INTRODUCTION

The Central Valley Project Improvement Act (CVPIA) amended the purposes of the Central Valley Project (CVP) to make fish and wildlife mitigation, protection, and restoration purposes equal to use of water for irrigation and domestic purposes of the CVP. To assist in meeting these newly-added goals, the Secretary is authorized and directed to modify CVP operations to provide flows "from the quantity of water dedicated to fish and wildlife and habitat restoration purposes" under Section 3406(b)(2), from acquired water supplies and from "other sources which do not conflict with fulfillment of the Secretary's remaining contractual obligations to provide CVP water for other authorized purposes."

Section 3406(b)(2) of the CVPIA directs the Secretary to "dedicate and manage annually eight hundred thousand acre-feet of Central Valley Project yield [hereinafter "(b)(2) water"] for the primary purpose of implementing the fish, wildlife, and habitat restoration purposes and measures authorized by this title; to assist the State of California in its efforts to protect the waters of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; and to help to meet such obligations as may be legally imposed upon the CVP under State or Federal law following the date of enactment of this title, including but not limited to additional obligations under the Federal Endangered Species Act." Subsection (B) of section 3406(b)(2) further provides that the (b)(2) water "be managed pursuant to conditions specified by the United States Fish and Wildlife Service after consultation with the Bureau of Reclamation and the California Department of Water Resources and in cooperation with the California Department of Fish and Game."

There has been considerable debate over the interpretation of this language, primarily regarding the issues of how the 800,000 acre-feet may be used and how it should be accounted. As discussed below, resolving these issues has been the goal of a substantial and lengthy agency, stakeholder, and public dialogue. This paper presents the Department of the Interior's (Interior's) conclusions as to how it intends to comply with the statutory mandate to dedicate and manage each year the water dedicated pursuant to 3406(b)(2).

BACKGROUND

(A) Development of the (b)(2) Guidelines and Draft CVPIA Administrative Proposals

In December 1994, Interior, acting through the U.S. Fish and Wildlife Service (Service) and the U.S. Bureau of Reclamation (Reclamation), issued draft guidelines ("(b)(2) guidelines") on the management of the (b)(2) water (also known as the "White Paper"). Comments were received from many sources, including environmental, urban, and agricultural stakeholders. Several meetings were held with stakeholders to discuss the concept of the paper. The draft (b)(2) guidelines were revised and reissued as a draft on September 12, 1995, and were transmitted as a final recommendation from the authors to the Regional Directors of Reclamation and the Service

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in May 1996. A copy of that recommendation was included with the first public draft of the CVPIA Administrative Proposal on Management of Section 3406(b)(2) Water (800,000 Acre-Feet) on July 1, 1996 (first Draft Administrative Proposal).

Further discussions of the issues involving the (b)(2) water began in late 1995 when a large stakeholder work team began meeting. These stakeholders identified a lengthy list of issues surrounding the management of the (b)(2) water. A summary of the stakeholder discussions and Interior's initial proposals for addressing the issues were included in the first Draft Administrative Proposal. A copy of that draft is available from Reclamation or may be accessed at Reclamation's home page on the Internet.

As noted in the first Draft Administrative Proposal, two additional issues raised by the stakeholders -- the operation of New Melones Dam and area of origin priorities -- have been reviewed in other forums in the CVPIA Forum process, and the results of those reviews are included in the final CVPIA Stanislaus Administrative Proposal, dated June 23, 1997, and a draft paper titled, "Applicability of Area of Origin Statutes Federal Central Valley Project," dated March 13, 1996. That draft was released for comment and will be released to the public when finalized.

(B) June 24 and October 31 Draft Administrative Proposals

On June 24, 1997, Interior released a substantially revised Draft Administrative Proposal (June 24 Draft Administrative Proposal). In this June 24 Draft Administrative Proposal, Interior suggested that it would be more productive and more in keeping with the intent of the statute to focus less on a formal "accounting system" for the dedication of 800,000 acre-feet and instead decide how it intends to manage the tools in 3406(b)(1), (b)(2), and (b)(3) for the benefit of the fish and wildlife resources in the Central Valley and in the Bay-Delta estuary. Consistent with this approach, Interior released a list of environmental measures it proposed meeting annually during the next 3 to 5 years. It also released preliminary model results showing the effects of implementing those measures on CVP water deliveries.

At the same time that it released the June 24 Draft Administrative Proposal, Interior initiated a series of public outreach efforts to solicit comment on its approach from affected interests and agencies. The public outreach effort involved three different focuses:

- A "Fish Group" met to discuss the list of proposed environmental measures in the Bay and Delta. This group analyzed the existing list of measures and proposals for how the measures might be improved to be more effective biologically, more useful for resolving biological questions in the Delta, and/or more water-efficient.

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- A "Modeling Group" met to discuss how the proposed or revised environmental measures should best be modeled to show the probable impacts of implementation on CVP and State Water Project deliveries across a broad range of potential hydrological conditions.

- A "Toolbox Group" met to consider whether there were actions that can be taken now and in the future to minimize the adverse effects to water users of implementing the environmental measures under the CVPIA. This Toolbox Group did not limit its work to the tools provided by the CVPIA; it operated under the premise that water policy in California was undergoing a fundamental review in the CALFED Bay-Delta Program, a component of which includes the environmental resources provided by the CVPIA. For this reason, a broader range of tools, resources, and objectives needed to be considered and included in order for all interest groups to move forward in the larger forum.

These three public forums met frequently during July, August, and September, and provided significant comment that was extremely useful in refining Interior's proposal for implementing Section 3406(b). Interior released another revised Administrative Proposal on October 31, which incorporated many of the refinements suggested by the public forums. Interior believes that the individual concerns and comments raised by the respective stakeholder participants have led to a substantially improved set of environmental measures for the next few years and to a better understanding of how these measures may affect water supplies.

In addition to specific comments that may be reflected elsewhere in this revised Administrative Proposal, participants in the public forums made two broad suggestions. First, that Interior should develop and support a long-term scientific evaluation process to evaluate the effectiveness of the CVPIA environmental measures, based on a sound monitoring program. Second, that Interior should consider forming an interagency-stakeholder group to assist in the "fast-track" implementation of appropriate measures identified in the "Toolbox" effort, using a broad array of CVPIA, CALFED, and other resources. Interior agrees that these ideas have merit, and will work with stakeholders to implement them in the coming months.

