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**Final Restoration Plan
for the
Anadromous Fish Restoration Program
A Plan to Increase Natural Production of Anadromous Fish in the
Central Valley of California**

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Central Valley of California**

**Released as a Revised Draft on May 30, 1997
and Adopted as Final on January 9, 2001**

SACRAMENTO RIVER BASIN

Upper mainstem Sacramento River

Action	Involved parties	Tools	Priority																						
<p>•1. Implement a river flow regulation plan that balances carryover storage needs with instream flow needs consistent with the 1993 biological opinion for winter-run chinook salmon based on runoff and storage conditions, including the following minimum recommended flows at Keswick and Red Bluff Diversion dams.</p> <p>Recommended minimum Sacramento River flows (cfs) at Keswick Dam for October 1 to April 30 based on October 1 carryover storage in Shasta Reservoir and critically dry runoff conditions (driest decile runoff of 2.5 maf) to produce a target April 30 Shasta Reservoir storage of 3,032 maf for temperature control.</p> <table border="1"> <thead> <tr> <th>Carryover storage (maf)</th> <th>Keswick release (cfs)</th> </tr> </thead> <tbody> <tr><td>1.9 to 2.1</td><td>3,250</td></tr> <tr><td>2.2</td><td>3,500</td></tr> <tr><td>2.3</td><td>3,750</td></tr> <tr><td>2.4</td><td>4,000</td></tr> <tr><td>2.5</td><td>4,250</td></tr> <tr><td>2.6</td><td>4,500</td></tr> <tr><td>2.7</td><td>4,750</td></tr> <tr><td>2.8</td><td>5,000</td></tr> <tr><td>2.9</td><td>5,250</td></tr> <tr><td>3</td><td>5,500</td></tr> </tbody> </table>	Carryover storage (maf)	Keswick release (cfs)	1.9 to 2.1	3,250	2.2	3,500	2.3	3,750	2.4	4,000	2.5	4,250	2.6	4,500	2.7	4,750	2.8	5,000	2.9	5,250	3	5,500	<p>USFWS, USBR, NMFS, CDFG, Tehama-Colusa Canal Authority (TCCA)</p>	<p>3406(b)(1)(B), 3406(b)(2), 3406(b)(3)</p>	<p>High</p>
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<p>•2. Implement a schedule for flow changes that avoids, to the extent controllable, dewatering redds and isolating or stranding juvenile anadromous salmonids, consistent with SWRCB Order 90-5.</p>	<p>USFWS, USBR, CDFG, SWRCB, NMFS</p>	<p>3406(b)(9)</p>	<p>High</p>																						
<p>•3. Continue to maintain water temperatures at or below 56°F from Keswick Dam to Bend Bridge to the extent controllable, consistent with the 1993</p>	<p>USFWS, USBR, CDFG, SWRCB.</p>	<p>3406(b)(1)(B)</p>	<p>High</p>																						

Action	Involved parties	Tools	Priority
biological opinion for winter-run chinook salmon and with SWRCB Order 90-5.	NMFS		
•4. Continue to raise the gates of the Red Bluff Diversion Dam (RBDD) for a minimum duration from September 15 through at least May 14 to protect adult and juvenile chinook salmon migrations, consistent with the 1993 biological opinion for winter-run chinook salmon and with SWRCB Order 90-5, and accommodate water delivery using appropriate pumping facilities.	USFWS, USBR, SWRCB, NMFS, CDFG, TCCA	3406(b)(6)	High ³
•5. Construct an escape channel for trapped adult chinook salmon and steelhead from the Keswick Dam stilling basin to the Sacramento River, as designed by NMFS and USBR.	USFWS, USBR, NMFS, CDFG	3406(b)(11)	Medium
•6. Continue to implement the Anadromous Fish Screen Program. ⁴	Diversers, USFWS, USBR, NMFS, CDFG, CDWR	3406(b)(21)	High ⁵
•7. Implement structural and operational modifications to the Glenn-Colusa Irrigation District's (GCID) water diversion facility to minimize impingement and entrainment of juvenile salmon.	GCID, USFWS, USBR, CDFG, NMFS, CDWR	3406(b)(20)	High ⁶

³Although Action 4 addresses fish passage, it was assigned high priority because it significantly increases fish productivity. These findings are based on unpublished data and reports located in the Northern Central Valley Fish and Wildlife Office, USFWS, Red Bluff, California (Rich Johnson, personal communication 1995).

⁴Priorities for screening are being determined by the Anadromous Fish Screen Program.

⁵Although Action 6 addresses fish passage, it was assigned a high priority because it has a high potential to significantly increase fish production.

