed action, are estimated at 7 percent for Sacramento River winter-run Chinook salmon, 10 percent for Central Valley spring-run Chinook salmon, and 18 percent for Central Valley steelhead in all but critically dry water year conditions. No additional losses, above the baseline, are anticipated for SONCC coho salmon or Central California Coast steelhead. Critically dry water year conditions and deviations during all other years from current plans, agreements, or criteria may result in additional loss and adverse effects to Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead that have not been analyzed in this opinion. In this event, formal consultation shall be reinitiated immediately to analyze these additional effects and to determine if the changes are likely to jeopardize these species or result in additional incidental take.
B. Effect of the Take - Formal Consultation

The expected effect of the proposed action in the up river areas will consist of fish behavior modification, temporary loss of habitat, and potential death or injury of egg, fry and juvenile Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead. These effects are the result of intensively managed flows within the upper Sacramento River, Clear Creek, the Feather River, the American River, and the Stanislaus River which are anticipated to elevate instream water temperatures, reduce the availability and suitability of spawning and rearing habitat, cause redds to be desiccated and juveniles stranded and generally limit the amount of habitat available to salmon and steelhead. In addition, gate closures at the Red Bluff Diversion Dam will adversely effect Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead by blocking or delaying adult migration to the upper Sacramento River and upstream tributaries to spawn. It is anticipated that blockage or delay at the RBDD will adversely effect the populations of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead by reducing spawning success and juvenile survival. In the Delta, this action will alter fish behavior, result in modification of habitat value, and result in the death and injury of juvenile and adult salmon and steelhead due to entrainment into the central Delta through the Delta Cross Channel, altered Delta hydrology, and the direct loss of juvenile salmon and juvenile and adult steelhead at the CVP and SWP pumping facilities and the Rock Slough Intake. These effects are reduced by the real time adjustments made in operation of temperature control strategies, minimum flow requirements, closures of the DCC gates, use of b(2) water and the EWA.

In the accompanying formal biological opinion, NOAA Fisheries has determined that the anticipated level of take associate with proposed project operations is not likely to result in jeopardy to the continued existence of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, or Central Valley steelhead.

C. Reasonable and Prudent Measures - Formal Consultation

NOAA Fisheries believes the following reasonable and prudent measures are necessary and appropriate to minimize take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead.

Joint Central Valley Project and State Water Project Measures:

1. Reclamation and DWR shall gather information regarding the effects of water temperatures and flow fluctuations on Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead downstream of CVP and SWP reservoirs, develop long-term ramping criteria, and operate to water temperature objectives that will avoid or minimize adverse effects to listed salmonids, consistent with meeting applicable conditions in CVP and SWP water right permits.

2. Reclamation and DWR shall augment spawning gravel within the Sacramento River,
Feather River, American River, and the Stanislaus River, as necessary, based on recommendations from DFG, FWS and NOAA Fisheries.

3. Reclamation and DWR shall continue the real-time monitoring of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead in the lower Sacramento River, the lower San Joaquin River and the Delta to establish presence and timing to serve as a basis for the management of Delta Cross Channel gate operations and CVP and SWP Delta pumping operations consistent with the *Salmon Decision Process*.

4. Reclamation and DWR shall monitor the extent of incidental take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead, associated with the operation of the CVP’s Tracy and SWP’s Harvey Banks pumping facilities.

**Central Valley Project Measures:**

**General**

5. Reclamation shall make its February 15 forecast of deliverable water based on an estimate of precipitation and runoff within the Sacramento River basin at least as conservatively as the 90 percent probability of exceedence. Subsequent updates of water delivery commitments must be based on forecasts at least as conservatively as the 90 percent probability of exceedence.

**Shasta Division/Whiskeytown Reservoir Operations**

6. Reclamation shall manage the cold water supply within Shasta Reservoir and make cold water releases from Shasta Reservoir to provide suitable habitat for Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead in the Sacramento River between Keswick Dam and Bend Bridge.

7. Reclamation shall minimize the adverse effects of flow fluctuations associated with Shasta Reservoir and Whiskeytown Reservoir operations on Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead spawning, egg incubation, and fry and juvenile rearing within the upper Sacramento River and Clear Creek.

**Sacramento River Division**

8. Reclamation shall implement all measures practicable to provide unimpeded passage upstream and downstream at the Red Bluff Diversion Dam during the period of September 1 through June 30 each year.

**American River Division**

213
9. Reclamation shall manage the cold water supply within Folsom Reservoir and make cold water releases from Folsom Reservoir to balance the needs of Central Valley steelhead with fall-run Chinook salmon in the American River downstream of Nimbus Dam.

10. Reclamation shall minimize the adverse effects of flow fluctuations associated with Folsom Reservoir and Nimbus Dam operations on Central Valley steelhead spawning, egg incubation, and fry and juvenile rearing within the American River.

New Melones Division

11. Reclamation shall manage the cold water supply within New Melones Reservoir and make cold water releases from New Melones Reservoir to provide suitable rearing habitat for Central Valley steelhead in the Stanislaus River downstream of Goodwin Dam.

12. Reclamation shall minimize the adverse effects of flow fluctuations associated with New Melones Reservoir and Goodwin Dam operations on Central Valley steelhead spawning, egg incubation, and fry and juvenile rearing within the Stanislaus River.

CVP Delta Operations

13. Reclamation shall operate the gates at the Delta Cross Channel (DCC) during the period of October 1 through April 30 each year to minimize the diversion of juvenile Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead from the Sacramento River basin into the central Delta.

14. Reclamation shall improve and maintain in good working order fish screens at the Tracy pumping facility to minimize entrainment of juvenile Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead as a result of Delta export operations. This shall include fish screen inspections and developing and implementing a collection and release program, designed to provide for the survival of fish salvaged at the facility.

15. Reclamation, in cooperation with the Contra Costa Water District (CCWD), shall continue to collect additional data at the Tracy Fish Collection Facility and the Rock Slough Intake to monitor the extent of incidental take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead associated with the operation of the CVP’s Tracy and CCWD’s Rock Slough pumping facilities.