(C) Public Comment on Draft Administrative Proposal

Interior provided opportunity for public comment on the June 24 and October 31 draft Administrative Proposals and has incorporated in this final Administrative Proposal many of the comments and suggestions that it received on its Draft Administrative Proposals. A full summary of the comments received on Interior's various draft Administrative Proposals, as well as Interior's responses to those comments, is available from the Sacramento Office of Reclamation.

RESOLUTION OF THE MAJOR ISSUES

This revised Administrative Proposal describes Interior's resolution of three major issues: (A) dedicating and managing the (b)(2) water; (B) role of the "Toolbox"; and (C) crediting (b)(2) water towards the Water Quality Control Plan (WQCP). In addition, the paper describes the resolution of six additional issues, which have been largely subsumed within Interior's approach to the three major issues. Those six additional issues are: (1) defining the (b)(2) baseline; (2) using (b)(2) in the Delta; (3) reoperation/reuse of (b)(2) water; (4) shortage provisions for (b)(2) water; (5) prioritizing use for (b)(2) water; and (6) status of the "(b)(2) Guidelines." This discussion reflects Interior's conclusions after considering the substantial comments developed in the three public forums discussed above, as well as other comments submitted to Interior on these issues.

(A) Dedicating and Managing the (b)(2) Water

The CVPIA represented a significant change in the way water resources are to be used and managed in the CVP. For the first time, the "mitigation, protection, and restoration of fish and wildlife" has been placed on an equal footing with other major CVP purposes. In addition, the CVPIA, in the (b)(2) water provisions, placed affirmative obligations on the Service to specify conditions for the management of the CVP water for fish, wildlife and habitat restoration purposes. The CVPIA also requires the Service to consult with Reclamation and others in determining those conditions.

When combined with the directives on water management included in CVPIA Section 3406(b)(1)(B)(generally referred to as "(b)(1)" or "reoperation" of the project) and Section 3406(b)(3)(water acquisition), the (b)(2) water provision requires a coordinated approach to the management of CVP water. Reclamation has had to refine, and will continue to refine, its decisionmaking process to account for the multiple and frequently competing objectives for the project as now defined in the CVPIA. At the same time, the Service is developing a better understanding of Reclamation's operations process, so that it can be more effective in carrying out its obligations under the CVPIA.

Section 3406(b)(2) provides that the Secretary "shall dedicate and manage annually 800,000 acre-feet of CVP yield" for the primary purpose of implementing the CVPIA's fish and wildlife habitat restoration purposes. The statute further defines the CVP yield as "the delivery capability of the CVP during the 1928-1934 drought period" after factoring in the conditions of the applicable permits, licenses, and agreements in place at the time the CVPIA was enacted. That water is to be managed "pursuant to conditions specified by the Fish and Wildlife Service" after consultation with Reclamation and the California Departments of Fish and Game and Water Resources.

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Interior continues to believe that a significant part of the disagreement over the (b)(2) provision is caused by attempting to separate (b)(2) "measurement" (an aspect of dedication) from (b)(2) "actions" (how the water is managed to accomplish the purposes of the Act). Interior believes that (b)(2) water measurement definitions cannot take place in a vacuum isolated from the process of defining the actual environmental restoration actions that will be accomplished through the use of (b)(2) water. Further, Interior believes that (b)(2) must also be implemented in concert with the remainder of the statute. In particular, Interior's water management process for the CVP must focus on using the many tools in the CVPIA (including (b)(2) water, reoperation possibilities, acquired water, and others) in a coordinated and flexible manner. Recent cooperative efforts in California, such as the Bay-Delta Accord and the CALFED Operations Group, have shown the advantages of flexible, real-time water management for both environmental and water supply goals. Interior intends to apply this same flexible approach to the management of CVP water. Interior also believes that much of the controversy over the (b)(2) water arises from concern over the potential impact of a method of dedication that is based on a given "accounting" system. Stakeholders have also expressed a desire for certainty, and a desire to understand clearly how the water will be managed and what the impact will be to each use.

In recognition of the interrelationship between the accounting and the management of the water and the interrelationship of (b)(2) with the remainder of the statute, and in an attempt to provide certainty to the broad range of stakeholders, Interior proposed in the June 24 Draft Administrative Proposal (and reiterated in the October 31 Draft Administrative Proposal) the following approach to resolution of the (b)(2) issues:

> "First, Interior has developed a set of environmental measures that it will commit to implement during the next 3 to 5 years. [Footnote omitted.]These measures will be accomplished through a combination of project reoperation ((b)(1)) and dedication of (b)(2) water. Interior believes that, within the reasonable range of uncertainty inherent in managing water for environmental purposes, implementation of these measures will comply with the Act's mandate to dedicate a quantity of water under section 3406(b)(2). Further, by coordinating actions under (b)(2) with the operational flexibility authorized under section 3406(b)(1), the expected benefit to the environment should exceed the benefit solely attributable to 3406(b)(2). Also, where appropriate, additional capabilities and benefits may be obtained, under certain circumstances, through the acquisition of water from willing sellers, using the authority provided in section 3406(b)(3). A matrix summarizing the environmental measures is attached to this administrative proposal as Appendix A. Note that most of these measures vary in some way according to hydrological and operational conditions."

In addition, Interior proposed modeling the expected effects of implementing the proposed environmental measures on CVP water deliveries. In doing so, it modeled its best approximation of those measures over a 70-year hydrological record and quantified the impacts to CVP water

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deliveries during that modeled period. While impacts to water deliveries are neither the stated goal nor the stated measure of the 800,000 acre-feet of (b)(2) water, the model results provided the best data available on the effect that implementation of the environmental measures would have on existing contractors. In addition to showing overall averages, the model summary provided maximum, minimum, and average CVP water supply impacts for each of the standard hydrologic water year type categories (wet, above-normal, etc.). This modeling process was similar to the modeling effort carried out in developing the Bay Delta Accord.