⁶Although Action 7 addresses solutions to impingement and entrainment of juvenile salmon, it was assigned a high priority because solutions can significantly enhance fish production on the upper mainstem Sacramento River.

Action	Involved parties	Tools	Priority
•8. Remedy water quality problems from toxic discharges associated with Iron Mountain Mine and water quality problems associated with metal sludges in Keswick Reservoir, consistent with the Comprehensive Environmental Response, Compensation, and Liability Act and the Clean Water Act.	USEPA, SWRCB USFWS, USBR, NMFS, CDFG		High
•9. Pursue opportunities, consistent with efforts conducted pursuant to Senate Bill 1086 (SB 1086), to create a meander belt from Keswick Dam to Colusa to recruit gravel and large woody debris, to moderate temperatures and to enhance nutrient input.	Upper Sacramento River Fisheries and Riparian Habitat Advisory Council (USRFRHAC), CDFG, COE, USFWS, USBR, CDWR, NMFS	3406(b)(1)(B), 3406(b)(13)	High
•10. Implement operational modifications to Anderson-Cottonwood Irrigation District's (ACID) diversion dam to eliminate passage and stranding problems for chinook salmon and steelhead adults and early life stages; eliminate toxic discharges from the canal and implement structural modifications to improve the strength of the fish screens.	ACID, USFWS, USBR, CDFG, RWQCB, NMFS	3406(b)(17)	Medium
•11. Develop and implement a program for restoring and replenishing spawning gravel, where appropriate, in the Sacramento River.	CDFG, USFWS, USBR, NMFS, CDWR	3406(b)(13)	High

Evaluation	Involved parties	Tools	Priority
•1. Continue study to refine a river regulation program, consistent with SB 1086, that balances fish habitats with the flow regime and addresses temperatures, flushing flows, attraction flows, emigration, channel and riparian corridor maintenance.	USFWS, USBR, CDFG, SWRCB, NMFS, USRFRHAC	3406(e)(1)	High
•2. Evaluate opportunities to incorporate flows to restore riparian vegetation from Keswick Dam to Verona that are consistent with the overall river regulation plan.	USFWS, USBR, NMFS, CDFG, USRFRHAC	3406(b)(13), 3406(e)(1)	High
•3. Continue the evaluation to identify solutions to passage at RBDD, including measures to improve passage when the RBDD gates are in the raised position from September 15 through at least May 14.	USFWS, USBR, CDFG, TCCA, NMFS	3406(b)(10)	High
4. Evaluate the contribution of large woody debris and boulders in the upper mainstem Sacramento River to salmonid production and rearing habitat quality.	CDFG, USFWS, USBR, CDFG, RWQCB, NMFS	3406(e)(6)	Medium ⁷
•5. Identify opportunities for restoring riparian forests in channelized sections of the upper mainstem Sacramento River that are appropriate with flood control and	USRFRHAC, The Nature Conservancy (TNC).	3406(b)(13)	High

⁷ Although Action 4 contributes to natural habitat, it was assigned medium priority because of a lack of evidence of benefits to fish production.

- Miscellaneous small tributaries

Evaluation	Involved parties	Tools	Priority
•1. Evaluate the contribution of small Sacramento River tributaries as rearing areas for juvenile winter-, spring-, fall- and late-fall-run chinook salmon and steelhead.	CDFG, USFWS, USBR, Chico State University	3406(e)(6)	High

LOWER SACRAMENTO RIVER AND DELTA TRIBUTARIES

Feather River

Action	Involved parties	Tools	Priority
•1. Supplement flows with water acquired from willing sellers consistent with applicable guidelines or negotiate agreements to improve conditions for all life history stages of fall- and spring-run chinook salmon and steelhead.	CDWR, CDFG, USFWS, USBR	3406(b)(3)	High
2. Improve flows for American shad migration, spawning, incubation and rearing from April to June, consistent with actions to protect chinook salmon and steelhead and when hydrologic conditions are adequate to minimize adverse effects to water supply operations.	Diversers, CDWR, CDFG, USFWS, USBR	3406(b)(3)	High
•3. Develop and utilize a temperature model as a tool for river management.	CDWR		High

Evaluation	Involved parties	Tools	Priority
•1. Evaluate the response of spawning salmonids to increased flows in the low-flow channel.	CDWR, CDFG		High