State Water Project Measures:

Oroville/Feather River Operations

214
NOAA Fisheries considered the issue of spring run/fall run hybridization, which is largely attributable to the existence of Oroville Dam, in its jeopardy analysis. NOAA fisheries also evaluated the effects of instream flows on juvenile Chinook and steelhead rearing habitat in the low flow channel under the existing regulatory regime. Although terms and conditions could be specified here to minimize take that might be attributable to in-river conditions resulting from the operations of the dam, NOAA Fisheries has decided to reiterate terms and conditions from its interim opinion with respect to cold water releases from Oroville Reservoir and ramping of flows to ensure those protective measures remain in place to minimize take associated with ongoing operations and to defer development of additional measures to the ongoing FERC relicensing process in which it is participating. DWR holds a license for Oroville from FERC, which is currently undergoing review in the context of a relicensing proceeding. In the FERC relicensing proceeding, the effects of Oroville Dam and its operations on listed species will be considered, and NOAA Fisheries will have the opportunity to develop recommendations to avoid or mitigate adverse effects on listed species not only through the ESA but through the additional authorities granted to NOAA Fisheries under the Federal Power Act. NOAA Fisheries has broad authority to prescribe fish passage measures under section 18 of the Federal Power Act (FPA) and to recommend measures to improve or maintain habitat downstream of a dam pursuant to section 10(j) of the FPA. As part of the FERC relicensing process, DWR is completing studies and negotiating measures to address these issues. Rather than risk complicating or frustrating those negotiations with terms and conditions that might prove to be incompatible with the final section 18 and 10(j) recommendations, NOAA Fisheries will defer the specification of any additional reasonable and prudent measures to the FERC process and consultation on reissuance of the license.

16. The California Department of Water Resources (DWR) shall investigate and implement all measures practicable to avoid or minimize adverse effects of Oroville Reservoir operations and to improve natural production of Central Valley spring-run Chinook salmon and Central Valley steelhead in the Feather River below Oroville Dam.

17. DWR shall manage cold water storage in Oroville Reservoir and make cold water releases from Oroville Reservoir to provide suitable spawning and rearing habitat within the Feather River for Central Valley spring-run Chinook salmon and Central Valley steelhead between the Fish Barrier Dam and Robinsons Riffle (RM 61.6).

**SWP Delta Operations**

18. DWR shall improve and maintain in good working order fish screens at the Harvey Banks pumping facility to minimize entrainment of juvenile Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead as a result of Delta export operations. This shall include developing and implementing a collection and release program for salvaged fish designed to provide for the survival of fish salvaged at the facility.

19. DWR shall collect additional data at the Clifton Court Forebay, the John Skinner Fish Collection Facility, and the Harvey Banks pumping facility to monitor the incidental take.
of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead and to develop improvements to pumping facility operations to further reduce or minimize losses of listed salmonids.

SWP Suisun Marsh Operations

20. DWR shall operate the Suisun Marsh Salinity Control Gate to minimize delay and blockage of adult Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead migrating upstream.

D. Terms and Conditions - Formal Consultation

Reclamation and DWR must comply or ensure compliance by their contractor(s) with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

Joint Central Valley Project and State Water Project Terms and Conditions:

1. Reclamation and DWR shall gather information regarding the effects of water temperatures and flow fluctuations on Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead downstream of CVP and SWP reservoirs, develop long-term ramping criteria, and operate to water temperature objectives that will avoid or minimize adverse effects to listed salmonids, consistent with meeting applicable conditions in CVP and SWP water right permits.

   • Reclamation and DWR shall participate in the design, implementation, and funding of a CALFED steelhead monitoring program that includes adult and juvenile direct counts, redd surveys, and escapement estimates on CVP and SWP controlled streams. If appropriate, authorization for any incidental take associated with the implementation of this monitoring program will be provided to Reclamation, DWR, or their agent, after NOAA Fisheries review and approval of the study plans.

   • Reclamation and DWR shall ensure that all monitoring programs regarding the effects of CVP and SWP operations and which result in the direct take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon or Central Valley steelhead are conducted by a person or entity that has been authorized by NOAA Fisheries. Reclamation and DWR shall establish a contact person to coordinate these activities with NOAA Fisheries.

   • Reclamation and DWR shall submit weekly reports to the interagency Data Assessment Team (DAT) regarding the results of monitoring and incidental take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead associated with operations of project facilities.
Reclamation and DWR shall provide an annual written report to NOAA Fisheries no later than October 1 of each year. This report shall provide the data gathered and summarize the results of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead monitoring and incidental take associated with the operation of the Delta pumping plants (including the Rock Slough Pumping Plant). All juvenile mortality must be minimized and reported, including those from special studies conducted during salvage operations. This report should be sent to NOAA Fisheries (Southwest Region, Protected Resources Division, Sacramento Area Office, 650 Capitol Mall, Suite 8-300, Sacramento, California 95814-4706).

2. Reclamation and DWR shall augment spawning gravel within the Sacramento River, Feather River, American River, and the Stanislaus River, as necessary, based on recommendations from DFG, FWS and NOAA Fisheries.

a. Reclamation and DWR shall develop a spawning gravel augmentation plan, in consultation with DFG, FWS, and NOAA Fisheries, for the Sacramento River, Clear Creek, Feather River, American River, and Stanislaus River, no later than December 31, 2005.

b. Reclamation and DWR shall implement the spawning gravel enhancement program, as described in the spawning gravel augmentation plan, as soon as possible.

3. Reclamation and DWR shall continue the real-time monitoring of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead in the lower Sacramento River, the lower San Joaquin River and the Delta to establish presence and timing to serve as a basis for the management of Delta Cross Channel gate operations and CVP and SWP Delta pumping operations consistent with the Salmon Decision Process.

a. Reclamation and DWR shall conduct continuous real-time monitoring must be conducted between October 1 and May 31 of each year commencing in 2004.

b. Reclamation and DWR shall submit weekly DAT reports and an annual written report to NOAA Fisheries describing the results of real-time monitoring of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead associated with operations of the DCC and CVP and SWP Delta pumping facilities.

4. Reclamation and DWR shall monitor the extent of incidental take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead, associated with the operation of the CVP’s Tracy and SWP’s Harvey Banks pumping facilities.
a. Reclamation and DWR shall calculated salmon and steelhead loss at the Tracy and Banks pumping plants on a real-time basis from October 1 through May 31 each year.

b. Reclamation and DWR will monitor the loss of juvenile Sacramento River winter-run Chinook salmon at the CVP and SWP Delta pumping facilities and will use that information to determine whether the anticipated level of loss is likely to exceed the authorized level of 2%, cumulatively, of the estimated number of juvenile Sacramento River winter-run Chinook salmon entering the Delta annually. If either agency or NOAA Fisheries determines the rate of loss has exceeded 1%, cumulatively, Reclamation and DWR shall immediately convene the Water Operations Management Team to explore additional measures which can be implemented to reduce the rate of take and ensure the identified 2% level of take is not exceeded. If either agency or NOAA Fisheries determines the rate of loss is sufficiently high that the estimated loss will likely exceed the 2% identified level, consultation shall be reinitiated immediately.

c. Reclamation and DWR will monitor the loss of identified Central Valley spring-run Chinook salmon surrogate release groups at the CVP and SWP Delta pumping facilities and use that information to determine whether the cumulative estimated level of loss is expected to exceed one percent. If the estimated rate of loss approaches 1% Reclamation and DWR shall immediately convene the Water Operations Management Team to explore additional measures which can be implemented to reduce the rate of take. If the rate of loss exceeds 1%, consultation shall be reinitiated immediately.

d. Reclamation and DWR will monitor the loss of Central Valley steelhead at the CVP and SWP Delta pumping facilities and use that information to determine whether the cumulative estimated level of loss is expected to exceed one percent of the juvenile production estimate (JPE) for steelhead entering the Delta. Until such time as a suitable JPE has been developed, the cumulative take at the CVP and SWP delta pumping facilities shall not exceed 3,000 steelhead (juveniles and adults combined). If the take level anticipated for Central Valley steelhead is exceeded, Reclamation and DWR shall immediately convene the Water Operations Management Team to explore additional measures which can be implemented to reduce the rate of take. If suitable measures to reduce the rate of take can not be implemented, consultation shall be reinitiated immediately.