After considering the comments that arose from the three public forums described above, as well as other comments submitted to Interior, Interior prepared a revised list of environmental measures and released that revised list on October 31 for public comment. The list, as revised in response to all comments received, is attached as Appendix A. After considering the comments, Interior has determined that it will implement the measures in Appendix A beginning in the 1998 water year (which began October 1, 1997), in cooperation with the CALFED Ops Group and with the State Water Project. Interior will implement these Appendix A measures for 5 years, in accordance with the hydrologic triggers and conditions described for each measure, at which time it will review the environmental effects of the measures and make any necessary revisions or refinements to the measures for implementation in subsequent years[1]. These revisions or refinements may either increase or decrease the impacts to water deliveries of implementing the measures, and may involve either reducing or increasing the number of measures themselves.

Stated broadly, the major change in Appendix A as compared to the June 24 Draft Administrative Proposal has been to better define the objective and implementation of each measure so that the measure's design and operation could be adjusted to meet that objective. As shown in the detailed description included in Appendix A, many of these measures have been restated as "protective experiments" -- measures that are intended to provide additional useful information about the biological processes at work within the ecosystem, while at the same time providing a level of protection of the resources that is consistent with the goals of the Revised Draft Anadromous Fish Restoration Plan (AFRP), and sufficient to meet, for the term they are effective, the purposes set out in the CVPIA. In addition, many of the measures have been revised to include better "triggers" or other responses to hydrological and/or biological conditions. The use of these real-time response mechanisms is intended to provide better biological results while minimizing unnecessary adverse impacts to water supplies. Interior will incorporate the measures described in Appendix A into a supplement to the 1992 Central Valley Project Operation Criteria and Plan (CVP-OCAP), with sufficient detail to allow project operators to plan and conduct CVP operations so as to attain all of the measures.

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[1] Some of the measures included in Appendix A, notably those associated with the Vernalis Adaptive Management Program or VAMP, by their own terms, will last longer than 5 years. Interior intends to implement these measures for the longer timeframes explicitly included in the definition of the measures.

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As part of its commitment to implement the measures outlined in Appendix A, Interior will ensure that the monitoring and evaluation process described for the particular measures is carried out during this 5-year period. Interior believes that this information and analysis will be critical in evaluating the effectiveness of Appendix A measures when these measures are reviewed at the end of the 5-year period. At that time, Interior anticipates that the measures will be revised as appropriate in response to the information made available through the scientific review process. Further, Interior commits to conducting its review of these measures at the end of the 5-year period through a public process similar to the process used in arriving at these Appendix A measures. Finally, Interior will coordinate its analysis of the effectiveness of the Appendix A measures with the triennial review process to be conducted by the State Board.

Interior is also providing a revised set of model results in Appendix B that portray the potential effects of implementing the environmental measures on water deliveries across a broad range of hydrologies. As noted in both the June 24 and October 31 Draft Administrative Proposals, impacts to water deliveries is neither the goal nor the measure of the (b)(2) water. These modeling data, however, provide the best available information on the water supply impacts of implementing the environmental measures. The revised model results are attached as Appendix B. Given the difficulty of portraying "triggers" or similar refinements in the existing hydrological models, these model results are necessarily only a rough approximation. Interior believes that although particular results may vary, on balance the use of the "triggers" will somewhat reduce the actual impacts to water deliveries as compared to the revised modeled results. Note that these models show average water delivery impacts of approximately 800,000 acre-feet in dry years and approximately 600,000 acre-feet in critically dry years. The level of impacts in critically dry years is consistent with Interior's decision to invoke the shortage provision of section 3406(b)(2)(C), as discussed below.

The information provided in the revised Appendix A and Appendix B reflects a number of important conclusions, including the following:

- The environmental measures included in revised Appendix A are generally consistent with the proposals for upstream and in-Delta measures included in the Revised Draft Anadromous Fish Restoration Plan. In addition, the measures in Appendix A reflect the discussions that have been taking place between agencies and stakeholders over the proper implementation of environmental measures on the lower San Joaquin River. These discussions, which have resulted in the development of the Vernalis Adaptive Management Plan or VAMP, bear directly on the nature of environmental measures 1, 2 and 5 in Appendix A.

- By designating a set of fish, wildlife and habitat restoration measures that will be implemented over the course of a set period of time, Interior is providing greater certainty for the environment, for project operators, and for water users. These measures will be incorporated into the annual operations of the CVP beginning in the 1997-98 water year,

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and will not be changed until Interior conducts a public process of revising those measures at the end of 5 years. Aside from the flexibility built into the measures themselves, "real time" flexibility to implement different or additional environmental measures in the system will come primarily through project reoperation, through management of a water reserve account, or through water purchases.

- Interior believes that the Act provides for the use of up to 800,000 acre feet of (b)(2) water every year. At the same time, it is reasonable to expect that the entire 800,000 acre-feet may not be necessary in the wetter hydrologies. As noted in the first Draft Administrative Proposal, CVPIA Section 3406(b)(2)(D) provides a relief provision from the mandate to dedicate (b)(2) water: "If the quantity of water dedicated under [(b)(2)] or any portion thereof, is not needed for the purposes of this section, based on a finding by the Secretary, the Secretary is authorized to make such water available for other project purposes." The matrix of measures in Appendix A reflects Interior's finding of how best to accomplish the purposes of the statute for the next 5 years. Thus, Interior believes by meeting the environmental measures set out in Appendix A, it is fully using the (b)(2) water. However, to the extent others question this conclusion, Interior relies on Section 3406(b)(2)(D) of the Act. To the extent that the measures in Appendix A do not use all the dedicated water, this document constitutes the Secretary's finding that such unused quantity, if any, is not needed for the purposes of Section 3406 of the Act, and such quantity is available for other project purposes. This finding is based on the entire record supporting this Administrative Proposal, and on the "protective experimental" nature of the measures. This finding will be reassessed in the context of the review and possible revision of these environmental measures at the end of the 5-year period.

(B) Role of the "Toolbox"

Discussions between Interior and the public (including the "Toolbox Group") over the past several months have highlighted the significant changes occurring in California water management. Notably, the CALFED Bay-Delta Program has been moving quickly towards developing and finalizing a preferred alternative for a broader resolution to the many competing interests in California water. Related to this planning effort was the passage of Proposition 204 by the California voters in November 1996, which provided almost $500 million for ecosystem restoration in the Bay and Delta, as well as almost another $500 million for related water management projects and activities. In addition, the U.S. Congress authorized up to $430 million over the next 3 years for Bay and Delta ecosystem restoration, and Congress has appropriated $85 million of this amount for fiscal year 1998.