Evaluation	Involved parties	Tools	Priority
•2. Evaluate the quality of spawning gravel in areas used by chinook salmon, and if indicated, consider gravel renovation or supplementation to enhance substrate quality.	CDWR		High
•3. Evaluate the distribution of Feather River Fish Hatchery chinook salmon in Central Valley stocks and determine the genetic integrity of Feather River spring-run chinook salmon.	CDWR, CDFG		Low
4. Identify and attempt to maintain adequate flows and temperatures for white sturgeon and green sturgeon migration, spawning, incubation and rearing from February to May, consistent with actions to protect chinook salmon and steelhead and when hydrologic conditions are adequate to minimize adverse effects to water supply operations.	CDFG, CDWR		High
5. Identify and remove physical and water quality barriers that impede access for white sturgeon and green sturgeon to spawning habitat or facilitate passage around these barriers.	CDFG, CDWR		Medium
6. Identify the extent of white sturgeon and green sturgeon entrainment at diversions and pumps and reduce or eliminate entrainment if found to be substantial.	CDFG, CDWR		Medium
7. Identify white sturgeon and green sturgeon spawning sites and evaluate the availability and use by adult sturgeon of spawning habitat.	CDFG, CDWR		High
8. Determine the effects of poaching and fishing on the number of spawning white sturgeon and green sturgeon.	CDFG		Low
9. Identify and implement actions that maintain mean daily water temperatures between 61° F and 65° F for at least one month from April 1 to June 30 for American shad spawning, consistent with actions to protect chinook salmon and steelhead and when hydrologic conditions are adequate to minimize adverse effects to water supply operations.	CDFG, CDWR		High

Evaluation	Involved parties	Tools	Priority
2. Evaluate instream flow, water temperature and fish habitat use in the Calaveras River to develop a real-time management program so that reservoir operations can maintain suitable habitat when fish are present.	CDFG, Diverters, USFWS		High

SAN JOAQUIN BASIN

Merced River

Action	Involved parties	Tools	Priority
•1. Supplement flows provided pursuant to the Davis-Grunsky Contract Number D-GGR17 and FERC License Number 2179 with water acquired from willing sellers consistent with applicable guidelines or negotiate agreements as needed to improve conditions for all life history stages of chinook salmon.	Merced Irrigation District (MID), Diverters, CDFG, CDWR, USFWS, USBR	3406(b)(3)	High
2. Reduce adverse effects of rapid flow fluctuations.	MID, CDFG, USFWS, USBR		High
3. Improve watershed management to restore and protect instream and riparian habitat, including consideration of restoring and replenishing spawning gravel.	Landowners, Merced County, NRCS, CDFG, USFWS, USBR		High

Action	Involved parties	Tools	Priority
4. Screen all diversions to protect all life history stages of anadromous fish.	Diversers, USFWS, USBR, NMFS, CDFG, CDWR	3406(b)(21)	Medium
5. Establish a streamwatch program to increase public participation in river management.	Public, CDFG, USFWS		Low

Evaluation	Involved parties	Tools	Priority
1. Identify and implement actions to provide suitable water temperatures for all life stages of chinook salmon; establish maximum temperature objectives of 56°F from October 15 to February 15 for incubation and 65°F from April 1 to May 31 for juvenile emigration.	Dam operators, CDFG, USFWS, USBR	3406(g)	High
•2. Evaluate and implement actions to reduce predation on juvenile chinook salmon, including actions to isolate "ponded" sections of the river.	CDFG, USFWS, USBR	3406(e)(6)	Medium
3. Evaluate fall pulse flows for attraction and passage benefits to chinook salmon and steelhead.	Dam operators, CDFG, USFWS, USBR		High

Tuolumne River

Action	Involved parties	Tools	Priority
<p>•1. Implement a flow schedule as specified in the terms of the FERC order resulting from the New Don Pedro Project (FERC Proceeding P-2299-024). Supplement FERC agreement flows with water acquired from willing sellers consistent with applicable guidelines or negotiate agreements as needed to improve conditions for all life history stages of chinook salmon.</p>	<p>City and County of San Francisco, Turlock Irrigation District (TID), Modesto Irrigation District (MID), Lower Tuolumne River Technical Advisory Committee (LTTAC), FERC, USFWS, USBR</p>	<p>3406(b)(3)</p>	<p>High</p>

Action	Involved parties	Tools	Priority
•2. Improve watershed management and restore and protect instream and riparian habitat, including consideration of restoring and replenishing spawning gravel and performing an integrated evaluation of biological and geomorphic processes.	Landowners, NRCS, CDFG, USFWS, USBR, LTTAC		High
3. Screen all diversions to protect all life history stages of anadromous fish.	Diversers, LTTAC, CDFG, CDWR, NMFS, USFWS, USBR	3406(b)(21)	Medium
4. Support the Tuolumne River Interpretive Center.	CDFG, LTTAC		Low
5. Establish a streamwatch program to increase public participation in river management.	Public, LTTAC, CDFG, USFWS		Low
6. Coordinate the AFRP with appropriate activities supported by the Riparian and Recreation Improvement fund that was established by the New Don Pedro Settlement Agreement.	LLTAC, USFWS, USBR		Low