Central Valley Project Terms and Conditions:

General

5. Reclamation shall make its February 15 forecast of deliverable water based on an estimate of precipitation and runoff within the Sacramento River basin at least as conservatively as the 90 percent probability of exceedence. Subsequent updates of water
delivery commitments must be based on monthly forecasts at least as conservatively as the 90 percent probability of exceedence.

a. Reclamation shall provide to the Regional Administrator, NOAA Fisheries, Southwest Region, the results of the February 90 percent exceedence forecast of runoff and planned CVP operations, including predictive water temperature models at least 3 working days prior to the first water allocations announcement for the current year and all subsequent updates for that year.

b. Reclamation shall provide NOAA Fisheries with the opportunity to review the proposed operations forecasts prior to the first water allocations announced each year and all subsequent updates for the purpose of ensuring their consistency with the objective of providing to the extent controllable habitat availability and suitability for listed salmonids.

c. Reclamation shall cooperate with DFG to fund and implement aerial surveys of redd distribution so that current information is available for consideration in making within year water management decisions.

Shasta Division/Whiskeytown Reservoir Operations

6. Reclamation shall manage the cold water supply within Shasta Reservoir and make cold water releases from Shasta Reservoir to provide suitable habitat for Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead in the Sacramento River between Keswick Dam and Bend Bridge.

a. Reclamation shall target a minimum end-of-year (September 30) carryover storage in Shasta Reservoir of 1.9 MAF for improvement of cold water resources in the following water year.

b. Reclamation shall target daily average water temperatures in the Sacramento River between Keswick Dam and Bend Bridge as follows:

i. Not in excess of 56 °F at compliance locations between Balls Ferry and Bend Bridge from April 15 through September 30, and not in excess of 60°F at the same compliance locations between Balls Ferry and Bend Bridge from October 1 through October 31, provided operations and temperature forecasts demonstrate the capability to achieve and sustain compliance.

ii. If annual conditions cannot support project compliance at Balls Ferry, Reclamation shall reinitiate consultation and convene the SRTTF to provide input regarding annual cold water management alternatives prior to announcement of the CVP water service delivery allocations.
iii. The selection of compliance locations downstream of Balls Ferry shall be accomplished through an annual adaptive management process, initiated by Reclamation in consultation with NOAA Fisheries, utilizing input from the SRTTF (as described in the OCAP BA, Appendix B), and based on the technical assessment of cold water resources information and projections available in the spring months (i.e., March, April, May).

iv. The annual adaptive management process will focus efforts to analyze annual cold water management flexibility to provide thermal protections to winter-run Chinook salmon, spring-run Chinook salmon, and steelhead as envisioned in the SWRCB Order 90-5. Initial technical analysis will consider the following selection of compliance locations based on the projected cold water availability and spawning distribution in the upper Sacramento River:

<table>
<thead>
<tr>
<th>May 1, Shasta cold water volume below 52 °F</th>
<th>Compliance Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 3.3 MAF</td>
<td>Balls Ferry</td>
</tr>
<tr>
<td>&gt; 3.3 MAF but &lt; 3.6 MAF</td>
<td>Jewlys Ferry</td>
</tr>
<tr>
<td>&gt; 3.6 MAF</td>
<td>Bend Bridge</td>
</tr>
</tbody>
</table>

d. Reclamation shall develop guidelines for use of the current temperature model to analyze information produced by the model in combination with measured temperature profiles to evaluate seasonal risks of cold water management. In 2005 Reclamation, in coordination with NOAA Fisheries and other representatives of the SRTTF, will assess potential improvements to the model and guidelines to increase its effectiveness and identify a schedule for implementation of the improvements.

e. In critical water years, when temperature mortality of winter-run and spring-run Chinook salmon eggs and fry within the mainstem Sacramento River in September and October is expected to be high (e.g., > 40% mortality using Reclamation’s Salmon Mortality Model), Reclamation shall consider all options for fully utilizing cold water available in Shasta Reservoir, including use of low level outlets.

7. Reclamation shall minimize the adverse effects of flow fluctuations associated with Shasta Reservoir and Whiskeytown Reservoir operations on Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead spawning, egg incubation, and fry and juvenile rearing within the upper Sacramento River and Clear Creek.

a. Reclamation shall coordinate with NOAA Fisheries before reducing releases downstream of Keswick Dam when monitoring suggests such changes may have
adverse effects.

b. Reclamation, as described in the CVPIA, shall develop a Fisheries Management Plan (FMP) for Clear Creek downstream of Whiskeytown Reservoir with input from the Clear Creek Technical Team, a working group comprised of fishery biologists, geologists, and other river and land management specialists from DFG, FWS, NOAA Fisheries, Reclamation, and BLM. The Clear Creek FMP should balance instream flow and temperature requirements of spring-run Chinook salmon, fall-run Chinook salmon, and steelhead with the operations for other CVP objectives, including water supply, power, and temperature control for winter-run Chinook salmon in the Sacramento River. In the absence of an FMP, Reclamation shall seek input from the Clear Creek Technical Team on these considerations, and will develop annual plans for avoiding or minimizing adverse impacts, and optimizing conditions for anadromous fish. Prior to implementation, these annual plans shall be reviewed and approved by NOAA Fisheries.

c. Reclamation shall manage Whiskeytown releases, to the maximum extent practical, to meet a daily water temperature of: 1) 60 °F at the lgo gage from June 1 through September 15 to protect over-summering steelhead and pre-spawning spring-run Chinook from thermal stress; and 2) 56 °F from September 15th to October 31st for spring-run Chinook spawning and steelhead rearing. In 2005 Reclamation, in coordination with NOAA Fisheries will assess improvements to modeling water temperatures in Clear Creek and identify a schedule for making improvements.

d. Reclamation shall schedule the ramping down of non-Glory Hole releases from Whiskeytown Reservoir to not exceed 0.1 foot / hour (estimated at RM 3.03 in attached table of maximum ramping rates). Ramping rates for releases greater than 300 cfs would be made after consultation with the Clear Creek Technical Team, considering: time of year of the change, time of day, timing change to occur with natural changes in flow and or turbidity, size of fish present in creek, species and protected status of vulnerable fish, the amount of water required, and relative costs or benefits of proposed flow. Reclamation shall time flow decreases so that the most juvenile Chinook salmon and steelhead experience the stage decrease during darkness. Maximum ramping rate of flow releases from Whiskeytown Dam into Clear Creek shall be accomplished based on the following targets within the precision of the outlet works or the City of Redding powerplant equipment.