Given these changes in the policy background of California water issues, Interior agrees that it should look beyond the CVPIA as it considers ways to mitigate potential adverse effects, if any, on CVP contractors. The Toolbox Group discussions developed a number of ideas for enhancing water supplies in the near term and in the longer term.

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In Appendix C, Interior has described a number of specific "tools" that it is committing to implement. These "tools" are based in large part on the discussions that took place in the Toolbox Group, although Interior has continued to evaluate and refine them to identify those tools that promise real water supply benefits in the near term. Some of the tools are primarily at the discretion of Interior, and Interior will move forward with implementing these tools immediately. Other tools require the cooperation and/or regulatory approval of other entities. As to these latter tools, Interior is committing to initiate the appropriate regulatory applications immediately.

Interior's discussions with various stakeholder groups have identified concerns about Interior's ability and commitment to move forward quickly on the development and implementation of these tools. To address these concerns, Interior has included in Appendix C a proposed schedule of tasks necessary to implement the toolbox measures. This schedule was developed in cooperation with many of the stakeholders and the State of California after reviewing the institutional needs and regulatory requirements that must be resolved to implement the tools. Interior is committing to apply the necessary technical and policy staff at all levels to achieve the schedule outlined in Appendix C.

A primary component of toolbox implementation is identifying necessary funding. In Appendix C, Interior has included a rough estimate of the potential costs of implementing the toolbox, and has listed potential sources for these funds. Given the recent changes in the policy background of California water issues discussed above, and the clear interconnection between toolbox implementation and the broader resolution of California water issues being developed in the CALFED Bay-Delta process, Interior believes it should pursue a broad approach of using all possible funding sources (CVPIA, CALFED, etc.) to implement appropriate measures. In reviewing funding opportunities, Interior believes one fundamental principle should have substantial weight, and that principle is that the beneficiary or beneficiaries of a toolbox measure should pay for that measure. This concept of "beneficiary pays" is a cornerstone of the CALFED program and is equally applicable in this broad toolbox implementation effort.

One concern that has been raised in Interior's many discussions with stakeholders is about the relationship of the environmental measures in Appendix A and the toolbox measures in Appendix C. As discussed above, Interior is committed to implementing both the environmental measures and the toolbox measures expeditiously and with equal effort. Beyond that commitment, however, there is no linkage between the two sets of measures. Interior is not attempting to maintain any particular notion of proportional implementation or temporally linked implementation.

One measure suggested in the June 24 and discussed further in the October 31 Draft Administrative Proposal -- the water reserve account -- reflects a different approach to managing CVP water. Under this approach, water derived from a number of potential sources would be stored in designated storage locations as a "reserve account." This reserve account could then be

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flexibly used by Interior to respond to new information or opportunities during the course of the year. After reviewing comments on the different possible forms of a water reserve account, Interior has concluded that it is best viewed and used as an adjunct of the toolbox measures. A description of the form and operation of the water reserve account is included in Appendix C.

(C) Crediting of Bay/Delta Requirements Towards the WQCP

The December 15, 1994, Principles for Agreement on Bay-Delta Standards between the State of California and the Federal Government ("Accord") provide that, for the term of the Accord, "All CVP water provided pursuant to these principles shall be credited toward the CVP obligation under Section 3406(b)(2) of the CVPIA to provide 800,000 acre feet of project yield for specified purposes." Stakeholders appear to agree that this crediting arrangement should remain in place for the life of the Accord. There is not consensus, however, as to whether the credit should be extended beyond the 3-year life of the Accord.

Sections 3406(b)(1)(C) states that Interior shall cooperate with the State "to the greatest degree practicable" to ensure that the water dedicated under (b)(2) is credited against additional obligations of the CVP arising after the enactment of the CVPIA, and that "to the greatest degree practicable" the programs required by the Act "avoid[ ] inconsistent or duplicative obligations from being imposed" on CVP water and power contractors. Section 3406(b)(2) states that one of the purposes of the (b)(2) water is to assist the State of California in its efforts to protect the waters of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. Many of the anadromous fish habitat restoration measures and management of the (b)(2) water, as provided in Appendix A, will have conjunctive benefits to other aquatic resources in the CVP streams and Delta ecosystem. Interior, therefore, believes that there is both legal and policy rationale supporting the use and extension of the credit, and intend to continue crediting water provided for meeting the CVP's share of the State's water quality standards towards the dedication of (b)(2) water.

Interior's conclusion on this issue is based in part on the assumed equal sharing of the burden of the Bay-Delta Accord between the State and Federal water projects. The two projects are moving towards a review and revision of the sharing formula in the Coordinated Operations Agreement (COA) governing joint operations of the projects. If the current formula for sharing the burdens of meeting current Endangered Species Act and Delta water quality requirements changes substantially, Interior will reevaluate this policy of crediting water provided under the Accord towards the (b)(2) water.

In addition to the three major issues discussed above, Interior's Draft Proposals also discussed six additional issues that had been raised by stakeholders at various times. Many of those issues were important in the context of evaluating various approaches to the (b)(2) water. Interior's resolution of those issues, however, has largely been subsumed by dedication and management

of the water for fish and wildlife restoration as discussed above. The additional six issues and their resolution are discussed below.

(1) Defining the (b)(2) Baseline

One issue that has generated many comments involves the question of the proper "baseline" against which to measure the dedicated water. That question is largely subsumed by Interior's approach to accounting for the (b)(2) water by meeting certain environmental measures. It remains relevant, however, for purposes of modeling the impacts to water deliveries. As explained in the Draft Administrative Proposal, some stakeholders believe that the proper baseline conditions should include only those requirements that were formally in place at the time of the CVPIA's passage (October 1992), including the D-1485 Bay-Delta standards along with the 1992 Biological Opinion's winter-run salmon temperature requirements. The fundamental issue is whether any of the 1993 winter-run Biological Opinion's requirements are appropriate for inclusion in the baseline.