Evaluation	Involved parties	Tools	Priority
1. Identify and implement actions to provide suitable water temperatures for all life stages of chinook salmon; establish maximum temperature objectives of 56°F from October 15 to	Dam operators, CDFG,	3406(g)	High

Stanislaus River

Action	Involved parties	Tools	Priority																																																																	
<p>•1. Implement an interim river regulation plan that meets the following flow schedule by supplementing the 1987 agreement between USBR and CDFG^a, through reoperation of New Melones Dam, use of (b)(2) water, and acquisition of water from willing sellers as needed.</p> <table border="1"> <thead> <tr> <th rowspan="2">Month</th> <th colspan="5">Stanislaus River flow schedules (cfs) by year type</th> </tr> <tr> <th>Wet</th> <th>Above normal</th> <th>Below normal</th> <th>Dry</th> <th>Critical</th> </tr> </thead> <tbody> <tr> <td>October</td> <td>350</td> <td>350</td> <td>250</td> <td>250</td> <td>200</td> </tr> <tr> <td>November - March</td> <td>400</td> <td>350</td> <td>300</td> <td>275</td> <td>250</td> </tr> <tr> <td>April</td> <td>1,500</td> <td>1,500</td> <td>300/1500^c</td> <td>300/1500^d</td> <td>300/1500^e</td> </tr> <tr> <td>May</td> <td>1,500</td> <td>1,500</td> <td>1500/300^c</td> <td>1500/300^d</td> <td>1500/300^e</td> </tr> <tr> <td>June</td> <td>1,500</td> <td>800</td> <td>250</td> <td>200</td> <td>200</td> </tr> <tr> <td>July - September</td> <td>300</td> <td>300</td> <td>250</td> <td>200</td> <td>200</td> </tr> <tr> <td>Total (taf)</td> <td>468</td> <td>410</td> <td>313</td> <td>257</td> <td>247</td> </tr> <tr> <td>Baseline (taf)</td> <td>1,015</td> <td>722</td> <td>406</td> <td>242</td> <td>269</td> </tr> <tr> <td>Unimpaired (taf)</td> <td>1,772</td> <td>1,291</td> <td>920</td> <td>631</td> <td>449</td> </tr> </tbody> </table> <p>^a Existing flow requirements are 98 to 302 taf, based on the 1987 agreement between CDFG and USBR (CDFG and USBR 1987); actual schedule is determined on an annual basis and depends on available yield, carryover storage, and hydrologic conditions.</p> <p>^b Year type based on San Joaquin basin 60-20-20 index. Flow schedules are releases from Goodwin Dam.</p> <p>^c In a below normal water year, April-May flow would be maintained for 45 days at 1500 cfs and 16 days at 300 cfs.</p> <p>^d In a dry water year, April-May flow would be maintained for 30 days at 1500 cfs and 31 days at 300 cfs.</p> <p>^e In a critical water year, April-May flow would be maintained at 1500 cfs for 30 days and at 300 cfs for 31 days.</p>	Month	Stanislaus River flow schedules (cfs) by year type					Wet	Above normal	Below normal	Dry	Critical	October	350	350	250	250	200	November - March	400	350	300	275	250	April	1,500	1,500	300/1500 ^c	300/1500 ^d	300/1500 ^e	May	1,500	1,500	1500/300 ^c	1500/300 ^d	1500/300 ^e	June	1,500	800	250	200	200	July - September	300	300	250	200	200	Total (taf)	468	410	313	257	247	Baseline (taf)	1,015	722	406	242	269	Unimpaired (taf)	1,772	1,291	920	631	449	<p>CDFG, USFWS, USBR, Oakdale Irrigation District, South San Joaquin Irrigation District, Stockton East Water District, Central San Joaquin Water Conservation District, South Delta Water Agency (SDWA), COE</p>	<p>3406(b)(1)(B), 3046(b)(2), 3406(b)(3)</p>	<p>High</p>
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<p>•2. Improve watershed management to restore and protect instream and riparian habitat, including consideration of restoring and replenishing spawning gravel.</p>	<p>Landowners, CDFG, NRCS, COE, USFWS, USBR</p>	<p>3406(b)(13)</p>	<p>High</p>																																																																	

Action	Involved parties	Tools	Priority
3. Screen all diversions to protect all life history stages of anadromous fish.	Diverters, USFWS, USBR, NMFS, CDFG, CDWR	3406(b)(21)	Medium