<table>
<thead>
<tr>
<th>Discharge</th>
<th>Ramping Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>600-330 cfs</td>
<td>16 cfs / hour</td>
</tr>
<tr>
<td>330-105 cfs</td>
<td>15 cfs / hour</td>
</tr>
</tbody>
</table>

221
e. Reclamation shall coordinate with DFG and FWS on conducting an IFIM study to aid in determining long term flow needs, including channel forming pulse flows, of Clear Creek as mandated under CVPIA. Upon completion of the study, Reclamation and FWS shall consider allocation of CVPIA 3406(b)(1) and (b)(2) resources to provide the recommended flows that provide habitat conditions for anadromous salmonids.

f. Reclamation will coordinate with NOAA Fisheries, FWS, and DFG to continue implementation and funding of fisheries monitoring of spring-run Chinook salmon and steelhead (including adult snorkel surveys, population estimates for steelhead, and rotary screw trapping) in Clear Creek to aide in determining the benefits of flow and temperature management.

Sacramento River Division

8. Reclamation shall implement all measures practicable to provide unimpeded passage upstream and downstream at the Red Bluff Diversion Dam during the period of September 1 through June 30 each year.

a. As a minimum, Reclamation shall provide unimpeded upstream and downstream passage at the Red Bluff Diversion Dam from September 15 through May 14 each year.

b. NOAA Fisheries will review proposals for early gate closures (prior to May 15) of up to 10 days, one time per year, only in emergency situations where the alternative water supplies (i.e., new 4th pump at Red Bluff Pumping Plant and Stony Creek) are unable to meet TCCA demands. Reclamation will reopen the gates for a minimum of five consecutive days, prior to June 15 of the same year in a manner that will be least likely to adversely affect water deliveries.

c. Reclamation shall further investigate and implement all practicable opportunities, including improvements to fish ladders, to improve or provide unimpeded upstream and downstream passage at Red Bluff Diversion Dam from May 15 through June 30 and from September 1 through September 15 each year.

d. Reclamation, in coordination with FWS and DFG, shall further investigate the results of blockage or delays in the migration of adult Sacramento River winter-run Chinook salmon and Central Valley spring-run Chinook salmon at the RBDD as a result of gate closures between May 15 and June 30 and from September 1 through September 15. Written reports shall be provided to NOAA Fisheries as investigations are completed.
American River Division

9. Reclamation shall manage the cold water supply within Folsom Reservoir and make cold water releases from Folsom Reservoir to balance the needs of Central Valley steelhead with fall-run Chinook salmon in the American River downstream of Nimbus Dam.

   a. Reclamation shall coordinate with the B2IT group to target a spring filling (May or June) of at least 700 TAF of storage in Folsom Reservoir in order to conserve available cold water resources and to develop a water temperature control plan.

   b. Reclamation shall develop a water temperature control plan for review and approval of NOAA Fisheries. The draft annual temperature control plan will be submitted by Reclamation for review by NOAA Fisheries not later than May 1 of each year. In the development of that annual temperature control plan, Reclamation shall seek input from the membership of the American River Operations Group (AROG).

   c. The water temperature control plan will give a preference to utilization of available cold water resources and Folsom Dam shutter management for the protection of steelhead by targeting 68 °F at Watt Avenue Bridge, before assessing cold water reserves available for the fall. A target of 68 °F at Watt Ave will likely provide a limited section of habitat between Nimbus Dam and Watt Ave in the preferred 65 °F range without seasonally exhausting the limited cold water available. If sufficient cold water availability exists to seasonally provide 68 °F at Watt Ave, then and only then would the potential to reserve the last shutter pull for the fall season exist.

10. Reclamation shall minimize the adverse effects of flow fluctuations associated with Folsom and Nimbus Reservoir operations on Central Valley steelhead spawning, egg incubation, and fry and juvenile rearing within the American River.

   a. During periods outside of flood control operations and to the extent controllable during flood control operations, Reclamation shall ramp down releases in the American River below Nimbus Dam as follows:

<table>
<thead>
<tr>
<th>Lower American River Daily Rate of Change (cfs)</th>
<th>Amount of decrease in 24 hrs (cfs)</th>
<th>Maximum change per step (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20,000 to 16,000</td>
<td>4,000</td>
<td>1,350</td>
</tr>
<tr>
<td>16,000 to 13,000</td>
<td>3,000</td>
<td>1,000</td>
</tr>
<tr>
<td>13,000 to 11,000</td>
<td>2,000</td>
<td>700</td>
</tr>
</tbody>
</table>

223
<table>
<thead>
<tr>
<th>11,000 to 9,500</th>
<th>1,500</th>
<th>500</th>
</tr>
</thead>
<tbody>
<tr>
<td>9,500 to 8,300</td>
<td>1,200</td>
<td>400</td>
</tr>
<tr>
<td>8,300 to 7,300</td>
<td>1,000</td>
<td>350</td>
</tr>
<tr>
<td>7,300 to 6,400</td>
<td>900</td>
<td>300</td>
</tr>
<tr>
<td>6,400 to 5,650</td>
<td>750</td>
<td>250</td>
</tr>
<tr>
<td>5,650 to 5,000</td>
<td>650</td>
<td>250</td>
</tr>
<tr>
<td>&lt;5,000</td>
<td>500</td>
<td>100</td>
</tr>
</tbody>
</table>

b. From January 1 through April 31 each year, Reclamation must coordinate with NOAA Fisheries, DFG and FWS to implement and fund monitoring of steelhead egg and juvenile stranding or dewatering events in order to estimate the incidental take associated with flow reductions in this time period from Nimbus Dam to the American River. All efforts shall be made to minimize dewatering of steelhead redds or adverse effects to incubating eggs, fry or juveniles.

New Melones Division

11. Reclamation shall manage the cold water supply within New Melones Reservoir and make cold water releases from New Melones Reservoir to optimize suitable rearing habitat for Central Valley steelhead in the Stanislaus River downstream of Goodwin Dam.

a. Reclamation shall manage cold water releases from New Melones Reservoir to maintain daily average water temperature in the Stanislaus River between Goodwin Dam and the Orange Blossom Road bridge at no more than 65°F during the period of June 1 through November 30 to protect rearing juvenile Central Valley steelhead.

b. Reclamation shall coordinate water temperature releases with DFG and FWS to use fishery release water, to the extent possible, consistent with NMIPO, D-1641, and CVPIA.

c. If it becomes necessary to deviate from condition 7.a. above, Reclamation shall consult with DFG, FWS and NOAA Fisheries to develop a plan using all means possible to maximize suitable rearing habitat for Central Valley steelhead juveniles within the Stanislaus River below Goodwin Dam prior to June 1 each year.