Interior continues to believe that the proper baseline includes not only the literal language of the 1992 Biological Opinion, but also those requirements from the 1993 Biological Opinion (as well as the related State Water Resources Control Board requirements to meet temperature targets) that were inherently part of the 1992 Biological Opinion. The 1992 Biological Opinion was a 1-year opinion only and did not have to consider issues such as long-term temperature objectives. The 1993 Biological Opinion is intended to be a long-term, multiyear opinion. As such, it was necessary in the 1993 Opinion to explicitly articulate the related conditions that would lead to compliance with the 1992 Biological Opinion temperature requirements over a broader range of hydrological conditions.

Interior believes that including the Shasta Reservoir storage requirements from the 1993 Biological Opinion is the best way to reflect how the temperature requirements of the 1992 Biological Opinion would affect CVP operations into the future. Accordingly, Interior is including those requirements in its baseline for purposes of modeling the impact of using the dedicated (b)(2) water. Similarly, Interior is using this same baseline in its analysis of the CVPIA in the Programmatic Environmental Impact Statement.

Interior notes that other measures included in the 1993 Biological Opinion, such as the "Q-West" requirements, are not being included in the baseline. This is because, consistent with the reasoning above, these requirements were additional to, rather than explanatory of, the measures in the 1992 Biological Opinion.

(2) Appropriateness of Delta Uses for (b)(2) Water

During the Spring 1996 water allocation process, a dispute arose about the appropriateness of using (b)(2) water to supplement the water dedicated under the Bay-Delta Accord for Delta

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outflow. The resolution of this controversy for the 1996 water year is summarized in the first Draft Administrative Proposal.

Interior continues to believe that the use of (b)(2) water for additional Delta fishery benefits above the standards required in the Accord is appropriate and that such use is consistent with both the CVPIA and the Accord. Interior recognizes the particular importance of the issues surrounding Delta uses of (b)(2) water, not only because of the continuation of the Accord, but because of the longer term need to balance potential impacts to water supplies and the need to address environmental issues in the Delta. Interior believes that the recent public forum process that led to the revised set of measures in Appendix A has been an effective mechanism for developing water-efficient approaches to protecting Delta environmental resources.

(3) Reoperation/Reuse of (b)(2) Water

The stakeholder comment letters indicated a fundamental disagreement over whether water released as (b)(2) water could be recaptured and reused for other project purposes. Many commenters found the discussion of this issue in the first Draft Administrative Proposal somewhat confusing.

Interior believes that the issues related to recapture and reuse are largely resolved in the description of particular measures. In modeling the effects of those measures, Interior has assumed that water released for a fish and wildlife objective upstream will be available in the Delta for consumptive purposes unless the measures in Appendix A or other existing environmental requirements provide an explicit additional fish and wildlife requirement for that water (e.g., it is needed to meet a Delta outflow requirement).[2] Thus, the modeled impacts to deliveries reflect only water released for a fish and wildlife objective that is not later recaptured.

Many commenters were also concerned about so-called "make-up pumping," which refers to the use of water for environmental purposes during one part of the year, and a subsequent effort to pump additional water later in the year to "make it up." The concern expressed (primarily by environmental interests) is that "make up pumping" unnecessarily shifts environmental risks from one part of the year to another.

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[2]This same approach has been used for any modeling of "(b)(3)" water purchases; it has been assumed that (b)(3) water purchased upstream is available for pumping for consumptive uses in the Delta unless it is necessary to use this water to meet environmental requirements in the Delta. For this purposes, (b)(3) water "protected" pursuant to California Water Code Section 1707 (protection of water acquired for instream flow) would be treated as Delta outflow not available for pumping.

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While Interior believes that it is appropriate to make use of the flexibility in the system to achieve environmental results without impacts to deliveries, it also acknowledges that "make up pumping" has the potential to shift environmental risks from one time period to another, from one stream segment to another, and/or from one species to another. Interior does not intend to rely on make-up pumping to accomplish the measures set out in Appendix A. In the event make-up pumping is needed for other purposes, Interior will not engage in make-up pumping activities unless those activities are in compliance with water quality standards, State Board Order 95-6, the biological opinions applicable to the Bay-Delta, the provisions of the Bay-Delta Accord, and the spring-run protection plan, and do not compromise Interior's ability to implement the measures in Appendix A.

(4) Shortage Provisions for (b)(2) Water

Under Section 3406(b)(2)(C) of the CVPIA, the Secretary is given discretion to reduce the dedication of the (b)(2) water up to 25 percent "whenever reductions due to hydrologic circumstances are imposed upon agricultural deliveries of Central Valley Project water" with the condition that "such reductions shall not exceed in percentage terms the reductions imposed on agricultural service contractors."

Interior has concluded that in critically dry years, it will invoke the shortage provision of section 3406(b)(2)(C), so that impacts of use of the (b)(2) water on deliveries will be reduced to the greater of 600,000 acre feet or the percentage of deliveries to agricultural service contractors. The attached matrix in Appendix A of environmental measures reflects that assumption.

In its evaluation of this shortage provision, Interior recognizes that the use of water year types can seriously misstate the actual hydrological conditions. The recent hydrology of 1997 is a good example: in this year, record floods in January were followed by near-record drought in the remainder of the spring period. Although the formal water year type was "wet" due to the early floods, both biological resources and water contractors faced a significantly more restricted water management problem. Many of the environmental measures in Appendix A incorporate "triggers" that more accurately reflect real time hydrological and biological conditions. Interior will continue reviewing whether a similar "trigger" can be developed to account for the possible inaccuracy of water year types in the shortage provision context.

(5) Priorities for Use of (b)(2) Water

Establishing priorities for the use of the (b)(2) water has also generated some controversy. The debate tends to focus on whether the (b)(2) water should be dedicated to use in the Delta first, or to upstream measures and then to the Delta, or in some combination of those approaches.

The measures attached as Appendix A set out Interior's view of the proper actions for the use of (b)(2) water during the next 5 years.

(6) Status of (b)(2) Guidelines

The June 24 Draft Administrative Proposal included a discussion of the "(b)(2) Guidelines" paper that had been forwarded as a final recommendation from its authors to the Regional Directors of Reclamation and the Service in May 1996. The June 24 Draft Administrative Proposal suggested the need for modification of the (b)(2) Guidelines. The (b)(2) Guidelines are superseded by this proposal.