Evaluation	Involved parties	Tools	Priority
•1. Identify and implement actions to provide suitable water temperatures for all life stages of chinook salmon, consistent with efforts to maintain adequate flows to provide fish habitat. Establish maximum temperature objectives of 56 °F from October 15 to February 15 for incubation and 65 °F from April 1 to May 31 for juvenile rearing and emigration.	Dam operators, CDFG, USFWS, USBR, COE	3406(g)	High
•2. Evaluate and implement actions to reduce predation on juvenile chinook salmon, including actions to isolate ponded sections of the river.	CDFG, USFWS, USBR, COE	3406(e)(6)	Medium
•3. Evaluate and refine a river regulation plan that provides adequate flows to protect all life stages of anadromous fish based on water storage at New Melones Reservoir, predicted hydrologic conditions, and current aquatic habitat conditions.	USFWS, USBR, CDFG, COE		High
4. Develop a carryover storage target for New Melones Reservoir to ensure Vernalis flow standards are met during the 30-day pulse flow period during the third year of a dry or critical period. This will protect at least one of three year classes of chinook salmon during emigration.	USFWS, USBR, CDFG, SEWD	3406(g)	High

Evaluation	Involved parties	Tools	Priority
5. Evaluate use of the Stanislaus River by American shad and consider increasing flows and maintaining mean daily water temperatures between 61 °F and 65 °F from April to June when hydrologic conditions are adequate to minimize adverse effects to water supply operations and in a manner consistent with actions to protect chinook salmon.	Dam operators, CDFG, USFWS, USBR	3406(g)	High
6. Evaluate fall pulse flows for attraction and passage benefits to chinook salmon and steelhead.	USFWS, USBR, CDFG, COE, SEWD		

Evaluation	Involved parties	Tools	Priority
	diverters, CDFG, USFWS, USBR		

SACRAMENTO-SAN JOAQUIN DELTA

Improvements to aquatic habitat in the Delta are essential to restore the natural production of anadromous fish in the Central Valley because habitat in the Delta is highly degraded and all species and races of fish use the Delta at some stage in their life history.

Recent actions to improve fish habitat in the Delta are described in the 15 December 1994, Principles for Agreement on Bay-Delta Standards between the State of California and the Federal Government (Bay-Delta Agreement) and in the State Water Resources Control Board's May, 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (1995 WQCP). The AFRP assumes that those actions will continue to be implemented in the future. Should changes occur in the 1995 WQCP objectives or the Bay-Delta Agreement, the AFRP will need to determine if new restoration actions in the Delta beyond those described below are needed in light of those changes.

Both the Bay-Delta Agreement and 1995 WQCP require operational flexibility of state and federal water projects to provide protection for anadromous fish. As described in the Bay-Delta Agreement, initial deliberation and operational decisions to achieve this flexibility will be made by the California Water Policy Council and Federal Ecosystem Directorate (CALFED) Coordination Group (Ops Group) in consultation with water users, environmentalists and fishery representatives. The Ops Group develops ways to use the operational flexibility of the State Water Project (SWP) and Central Valley Project (CVP) such that species using the estuary receive more protection than they would have received by strict adherence to 1995 WQCP standards.

Operational flexibility allows the Ops Group to meet operational targets that contribute to doubling natural production of anadromous fish, and the Bay-Delta Agreement's criterion to maintain water quality conditions which, together with other measures in the watershed, would be sufficient to achieve a doubling of production of chinook salmon. The operational targets listed in the first table below are the AFRP recommendations to the Ops Group. These targets allow variability in the timing and nature of operations to meet requirements in the 1995 WQCP.

A second table lists supplemental actions requiring water that may involve changes in operations beyond the authority of the Ops Group that further contribute to meeting the AFRP goal. In this table, some supplemental actions are identical to operational targets because their full implementation may be beyond the authority of the Ops Group. Supplemental actions can be met through a combination of project reoperation (Section 3406(b)(1)), management of 800,000 acre-feet of CVP yield (Section 3406(b)(2)), and acquisition of water from willing sellers (Section 3406(b)(3)). The best combination of these three tools for achieving the actions will be determined through the preparation of annual implementation plans along with guidance from the long-term water management plan, which will seek to maximize the biological benefits of the actions while minimizing their water supply impacts. In some years, the three tools may not be sufficient to fully implement all actions, resulting in partial implementation of some actions. Sub-priorities are provided as guidance for partial implementation for some actions.

These supplemental actions (some in slightly modified form) are being used to develop an implementation plan in the form of the CVP operational forecast for water year 1997 and to develop a long-term CVP Water Management Plan that integrates these supplemental actions with upstream flow actions and Delta operational targets.

In addition, these supplemental actions requiring water formed the basis for the nine priorities that were provided to the PEIS team for their use in developing alternatives for the PEIS in a letter to interested parties dated October 25, 1996 announcing an AFRP workshop on proposed fish flow and habitat objectives for selected Central Valley rivers and the Delta.