12. Reclamation shall minimize the adverse effects of flow fluctuations associated with New Melones Reservoir and Goodwin Dam operations on Central Valley steelhead spawning, egg incubation, and fry and juvenile rearing within the Stanislaus River.
a. During periods outside of flood control operations and to the extent controllable during flood control operations, Reclamation shall ramp down releases in the Stanislaus River below Goodwin Dam as follows:

<table>
<thead>
<tr>
<th>Existing Release Level (cfs)</th>
<th>Rate of Increase (cfs)</th>
<th>Rate of Decrease (cfs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>at or above 4,500</td>
<td>500 per 4 hours</td>
<td>500 per 4 hours</td>
</tr>
<tr>
<td>2,000 to 4,499</td>
<td>500 per 2 hours</td>
<td>500 per 4 hours</td>
</tr>
<tr>
<td>500 to 1,999</td>
<td>250 per 2 hours</td>
<td>200 per 4 hours</td>
</tr>
<tr>
<td>300 to 499</td>
<td>100 per 2 hours</td>
<td>100 per 4 hours</td>
</tr>
</tbody>
</table>

CVP Delta Operations

13. Reclamation shall operate the gates at the Delta Cross Channel (DCC) during the period of October 1 through April 30 each year to minimize the diversion of juvenile Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead from the Sacramento River basin into the central Delta.

a. Reclamation shall operate the gates of the DCC consistent with recommendations from the CALFED Operations Group, SWRCB D-1641 and the Salmon Decision Process (i.e., see OCAP Appendix B). Reclamation in coordination with the interagency Data Assessment Team (DAT), will monitor fish movement and water quality conditions within the Delta from October 1 through May 15. Gate openings for water quality improvements shall be coordinated with NOAA Fisheries, DFG, and FWS through the Water Operations Management Team (WOMT) and shall be minimized if fishery monitoring results indicate that juvenile Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead are migrating through the area and are in the vicinity of the DCC.

b. To facilitate common understanding of the potential competing objectives of water quality maintenance, export water supplies, and fisheries protection, Reclamation in cooperation with DWR shall develop a document addressing specific water quality criteria, operational rules, and a decision making process for operation of the DCC gates during the period between October 1 and May 15. This effort shall include investigation of whether hydrodynamic models can be used to predict potential water quality problems and develop alternative operations scenarios for the DCC gates and the Delta export pumps. This document, including updated water quality criteria, operational rules, and the
decision-making process shall be completed and provided to NOAA Fisheries, Southwest Region, for review and approval no later than December 31, 2005. As necessary this document shall be updated or revised, with NOAA Fisheries approval, annually thereafter.

14. Reclamation shall improve and maintain in good working order fish screens at the Tracy pumping facility to minimize entrainment of juvenile Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead as a result of Delta export operations. This shall include fish screen inspections and developing and implementing a collection and release program, designed to provide for the survival of fish salvaged at the facility.

a. Reclamation shall submit to NOAA Fisheries for approval one or more solutions to reduce losses associated with cleaning operations of the primary and secondary louver screens and secondary channel dewatering at the Tracy Fish Collection Facility (TFCF) no later than September 30, 2005. Upon approval by NOAA Fisheries, the selected solution shall be implemented as soon as possible.

b. Prior to and until such time as a reasonable solution to losses associated with cleaning operations at the TFCF is implemented, Reclamations shall coordinate with NOAA Fisheries and revise the loss calculation formula for the Tracy pumping facility to reflect the expected higher losses not previously considered. This updated loss calculation formula shall be developed and submitted to NOAA fisheries for review and approval no later than December 15, 2004.

c. Reclamation shall conduct annual fish screen inspections, in coordination with NOAA Fisheries, of all Tracy pumping facility fish screens and permit reasonable unannounced access to the TFCF by NOAA Fisheries staff at least one additional time each year for additional inspections. These inspections shall include access all to records of operation, fish salvage, and fish transportation and release activities.

d. Reclamation shall ensure that fish transportation runs conducted as part of the collection and release (salvage) program for listed salmonids are conducted at least every 12 hours or more frequently if required by the “Bates Table” calculations made at each count and recorded on the monthly report.

15. Reclamation, in cooperation with the Contra Costa Water District (CCWD), shall continue to collect additional data at the Tracy Fish Collection Facility and the Rock Slough Intake to monitor the extent of incidental take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead associated with the operation of the CVP’s Tracy and CCWD’s Rock Slough pumping facilities.
a. Incidental take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead shall be monitored daily at the Tracy pumping facility and Rock Slough Intake from October 1 through May 31 of each year. Tissue samples from salvaged fish shall be collected for genetic analysis and provided to a lab identified by NOAA Fisheries. Loss and salvage at each facility shall be computed using formulas developed in consultation with DFG and FWS and approved by NOAA Fisheries.

b. At the Tracy pumping facility, the following monitoring procedures must be performed at the Tracy Fish Collection Facility by personnel experienced in salmon biology. For a minimum period of 10 minutes within each 2 hour interval throughout the day and night (minimum of 120 minutes per day) all salmon and steelhead are to be measured (fork length to the nearest millimeter), examined for the presence or absence of the adipose fin and enumerated. At the Rock Slough Intake a monitoring program must be implemented similar to the expanded monitoring plan developed by DFG and implemented in 2004 and performed by personnel experienced in salmon biology.

c. Reclamation, in cooperation with CCWD, will monitor the loss of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead at the Rock Slough diversion from October 1 through May 31 each year. Monitoring information shall be used to determine whether the estimated levels of take at the Rock Slough diversion are expected to exceed 5 Sacramento River winter-run Chinook salmon juveniles, 10 Central Valley spring-run Chinook juveniles, and 5 Central Valley steelhead total (juveniles plus adults) annually. If the take levels above are exceeded, Reclamation and CCWD shall immediately consult NOAA Fisheries to explore additional measures which can be implemented to reduce the level of take. If suitable measure to reduce take are not available, Reclamation and CCWD shall immediately reinstitute consultation.

d. Reclamation shall submit weekly reports to the interagency DAT and provide an annual written report to NOAA Fisheries. As a minimum, these reports shall describe the estimated loss and salvage of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead associated with operations of the Tracy and Rock Slough pumping facilities. The annual written report shall be submitted to NOAA Fisheries no later than October 1.