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APPENDIX A

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APPENDIX A -- SUMMARIES OF THE CURRENT STATUS OF THE AFRP FLOW-RELATED ACTIONS

DELTA ACTION 1: VERNALIS ADAPTIVE MANAGEMENT PROGRAM (VAMP)

Description

Increase flow at Vernalis and reduce CVP and SWP exports during the 31-day pulse flow period (generally April 15-May 15) as an experiment to determine effects on San Joaquin salmon smolt survival through the Delta. Baseline flows determined from the preceding April 1 to April 14 period would be increased to one of five levels (2,000; 3,200; 4,450; 5,700; and 7,000 cfs), with exports set accordingly (1,500; 1,500; 1,500; 2,250; and either 1,500 or 3,000 cfs). Special provisions apply in high flow years.

Purpose

To improve the scientific basis for the protection of San Joaquin chinook salmon smolts during migration through the Delta, and assist in meeting the needs of estuarine species.

Affected Species

San Joaquin chinook salmon smolts, young striped bass, American shad, sturgeon, delta smelt, and other estuarine species could be positively affected.

Experimental Design

Hypotheses. Survival of San Joaquin salmon smolts migrating through the Delta is positively related to San Joaquin River flow and negatively related to exports. Survival of tagged smolts would be determined under the five flow/export conditions over a period of years. Comprehensive details of the monitoring and evaluation aspects of the experiment were initially described by Herbold and Hanson's revised draft (October 1997). Some details of the experiment must wait to be worked out by the San Joaquin River Technical Committee and can't be finalized before March.

Triggers

Flow and export levels would be determined by current and previous year type and baseline flow. If water is unavailable for the VAMP flows, limit exports to 1,500 cfs. If water temperature exceeds a certain threshold (75 °F at Vernalis for 5 consecutive days), salmon survival would be assumed to be low and the experimental conditions would no longer be implemented. Experimental releases of salmon are not recommended at temperatures remaining above 70 °F for 5 days preceding the release.

Implementation

The water to implement VAMP will be acquired from the San Joaquin tributaries (SJRGA). The contractual arrangements are under negotiation with SJRGA to minimally secure up to 110,000 acre-feet for providing the experimental flows of VAMP. Additional waters on a limited willing seller basis are envisioned to potentially be available to support VAMP higher experimental goals. The final framework agreement will address the details.

Reclamation and DWR will produce an April 1 projected plan of operations for the 31-day pulse flow period (generally April 15 to May 15). This plan will include projected flows from upstream tributaries and in the San Joaquin River at Vernalis and export conditions with and without the VAMP scenario in order to demonstrate VAMP compliance on an individual year-to-year basis. The selection of 1,500 or 3,000 cfs exports at 7,000 cfs flow in the first year will be based on an assessment of current and projected hydrological conditions. Thereafter, the exports will be alternated between 1,500 or 3,000 cfs when Vernalis flows are 7,000 cfs, in accordance with detailed implementation criteria being developed.

Flows above 7,000 cfs would generally prevent operation of the Head of Old River Barrier. For purposes of modeling this measure during these high flow periods, Interior used total exports of 1,500 and 3,000cfs. After further review, Interior is proposing operational parameters for high flow periods as follows: (a) when flows are between 7,000 and 10,000 cfs, Interior will continue meeting the 1,500 or 3,000 cfs export limitations; (b) when flows exceed 10,000 cfs, Interior will continue meeting the 1,500 or 3,000 cfs export limitations unless projections indicate that doing so would prevent San Luis Reservoir from filling. In years in which San Luis Reservoir is projected not to fill, Interior will meet the export restrictions contained in the delta smelt biological opinion.

DELTA ACTION 2: HEAD OF OLD RIVER BARRIER

Description

Install, operate, and maintain a barrier of consistent design at the head of Old River

Purpose

Reduce mortality of San Joaquin River chinook smolts during migration through the Delta.

Affected Species

San Joaquin chinook salmon smolts could be positively affected; young striped bass and delta smelt could be adversely affected.

Experimental Design

Hypotheses: Survival of San Joaquin fall-run chinook salmon smolts migrating through the Delta is higher when the Old River barrier is in place than when it is not, at the same export flow levels.

Triggers

The barrier cannot be installed or operated at flows above 5,000 and 7,000 cfs respectively.

Implementation

Implementation of this action will be coordinated with Delta Action 1. A preliminary April 1 Plan of Operations developed by Reclamation and DWR by March 1 will be used to determine whether to install the rock barrier and criteria for its removal. The removal of the barrier between April 15 and June 1 will occur if salmon are not present, or if consultation with the FWS determines that removal is necessary for delta smelt protection. Salmon absence is indicated by 0 catch for 5 consecutive days using ten 20-minute tows. An access agreement with the landowner and the State's final design of the rock barrier are needed by March 1 to allow construction of the barrier by April 15 and to ensure barrier-design consistency between years.

DELTA ACTION 3: ADDITIONAL X2 PROTECTION

Description

Increase X2 requirements in spring to the 1962 level of development during March-June and calculate X2 as for the SWRCB's Water Quality Control Plan (WQCP).

Purpose

Provide ecosystem-level benefits beyond those provided by the existing X2 standard. An increase in the number of days in spring during which X2 is seaward of Chipps Island increases the abundance or survival of estuarine fish, including anadromous fish.

Affected Species

Improved estuarine habitat for several estuarine-dependent species, such as striped bass young-of-year, with probable benefits to chinook salmon smolts and fry, American shad, and sturgeon.

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Experimental Design

The X2 measure, as included in both the State's WQCP and in this set of environmental measures, is a broad ecosystem measure based on observed relationships between the position of X2 and abundance data or indices for a large number of aquatic species. Interior will assure that the underlying monitoring that generates the abundance data or indices continues to be done during 5-year periods, so that all parties can review and evaluate these observed relationships in light of the new data. Interior anticipates that this monitoring will be done as an integrated monitoring program as part of the CALFED Bay-Delta Program.