Supplemental actions not requiring water include screens at diversions and a channel barrier. Some of these actions are not under the direct authority of the Ops Group or addressed by the 1995 WQCP, however, some actions may be addressed by Category III of the Bay-Delta Agreement.

In developing this Restoration Plan, Interior has made an initial programmatic-level determination of the reasonableness of the restoration actions included in the following tables. As USFWS and USBR move towards specific plans for implementation based on this Restoration Plan, they will continue to examine the reasonableness of a particular mix of restoration actions. The final decision to implement any action will be done through the implementation process and described in the implementation plans.

The following operational targets, supplemental actions, and evaluations are intended to be consistent with and supportive of the CALFED Bay-Delta process, the Bay-Delta Agreement's criterion to maintain conditions sufficient to achieve a doubling of production of chinook salmon, and with the narrative water quality objective in the 1995 WQCP to maintain water quality conditions and other

measures sufficient to achieve a doubling of natural production of chinook salmon from the average production of 1967-1991, consistent with the provisions of State and federal law.

Operational target	Involved parties	Tools	Priority
<p>•1. Close Delta Cross Channel (DCC) up to 45 days in the November through January period, when juvenile salmon enter the Delta or flow or turbidity changes trigger salmon migration. The DCC gates are to be closed within 24 hours when any of the following triggers occur:</p> <p>1) daily average flow or turbidity of the Sacramento River at Freeport increases by 20% from the previous 3 day running average;</p> <p>2) capture of at least one juvenile chinook salmon of spring-run size in the Sacramento River tributaries and in the Sutter Bypass, or in the Sacramento River at or below Knights Landing;</p> <p>3) capture of at least two juvenile chinook salmon of any race in the Sacramento River at or below Knights Landing at any Interagency Ecological Program (IEP) sampling station in one day.</p> <p>The gate closure period will be for 10, 15 and 20 consecutive days in November, December and January, respectively, and will remain closed for another 10 consecutive days if any of the above triggers are met after the initial closure for that month.</p>	CALFED agencies	WQCP, Bay-Delta Agreement, 3406(b)(1)(B)	High ¹
<p>•2. When the DCC is closed during the November through January period, limit the average SWP and CVP exports to no greater than 35% of Delta inflow if Evaluation 3</p>	CALFED agencies	WQCP, Bay-Delta Agreement.	High

¹Although Operational target 1 addresses fish passage, it was assigned high priority because potential to increase fish production is great.

Operational target	Involved parties	Tools	Priority
determines that a relatively high ratio of Delta export to inflow limits juvenile salmon survival through the Sacramento River Delta. Sub-priorities: 1) January, 2) December, 3) November.		3406(b)(1)(B)	
•3. Maximize DCC closure from May 21 through June 15 when chinook salmon and other anadromous species are abundant in the lower Sacramento River, but keep open when the net benefit to striped bass and other sensitive species in the lower San Joaquin River is great.	CALFED agencies, United States Coast Guard, Boating interests	WQCP, Bay-Delta Agreement, 3406(b)(1)(B)	High ²
•4. Maintain an average export to inflow ratio of no more than 45% during February in dry years by increasing the ratio to ~55% in early February and decreasing the ratio to ~35% in late February, when winter-run chinook salmon smolts are present.	CALFED agencies	WQCP, Bay-Delta Agreement, 3406(b)(1)(B)	High
•5. Minimize fish losses and predation at facilities by operating state and federal pumps interchangeably when this operation achieves a net benefit to anadromous fish production.	CALFED agencies	WQCP, Bay-Delta Agreement, 3406(b)(1)(B)	Medium

Supplemental action requiring water	Involved parties	Tools	Priority
•6. In conjunction with operation of a barrier at the head of Old River and consistent with efforts to conduct evaluations 1 and 2,	CALFED agencies	3406(b)(2), 3406(b)(3)	High

²Although Operational target 3 addresses fish passage, it was assigned high priority because potential to increase fish production is great.