State Water Project Operations:

Oroville Reservoir and Feather River Operations

16. The California Department of Water Resources (DWR) shall investigate and implement all measures practicable to avoid or minimize adverse effects of Oroville Reservoir
operations and to improve natural production of Central Valley spring-run Chinook salmon and Central Valley steelhead in the Feather River below Oroville Dam.

a. DWR will establish and chair a Feather River Interagency Anadromous Fishery Technical Team (Feather River Technical Team). The Feather River Technical Team should include fishery biologists, hatchery specialists, and river morphology specialists from DWR, DFG, FWS, and NOAA Fisheries. The Feather River Technical Team will meet monthly, quarterly, or as needed to review, and deliberate O&M actions that may adversely affect anadromous salmonids and their habitat, and will develop recommendations for avoiding or minimizing adverse impacts that may result from such actions.

b. DWR will coordinate Dam safety inspections that involve the need to fluctuate flows in the low flow channel to ensure the inspections are conducted at a time or in a manner that minimize the potential for adverse effects to spawning and/or rearing salmon and steelhead without affecting flood control or water supply operations and minimizes effects on power generation.

c. During periods outside of flood control operations and to the extent controllable during flood control operations, DWR shall ramp down releases to the low flow channel as presented in the table below:

<table>
<thead>
<tr>
<th>Feather River Low-Flow Channel Releases (cfs)</th>
<th>Rate of Decrease (cfs) per 24 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,000 to 3,501</td>
<td>1,000</td>
</tr>
<tr>
<td>3,500 to 2,501</td>
<td>500</td>
</tr>
<tr>
<td>2,500 to 600</td>
<td>300</td>
</tr>
</tbody>
</table>

d. DWR shall provide a written report containing the results of rotary screw traps, fyke traps, snorkel surveys, creel census and tissue sampling for monitoring studies to NOAA Fisheries (Southwest Region, Protected Resources Division, Sacramento Area Office, 650 Capitol Mall, Suite 8-300, Sacramento, California 95814-4706). In addition, DWR will continue with the stranding and isolation study as proposed in the project description. A written report summarizing study findings shall be provided to NOAA Fisheries annually, no later than December 31, each year. Additional studies are needed to determine (1) in-river abundance, (2) spawning habitat utilization, and (3) suitability of annual flow patterns for all life-stages of steelhead and spring-run Chinook salmon.

17. DWR shall manage cold water storage in Oroville Reservoir and make cold water releases from Oroville Reservoir to provide suitable spawning and rearing habitat within
the Feather River for Central Valley spring-run Chinook salmon and Central Valley steelhead between the Fish Barrier Dam and Robinson’s Riffle (RM 61.6).

a. DWR shall maintain daily average water temperatures in the Feather River, between the Fish Barrier Dam and Robinson’s Riffle (RM 61.6) from June 1 through September 30 less than or equal to 65 °F to protect over-summering steelhead. This term is not intended to preclude pump-back operations at the Oroville Facilities that are needed to assist the State of California with supplying energy during periods when the California ISO has anticipated Stage 2 or higher alerts.

b. DWR shall consult with the Feather River Technical Team and receive approval from NOAA Fisheries, prior to making any necessary deviations from the average daily water temperature compliance criteria as described in 2.a above.

SWP Delta Operations

18. DWR shall improve and maintain in good working order fish screens at the Harvey Banks pumping facility to minimize entrainment of juvenile Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead as a result of Delta export operations. This shall include developing and implementing a collection and release program for salvaged fish designed to provide for the survival of fish salvaged at the facility.

a. Incidental take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead shall be monitored daily at the Skinner Fish Collection Facility. Loss and salvage shall be computed using formulas developed in consultation with DFG and FWS and approved by NOAA Fisheries.

b. If the trigger for incidental take (identified in amount of take section) for Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead at the SWP Harvey Banks pumping facility combined with the estimated take at the CVP Tracy pumping facility is exceeded Reclamation and DWR, in consultation with the DAT and WOMT, shall develop and implement actions to avoid further loss.

19. DWR shall collect additional data at the Clifton Court Forebay, the John Skinner Fish Collection Facility, and the Harvey Banks pumping plant to monitor the incidental take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook
salmon, and Central Valley steelhead and to develop and implement improvements to pumping facility operations to further reduce or minimize losses of listed salmonids.

a. DNA tissue samples and CWT samples from juvenile spring-run and winter-run Chinook salmon and steelhead at the Tracy and Skinner fish collection facilities shall be collected by DWR or DFG for genetic analysis or tag removal/reading pursuant to the sampling protocols established by the IEP Salmon Genetics Project Work Team. Tissues shall be stored at the DFG tissue bank at Rancho Cordova for subsequent analysis by Oregon State University or similar lab approved by NOAA Fisheries. Whole fish or heads for CWT processing and identification shall be stored at the FWS Bay/Delta Office in Stockton. All samples shall be clearly marked according to office protocol and a log maintained at each storage facility. Unclipped steelhead samples for DFG otolith studies may be collected and stored at the above facilities after providing NOAA Fisheries, Sacramento Office with a detailed study plan.

b. DWR shall submit weekly reports to the interagency DAT and an annual written report to NOAA Fisheries describing, as a minimum, the estimated loss and salvage of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead associated with operations of the Harvey Banks pumping facility. This annual written report shall be submitted no later than October 1.

SWP Suisun Marsh Operations

20. DWR shall operate the of Suisun Marsh Salinity Control Gate to minimize delay and blockage of adult Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon and Central Valley steelhead migrating upstream.

a. Incidental take for the Suisun Marsh Salinity Control Gates shall be based upon DFG monitoring studies associated with gate operations. It is anticipated that some adult steelhead may be caught during these studies, therefore up to 10 adult steelhead may be tagged to determine their migratory patterns.

i. Beginning no later than November 15, 2004, hold the boat lock “open” at all times when the flashboards are installed at the SMSCG. The boat lock may be closed temporarily to facilitate the passage of vessels traveling through Montezuma Slough and for fish passage investigations. This term and condition will continue to be in effect after September 2005 in conjunction with the implementation of term and condition “ii” below.
Reclamation and DWR shall continue to work with DFG, FWS, and NOAA Fisheries through the SMSCG Steering Committee to develop a proposal that will improve fish passage at the SMSCG. The proposal shall include feasible measures to remove and re-install the SMSCG flashboards in a timely and efficient manner between September and May during periods when operation of the structure is not required for water quality. The proposal shall be submitted to NOAA Fisheries for review and concurrence by June 1, 2005.

X. PRELIMINARY INCIDENTAL TAKE STATEMENT - EARLY CONSULTATION

Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, 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 7(c)(2), taking that is incidental to and not intended as part of the proposed action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with this Incidental Take Statement.

Because the prospective actions considered in the early consultation and preliminary biological opinion are likely to result in the taking of listed salmonids incidental to the action, NOAA Fisheries has included this preliminary incidental take statement pursuant to section 7(b)(4) of the Act. However, because this is an early consultation on the prospective action, this preliminary incidental take statement does not eliminate Reclamations or DWR’s liability under the taking prohibitions of section 9 of the Act. Instead, this preliminary incidental take statement provides Reclamation and DWR with the foreknowledge of the terms and conditions that will be required if this prospective action is taken.