Triggers

The previous month's index (PMI) of unimpaired flows on the eight major Central Valley rivers is the trigger. The table of PMI and X2 days values reflects the addition of a trigger that reduces the number of X2 days in March when the February PMI indicates an extremely dry month. This trigger has been designed to identify those extreme hydrological conditions during which March X2 enhancement imposes excessive water supply impacts on the project.

Implementation

Implementation would be equivalent to the substitution of the WQCP 1971.5 level of development March-June Chipps Island X2 days table with the 1962 level of development X2 days table. The "three ways to win" compliance strategy of either daily water quality, 14-day mean water quality or minimum Delta outflow would remain. Coordination of the CVP operation with the SWP operation will be identified in monthly updates of annual operational plans.

PMI	Mar	Apr	May	Jun
1000	31	3	0	0
1250	31	9	0	0
1500	31	17	0	0
1750	31	23	1	0
2000	31	27	4	0
2250	31	28	13	1
2500	31	29	23	3
2750	31	30	29	7
3000	31	30	30	12
3250	31	30	31	18
3500	31	30	31	23
3750	31	30	31	26
4000	31	30	31	28
4250	31	30	31	29
4500	31	30	31	29
4750	31	30	31	30
5000	31	30	31	30
5250	31	30	31	30

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5500	31	30	31	30
99999	31	30	31	30

DELTA ACTION 4: MAINTAIN SACRAMENTO RIVER FLOW

Description

Establish Sacramento River flows at Freeport from 9,000 to 15,000 cfs (7-day average) when striped bass spawn. Flow levels will be established for 1-week periods over a 30-day period (May or as triggered) by Keswick releases if water is available in Shasta Reservoir and release changes at Keswick Dam do not exceed flow fluctuation criteria.

Purpose

Increase early survival of striped bass and improve our understanding of the influence of flow on early survival of striped bass. Any increases in flows over existing levels will contribute to improved survival of migrating chinook salmon smolts and assist in meeting the needs of estuarine species, consistent with Delta Action 3.

Affected Species

Striped bass eggs and larvae in the Sacramento River, with possible collateral benefits to fall-run salmon and estuarine fish, as well as sturgeon, American shad, and steelhead.

Experimental Design

Hypotheses: The mortality rate of striped bass eggs and larvae decreases as Sacramento River flow increases from 9,000 to 15,000 cfs. Flow above a threshold in that range is associated with reduced settling of eggs and larvae and increased rate of transport. The primary goal is to provide stable flows in the range of 9,000 to 15,000 cfs blocks with which to evaluate the effect of flow on egg and larvae striped bass survival for 1-week periods over a 30-day period.

Automated continuous monitoring stations at three locations along the Sacramento River would count eggs and larvae from three depths (near-surface, near-bottom, and mid-depth) through the period of expected spawning, in conjunction with net sampling from boats. Data would include timing and magnitude of pulses of eggs and larvae, travel time, vertical and lateral distribution, and survival. This experiment would build on previous experiments, and results would be placed in the context of the population by examining the relationship between survival from egg to early larvae and survival from egg to adult. A technical group from the Interagency Ecological Program including stakeholders will develop the experimental design proposal in early 1998.

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Triggers

This action will be initiated upon reaching a Sacramento River temperature consistent with the onset of striped bass spawning. In the interim, setting the protective period for May would capture about half of the spawning.

Implementation

This action will be implemented opportunistically utilizing runoff and water temperature forecast tools. In most years this action will be implemented using existing flows, and will not increase or decrease flow releases, due to potential impacts on Shasta storage, fish spawning and rearing due to flow fluctuations, and the winter-run chinook salmon biological opinion. Keswick releases will be made to attain target Freeport flows in 1,000 to 2,000 cfs increments between 9,000 and 15,000 cfs for 1-week periods over a 31-day period based on Shasta storage. In drier years if Freeport flows are less than 9,000 cfs during the striped bass spawning period, water in Shasta Reservoir will be needed to meet the winter-run chinook salmon biological opinion (and other existing flow requirements), which may prevent implementation of this action. If the biological opinion or other flow requirements do not interfere, Interior would provide flows to attain one of the target Freeport flow values. In wet years this action would be unnecessary because flow will generally be above 15,000 cfs. The experimental component, (i.e., monitoring and evaluation) should proceed in either case.

The implementation plan and hydrological triggers and criteria have not been developed yet. Seasonal implementation will be developed in April based on the April 1 forecast, and updated with a preliminary May 1 forecast, and will require daily monitoring of CVP operations to minimize potential operational concerns with: (1) Keswick daily flow fluctuations; (2) effects on CVP coldwater pool reserves at Shasta Reservoir on a seasonal basis; and (3) coordination with SWP operations, especially Feather River releases during this time period. Future implementation of this action will need to consider the potential operational interaction between Trinity River Division operations and Shasta Reservoir operations, when and if a new Trinity River flow regime is developed and implemented. It is also important to note that it is very difficult to maintain stable flows at Freeport using Keswick releases due to accretions and depletions in May.

The above notwithstanding, the initial implementation criteria are: minimum instream flow requirements at Freeport shall be based on thresholds of STOR+INFLO as shown below, where STOR is defined as Shasta end-of-April storage in TAF and INFLO is defined as the May through Sep forecasted inflow in TAF. The inflows shall be based on a 50-percent forecast. Oroville is generally not to be drawn upon to maintain these flows.

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Month	Criteria

May	If (STOR+INFLO) >or = 6200 TAF, then use 15000 cfs
	If 6200 > (STOR+INFLO) >5000 TAF, then interpolate
	If (STOR+INFLO) = 5000 TAF, then use 10000 cfs
	If 5000 > (STOR+INFLO) >4000 TAF, then interpolate
	If (STOR+INFLO) = 4000 TAF, then use 9000 cfs
	If (STOR+INFLO) < 4000 TAF, then use 0 cfs

DELTA ACTION 5: RAMPING OF SAN JOAQUIN RIVER (SJR) FLOWS

Description

Ramp the San Joaquin River flows down, ramp exports up, or maintain Vernalis flows and exports provided under Delta Action 1 for up to 15 additional days, after the 31-day pulse flow period.

Purpose

Extend the period of protection afforded by Delta Action 1.