Supplemental action requiring water	Involved parties	Tools	Priority																																																																															
maximize the difference between flows and export rates at levels greater than those required under the Delta smelt biological opinion during the 30-day April and May pulse flow period.																																																																																		
•7. When a barrier at the head of Old River is not operational, limit the combined SWP and CVP exports to 1,500 cfs or maintain a Vernalis inflow to total export ratio of 5 to 1 during the 30-day April through May pulse flow period.	CALFED agencies	3406(b)(2), 3406(b)(3)	High																																																																															
•8. Increase the level of protection targeted by the May and June X2 requirements to a 1962 level of development (LOD), as described below, where the number of days when X2 is required at Chipps Island in Table A of the 1995 WQCP is shown to the right of the requirements to meet a 1962 LOD and where PMI is the previous months eight river index in acre feet.	CALFED agencies	3406(b)(2),	High																																																																															
<table border="1"> <thead> <tr> <th rowspan="2">PMI</th> <th colspan="2">1962 LOD</th> <th colspan="2">IN WQCP</th> </tr> <tr> <th>MAY</th> <th>JUNE</th> <th>MAY</th> <th>JUNE</th> </tr> </thead> <tbody> <tr><td>≤1500</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1750</td><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>2000</td><td>4</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>2250</td><td>13</td><td>1</td><td>3</td><td>0</td></tr> <tr><td>2500</td><td>24</td><td>3</td><td>11</td><td>1</td></tr> <tr><td>2750</td><td>29</td><td>7</td><td>20</td><td>2</td></tr> <tr><td>3000</td><td>30</td><td>12</td><td>27</td><td>4</td></tr> <tr><td>3250</td><td>31</td><td>18</td><td>29</td><td>8</td></tr> <tr><td>3500</td><td>31</td><td>23</td><td>30</td><td>13</td></tr> <tr><td>3750</td><td>31</td><td>26</td><td>31</td><td>18</td></tr> <tr><td>4000</td><td>31</td><td>28</td><td>31</td><td>23</td></tr> <tr><td>4250</td><td>31</td><td>29</td><td>31</td><td>25</td></tr> <tr><td>4500</td><td>31</td><td>29</td><td>31</td><td>27</td></tr> <tr><td>4750</td><td>31</td><td>30</td><td>31</td><td>28</td></tr> </tbody> </table>	PMI	1962 LOD		IN WQCP		MAY	JUNE	MAY	JUNE	≤1500	0	0	0	0	1750	1	0	0	0	2000	4	0	1	0	2250	13	1	3	0	2500	24	3	11	1	2750	29	7	20	2	3000	30	12	27	4	3250	31	18	29	8	3500	31	23	30	13	3750	31	26	31	18	4000	31	28	31	23	4250	31	29	31	25	4500	31	29	31	27	4750	31	30	31	28			
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•9. During May, maintain at least 13,000 cfs daily flow in the Sacramento River at the I Street Bridge and 9,000 cfs at Knights Landing to improve transport of eggs and larval striped bass and other young anadromous fish and to reduce egg settling and mortality at low flows. Sub-priorities: 1) 13,000 cfs at I Street Bridge, 2) 9,000 cfs at Knights Landing.	CALFED agencies	3406(b)(2), 3406(b)(3)	High																																																																															
•10. During the last half of May, ramp (linearly) the total SWP	CALFED	3406(b)(2),	High																																																																															

Supplemental action requiring water	Involved parties	Tools	Priority
and CVP export level from what it is at the end of the 30-day April and May pulse flow period to that export level proposed by the SWP and CVP to meet the requirements of the 1995 WQCP on June 1.	agencies	3406(b)(3)	
•11. Close the DCC during the November through January period beyond the 45-day limit defined under Operational Target 1 should meeting one of the triggers stipulated in Operational Target 1 require additional closure.	CALFED agencies	3406(b)(2), 3406(b)(3),	High ¹
•12. Limit the average SWP and CVP exports to no greater than 35% of Delta inflow in July. Sub-priorities: 1) July 1 to July 14, 2) July 16 to July 31.	CALFED agencies	3406(b)(2), 3406(b)(3)	High
13. Supplement Delta outflow for migration and rearing of white sturgeon, green sturgeon, striped bass, and American shad by modifying CVP operations and using water available under the CVPIA (sections 3406(b)(2) and (3)), consistent with actions to protect chinook salmon and steelhead.	CALFED agencies	3406(b)(2), 3406(b)(3)	High
•14. When the DCC is closed during the November through January period, limit the average SWP and CVP exports to no greater than 35% of Delta inflow if Evaluation 3 determines that a relatively high ratio of export to inflow limits survival of juvenile chinook salmon migrating through the Sacramento River Delta. Sub-priorities: 1) January, 2) December, 3) November.	CALFED agencies	3406(b)(2), 3406(b)(3)	High

Supplemental action not requiring water	Involved parties	Tools	Priority
•15. Implement actions to reduce losses of juvenile anadromous fish resulting from unscreened or inadequately screened diversions in the Sacramento-San Joaquin Delta and	Diversers, CDFG, CDWR,	3406(b)(21)	Medium

¹Although Supplemental action 11 addresses fish passage, it was assigned high priority because potential to increase fish production is great.