The following reasonable and prudent measures and implementing terms and conditions become effective only after NOAA Fisheries confirms the preliminary biological opinion as a final biological opinion on the prospective action. Reclamation and DWR must request that NOAA Fisheries confirm this preliminary biological opinion as a final biological opinion on the prospective action in writing. If NOAA Fisheries reviews the proposed action and finds that there are no significant changes in the action as planned or in the information used during the early consultation, it will confirm the preliminary biological opinion as a final biological opinion on the project and no further section 7 consultation will be necessary except when one or more of the criteria described in Section XII of this opinion (Reimitation of Consultation) are met.

This preliminary incidental take statement is applicable to all activities related to the operation of the CVP and SWP described in the preliminary biological opinion. This preliminary incidental take statement does not cover activities that are not described and assessed within the
preliminary biological opinion. In addition, this preliminary incidental take statement does not cover the facilities or activities of any CVP or SWP contractor, or the facilities or activities of parties to agreements with the U.S. that recognize a previous vested water right.

A. Preliminary Amount or Extent of Take - Early Consultation

NOAA Fisheries anticipates that the implementation of prospective actions considered in this early consultation will increase project impacts to endangered Sacramento River winter-run Chinook salmon, threatened Central Valley spring-run Chinook salmon, and threatened Central Valley steelhead over those anticipated as a result of the formal consultation. This additional incidental take is expected to be in the form of death, injury, harm, capture, and collection.

Death, injury, and harm to juvenile and adult winter-run Chinook salmon, spring-run Chinook salmon, and steelhead are anticipated due to reduced storage in upstream CVP and SWP reservoirs, further altering the natural hydrological cycle downstream of CVP and SWP dams. The frequency of water temperatures exceeding 56 °F at Ball’s Ferry on the Sacramento River, for example, is anticipated to increase by 7% over that expected in the formal consultation. Since these exceedances are expected to occur in September and October it is likely that individual reproductive success of Central Valley spring-run Chinook salmon will be most affected. Egg and fry mortality is anticipated to increase under the prospective actions of the early consultation as storage will be reduced and the ability to control water temperatures downstream decreases. Predicted additional average mortality over that anticipated in the formal consultation is 1% for winter-run Chinook salmon, 5% for spring-run Chinook salmon, and 1% for steelhead. On the American River, prospective actions considered under early consultation are also expected to be greater than those anticipated under formal consultation and include: 1) further reductions in available and suitable habitat; 2) increased redd superimposition; 3) increased flow fluctuations; and, 4) increased predation on juvenile steelhead.

Prospective actions considered in the early consultation are also expected to increase the severity of effects in the Delta compared to those anticipated in the formal consultation. Additional effects in the Delta are primarily linked to additional pumping that will occur when pumping at Banks increases to 8,500 cfs and the CVP/SWP Intertie is completed. While it is anticipated that the incidental take of juvenile Sacramento River winter-run Chinook salmon can still generally be managed to less than 2 percent, cumulatively, between the CVP and SWP pumping plants as a result of prospective actions considered in the early consultation, it is anticipated that the incidental take of Central Valley spring-run Chinook salmon and Central Valley steelhead may increase by 1% of the estimated juvenile population entering the Delta.

Additional changes in Delta hydrology created by prospective actions considered in the early consultation are also expected to increase incidental take levels. This take includes further reduced survival of juvenile Chinook salmon diverted through the DCC into the central Delta from 1) elevated water temperatures and poorer water quality within the central Delta; 2) losses due to entrainment at unscreened water diversions within the central Delta; 3) predation
associated with physical structures; 4) reverse flow conditions as a result of CVP/SWP pumping; and 5) direct loss at the Delta pumping facilities within the southern Delta.

B. Preliminary Effect of the Take - Early Consultation

The expected effect of prospective actions considered in the early consultation are generally the same as those described for the formal consultation.

In the accompanying preliminary biological opinion, NOAA Fisheries has determined that the anticipated level of take associate with prospective project operations is not likely to result in jeopardy to the continued existence of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, or Central Valley steelhead.

C. Preliminary Reasonable and Prudent Measures - Early Consultation

NOAA Fisheries believes that the reasonable and prudent measures described previously in the incidental take statement for the formal consultation (Section IX.C.) combined with the following preliminary reasonable and prudent measure are necessary and appropriate to minimize take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead.

1. Reclamation and DWR shall monitor the extent of incidental take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead, associated with the operation of the CVP’s Tracy and SWP’s Harvey Banks pumping facilities.

2. DWR shall reduce predation and loss of Central Valley steelhead due to increased pumping to 8,500 cfs at the Harvey Banks pumping facility at Clifton Court Forebay, the John Skinner Fish Collection Facility and the associated collection, trucking, and release program.

D. Preliminary Terms and Conditions - Early Consultation

Reclamation and DWR must comply or ensure compliance by their contractor(s) with all terms and conditions described previously (Section IX. D.) for the formal consultation and the following additional terms and conditions, which implement the reasonable and prudent measures described above for early consultation. These terms and conditions are non-discretionary.

1. Reclamation and DWR shall monitor the extent of incidental take of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central
Valley steelhead, associated with the operation of the CVP’s Tracy and SWP’s Harvey Banks pumping facilities.

a. Reclamation and DWR shall calculate salmon and steelhead loss at the Tracy and Banks pumping plants on a real-time basis from October 1 through May 31 each year.

b. Reclamation and DWR will monitor the loss of juvenile Sacramento River winter-run Chinook salmon at the CVP and SWP Delta pumping facilities and will use that information to determine whether the anticipated level of loss is likely to exceed the authorized level of 2%, cumulatively, of the estimated number of juvenile Sacramento River winter-run Chinook salmon entering the Delta annually. If either agency or NOAA Fisheries determines the rate of loss has exceeded 1%, cumulatively, Reclamation and DWR shall immediately convene the Water Operations Management Team to explore additional measures which can be implemented to reduce the rate of take and ensure the identified 2% level of take is not exceeded. If either agency or NOAA Fisheries determines the rate of loss is sufficiently high that the estimated loss will likely exceed the 2% identified level, consultation shall be reinitiated immediately.

c. Reclamation and DWR will monitor the loss of identified Central Valley spring-run Chinook salmon surrogate release groups at the CVP and SWP Delta pumping facilities and use that information to determine whether the cumulative estimated level of loss is expected to exceed one percent. If the estimated rate of loss exceeds 1% Reclamation and DWR shall immediately convene the Water Operations Management Team to explore additional measures which can be implemented to reduce the rate of take. If the rate of loss exceeds 2%, consultation shall be reinitiated immediately.

d. Reclamation and DWR will monitor the loss of Central Valley steelhead at the CVP and SWP Delta pumping facilities and use that information to determine whether the cumulative estimated level of loss is expected to exceed 2% of the juvenile production estimate (JPE) for steelhead entering the Delta. Until such time as a suitable steelhead JPE has been developed, the cumulative take at the CVP and SWP delta pumping facilities shall not exceed 4,500 steelhead (juveniles and adults combined). If the take level anticipated for Central Valley steelhead is exceeded, Reclamation and DWR shall immediately convene the Water Operations Management Team to explore additional measures which can be implemented to reduce the rate of take. If suitable measures to reduce the rate of take can not be implemented, consultation shall be reinitiated immediately.