Supplemental action not requiring water	Involved parties	Tools	Priority
Suisun Marsh, if Evaluation 12 determines significant benefits to juvenile anadromous fish can be achieved by screening.	USFWS, USBR, NMFS, SWRCB, COE		
•16. Construct and operate a barrier at the head of Old River to improve conditions for chinook salmon migration and survival if Evaluation 1 determines that a barrier can be operated to improve conditions for salmon with minimal adverse effects on other Delta species.	CALFED agencies	3406(b)(2), 3406(b)(3), 3406(b)(15)	High ²

²Although Supplemental Action 16 addresses fish passage, it was assigned high priority because potential to increase fish production is great.

Evaluation	Involved parties	Tools	Priority
<p>•1. In conjunction with Evaluation 2, evaluate whether a temporary rock barrier at the head of Old River can be operated during the 30-day April through May pulse flow period to improve conditions for chinook salmon migration and survival with minimal adverse effects on other Delta species, consistent with the COEs permit (PN 199600027) to the CDWR and USFWS's Biological Opinion on delta smelt for the Temporary Barriers Project.</p>	IEP agencies	3406(b)(15)	High ¹
<p>•2. Evaluate in conjunction with Evaluation 1 the impacts of San Joaquin River Delta inflow and SWP and CVP export rates on salmon smolt survival through the San Joaquin Delta. This evaluation is intended to be consistent with the proposed adaptive management plan for the San Joaquin River and Delta that is being considered by involved parties.</p>	IEP agencies	3406(b)(1), 3406(b)(2), 3406(b)(3)	High
<p>•3. Evaluate the effect of a low (~35%) versus a high (~65%) SWP and CVP export to Delta inflow ratio on the survival of coded-wire-tagged, late-fall-run chinook salmon smolts migrating through the Delta when the DCC is closed.</p>	IEP agencies	3406(b)(1), 3406(b)(2), 3406(b)(3)	High
<p>•4. Evaluate potential benefits of and opportunities for increasing salmonid and other anadromous fish production through improved riparian habitats in the Delta.</p>	SWP and CVP contractors, TNC, IEP agencies	3406(e)(1)	High
<p>•5. Evaluate opportunities to provide modified operations and a new or improved control structure for the DCC and Georgiana Slough or other methods at those locations to assist in the successful migration of anadromous salmonids.</p>	SWP and CVP contractors, IEP agencies	3406(b)(14), 3406(e)(5)	High ²

¹Although Evaluation 1 addresses fish passage, it was assigned high priority because resulting information is needed before Supplemental Action 16 can be implemented.

Evaluation	Involved parties	Tools	Priority
*6. Evaluate benefits of and opportunities for additional tidal shallow-water habitat as rearing habitat for anadromous fish in the Delta.	SWP and CVP contractors, TNC, IEP agencies		High
7. Evaluate the benefit of and opportunities for new technologies to improve water quality and to guide migrating fish.	SWP and CVP contractors, IEP agencies		Medium
*8. Evaluate the benefits of short-term pulsed Delta inflows (five days or less) on the migration rate and survival of anadromous fish.	SWP and CVP contractors, IEP agencies		High
*9. Continue to evaluate the effects of Delta hydraulic conditions such as net reverse flows on anadromous fish migration and distribution.	SWP and CVP contractors, IEP agencies	3406(g)	High
10. Evaluate the potential effects of reductions in food chain organisms in the Delta and Suisun Bay on anadromous fish production.	SWP and CVP contractors, IEP agencies	3406(g)	High
*11. Evaluate whether Delta inflow and export rates and other Delta hydrodynamic parameters effect juvenile salmon survival when the DCC is closed.	SWP and CVP contractors, IEP	3406(g)	High

²Although Evaluation 5 addresses fish passage, it was assigned high priority because the potential to increase fish production is great.

Evaluation	Involved parties	Tools	Priority
	agencies		
12. Evaluate the benefits to juvenile anadromous fish of and opportunities for screening diversions and re-locating riparian diversions in the Delta and Suisun Marsh.	SWP and CVP contractors, IEP agencies	3406(b)(21)	Medium
•13. Evaluate the potential effect of Delta export rate during the fall on the upstream migration of adult San Joaquin chinook salmon.	SWP and CVP contractors, IEP agencies	3406(b)(1)(B)	High

CENTRAL VALLEY-WIDE

Action	Involved parties	Tools	Priority
•1. Support programs to provide educational outreach and local involvement in restoration, including programs like Salmonids in the Classroom, Aquatic Wild, and Adopt a Watershed and school district environmental camps.	Local schools, CDFG, USFWS, NMFS		Low
2. Develop programs to educate the public about anadromous fish issues, such as the effects of poaching and environmental contaminants, especially contaminants in urban runoff.	CDFG, USFWS, NMFS, Water Education Foundation, California Teachers Association		Low
3. Reduce toxic chemical and trace element contamination.	CDFG,		High