2. DWR shall reduce predation and loss of Central Valley steelhead due to increased pumping to 8,500 cfs at the Harvey Banks pumping facility at Clifton Court Forebay, the
John Skinner Fish Collection Facility and the associated collection, trucking, and release program.

a. DWR shall design, implement, and complete studies to document the rate of predation on Central Valley steelhead while in Clifton Court Forebay (CCF) and prior to salvage at the John Skinner Fish Collection Facility. Initial studies shall be completed prior to permanent barriers being constructed and increased pumping at the Banks pumping facility to 8,500 cfs.

b. Upon completion of initial studies, DWR shall take appropriate action to reduce the predation rate on Central Valley steelhead, while in Clifton Court Forebay.

XI. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. These "conservation recommendations" include discretionary measures that Reclamation and DWR can take to minimize or avoid adverse effects of a proposed action on a listed species or critical habitat or regarding the development of information. In addition to the terms and conditions of the Incidental Take Statement, the NOAA Fisheries provides the following conservation recommendations that would reduce or avoid adverse impacts on the listed species:

1. Reclamation and DWR should support and expand salmon and steelhead monitoring programs throughout the Central Valley to improve understanding of the life history of these listed species and improve the ability to provide Fisheries protection through real-time management of CVP/SWP facilities. This information can be used to better implement real-time operational decisions, such as the closing of the DCC gates and arrival of listed salmonids in the Delta (See Monitoring (Table A1), spawner surveys, adult counts, rotary screw trapping).

2. Reclamation and DWR should participate in watershed planning efforts (including the San Joaquin River), and support measures to protect adequate instream flows, and equitable approaches to increasing stream flows and water available for flow augmentation.

3. Reclamation should adopt a new minimum flow standard on the American River consistent with the Water Forum Agreement referenced in the OCAP project description that maintains the suitability of habitat below Nimbus Dam for steelhead spawning and over-summering.

235
4. Reclamation and DWR should support and promote aquatic and riparian habitat restoration downstream of CVP/SWP reservoirs with special emphasis upon the protection and restoration of critical habitat (i.e., shaded riverine aquatic cover) that increase the existing stream meander zone.

5. Reclamation, consistent with the CVPIA, shall consider funding channel restoration activities such as 1) implementing recommendations of the Clear Creek Gravel Management Plan, as amended by the Clear Creek Technical Team; 2) maintaining a stockpile of clean spawning gravel at the Whiskeytown Dam site; 3) supplementing gravel supply within Clear Creek from Whiskeytown Dam downstream to the Clear Creek Road Bridge; and 4) developing a detailed sediment transport budget for use in determining required supplementation rates.

6. Reclamation and DWR should continue to provide benefits to winter-run Chinook salmon, spring-run Chinook salmon and steelhead to mitigate losses associated with the CVP/SWP Delta Facilities.

   a. DWR should continue to implement and/or fund projects pursuant to the 4-Pumps Agreement with DFG.

   b. Reclamation should continue to develop and implement measures to minimize fish passage problems at RBDD as required under CVPIA Section 3406(b)(10).

   c. Reclamation should include NOAA Fisheries in the review of projects implemented or funded pursuant to the Tracy Fish Facility Agreement consistent with CVPIA Section 3406(b)(4).

7. Reclamation and DWR shall work with NOAA Fisheries staff to minimize take from unscreened diversions that are a part of water contract renewals.

   a. Reclamation should complete funding and construction of fish screens pursuant to CVPIA Section 3406(b)(21), to reduce entrainment of listed salmonids that receive CVP contract water (e.g., Rock Slough Intake, City of Redding, Reclamation District 108, Sutter Mutual, Natomas Mutual).

   b. DWR should proceed with constructing a fish screen at the Morrow Island Distribution system intake during 2005 to eliminate this source of fish mortality in Suisun Marsh.

   c. Reclamation should provide current information on the effects of agricultural return flows from CVP water contracts on listed salmonids in the Sacramento River prior to the renewal of long-term contracts.
8. Reclamation and DWR shall work with NOAA Fisheries, FWS and DFG to implement and/or fund any monitoring associated with projects that Reclamation, DWR, DFG, FWS or NOAA Fisheries agree are necessary and appropriate to determine incidental take levels (including genetic identification research, predation studies, and post-release studies) or provide for the protection and/or recovery of spring-run Chinook salmon or steelhead.

9. An adaptive management approach, including monitoring of salmon and steelhead status and response to flow fluctuations, if they occur, should be established for each river to minimize the loss associated with isolation and stranding events. If inadequate water resources are anticipated, Reclamation and DWR should expedite the purchase of water from willing sellers through EWA or (b)(3) to ensure meeting their environmental responsibilities.

10. Pursue opportunities to conserve water and manage water more efficiently, including but not limited to: improving water measurement, accurate water accounting, minimizing conveyance losses, and minimizing environmental impacts to instream resources.

11. Reclamation should initiate section 7 consultation for Trinity River Hatchery and Nimbus Hatchery within one year of issuance of this biological opinion to determine the effects of those hatcheries on listed species (i.e., SONCC coho salmon and Central Valley steelhead) and critical habitat. Reclamation and DWR should pursue mass marking of all hatchery origin fish produced as mitigation for the Project to determine their effect on natural spawning populations.

12. NOAA Fisheries recommends that Reclamation, and DWR should conduct a Fish Passage Feasibility Study to evaluate the best opportunity for listed salmonids at all CVP and SWP dams by no later than September 15, 2008.

13. The Reclamation and DWR should expedite, to the extent possible funding is available, implementation and completion of the Battle Creek Restoration Project.

XII. REINITIATION OF CONSULTATION

This concludes formal and early consultation on the proposed actions outlined in the biological opinion for the long-term operation of the CVP and SWP. In order to confirm the preliminary portion of this biological opinion on proposed early actions (i.e., 8500 Banks, long-term EWA, SDIP, and Project Integration), Reclamation and DWR should request in writing that the early consultation be considered in a final biological opinion. If after NOAA Fisheries reviews the proposed early consultation actions and finds that there are no significant changes in the actions as planned or in the information used during the early consultation, it will confirm the
preliminary biological opinion as a final biological opinion on the project and no further section 7 consultation will be necessary except when one of the following criteria for reinitiation is met:

(1) the amount or extent of incidental take is exceeded; (2) 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 in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this 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, formal consultation shall be reinitiated immediately.

If NOAA Fisheries does not confirm this preliminary biological opinion as a final biological opinion on the prospective early actions, Reclamation and DWR are required to initiate formal consultation with NOAA Fisheries.