Affected Species

San Joaquin chinook salmon smolts, young striped bass, and delta smelt could be positively affected.

Experimental Design

No experiment was recommended for this specific action since it is merely a partial to full extension of Delta Action 1; however, real-time and salvage monitoring will continue and may enable conclusions to be drawn as to the influence of ramping on fish distribution.

Triggers

The triggers to be used are temperatures at Vernalis, presence of salmon at Mossdale (absence indicated by 0 catch for 5 consecutive days using ten 20-minute tows) and reaching the "yellow-light" limit on take of delta smelt at the pumps. All biological triggers will be coordinated with the FWS. Based on the Mossdale catch through May 7, if salmon are projected to be present at the end of the pulse-flow period (generally May 15), scenario 1 or 2 (below) will be implemented.

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Implementation

The ability to provide flows for this action would come from the willing-seller basis of the VAMP framework and the New Melones Reservoir interim plan of operations. Coordination of CVP operations with SWP operations, and the potential impacts of export reductions to CVP and SWP water supplies, and flow acquisition opportunities, will be included in an April 1 projected plan of operations. Coordination regarding specific actions related to delta smelt is required between the FWS, Reclamation, and the State in order to be consistent with the delta smelt biological opinion.

Although this action does not offer the opportunity for experiments, it allows for adaptive management through the use of biological triggers; however, information may be gained on the benefit of this action through the analysis of real-time monitoring data and take at the pumps with and without ramping. Four alternative scenarios are proposed:

1. If salmon are still present at Mossdale and acquired water is available, and delta smelt take at the pumps is above the "yellow light" level at the end of the pulse-flow period (generally May 15) and projected to exceed the "red light" within a week, maintain flows and exports under Delta Action 1 for an additional period based on consultation with the FWS.

2. If salmon are present at Mossdale and acquired water is available, and delta smelt take at the pumps is below the "yellow light" level, ramp flow down linearly from existing level at the end of the pulse-flow period (generally May 15) to the June 1 level, and increase exports to the extent permitted under other constraints.

3. If salmon are absent at Mossdale and delta smelt take at the pumps is above the "yellow light" level, at the end of the pulse-flow period (generally May 15) and projected to exceed the "red light" within a week, actions for the May 16 to June 1 period will be determined based on consultation with the FWS.

4. If none of the above conditions is true, do not ramp flows or exports.

As for Delta Action 1, if temperature exceeds a certain threshold (75 °F at Vernalis for 5 consecutive days), salmon survival would be assumed to be low and these salmon protective measures would no longer be implemented. In years when the VAMP cannot be implemented, this action will be implemented to the degree acquired water is available and based on consultation with the FWS.

DELTA ACTION 6: CLOSE DELTA CROSS CHANNEL (DCC) GATES IN DECEMBER-JANUARY AND OCTOBER-NOVEMBER BASED ON THE SPRING-RUN CHINOOK SALMON PROTECTION PLAN

Description

In the first year the action will be implemented as described in the 1997 CALFED Operations Group Sacramento River Spring-Run Chinook Salmon Protection Plan. The action will continue to be implemented in this manner in subsequent years unless and until it is replaced by a more protective plan adopted by the CALFED Ops Group or adopted pursuant to the State or Federal Endangered Species Acts.

Purpose

Increase survival of spring-run salmon smolts migrating through the Delta in winter.

Affected Species

Spring-run and late-fall run chinook salmon smolts, winter-run fry, and fall-run yearlings could be positively affected; adult winter-run salmon could possibly be delayed during upstream migration.

Experimental Design

Hypotheses: Survival of salmon smolts migrating through the Delta in winter is higher when the DCC is closed than when it is open. Upstream migration of winter- and late-fall-run adult chinook salmon can be blocked by the closed DCC gates. Salinity in Rock Slough increases more rapidly with the DCC closed than open.

Smolt survival experiments will be conducted under Delta Action 8, generally with the gates closed; when gates are open for water quality, the experiments will test the effect of gate position on survival. An effort will be made to monitor winter-run salmon adults migrating up into the back side of the DCC. The State in coordination with Reclamation will evaluate the effect of flows and DCC position on the value and rate of change of salinity in the Delta.

Triggers

The gates would be closed on December 1 unless water quality in the Delta is a concern. The water quality triggers as described in the Spring-Run Chinook Salmon Protection Plan will be used to indicate a water quality problem. These water quality triggers will be evaluated and revised as necessary using the experimental results on the response of salinity to DCC closure and flow.

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Implementation

If outflow must be increased to maintain water quality standards with the DCC gates closed, coordination of CVP operations with the SWP operations will be necessary. Results of water quality experiments will help determine the operational effects and potential threshold indicators on the relationship of DCC operations to salinity levels in the Delta, including Rock Slough chlorides, and may help the evaluation and coordination of operational goals, both fishery and water quality.

DELTA ACTION 7: JULY FLOWS AND EXPORTS

Description

Establish July exports based on X2 location and June exports.

Purpose

Protect young striped bass, American shad, and other estuarine species from exposure to export pumping.

Affected Species

Striped bass young-of-year and American shad with possible benefits to other species.

Experimental Design

Hypotheses: Losses of young striped bass and other estuarine species to export pumping increases with export pumping rates and decreases as X2 moves seaward. Continuing existing monitoring of adult and young bass and other species would suffice to continue to test this hypothesis.

Triggers

Average export in June and location of X2 in July.

Implementation

Reclamation and the FWS will develop an implementation plan in coordination with the State. During July, a 7-day running average of daily exports will be determined by applying a multiplier to the mean monthly export in June depending on daily X2 location in July. This multiplier would be 1.0 if X2 is at or east of Collinsville (81 km), and would increase linearly with X2 to a maximum of 1.86 when X2 is at Chipps Island (74 km). There would be no export

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limitation due to this action (beyond existing constraints) when X2 is located seaward of Chipps Island (74km). The estimation techniques for tracking the X2 location on a daily basis will include use of the following Monismith-Kimmerer equation ($X2_t = 10.16 + 0.945 \bullet X2_{(t-1)} - 1.487 \log DeltaQ_t$) after the X2 location has been determined on a specific date in June or July at Chipps Island or Collinsville by measurement of 2.64 EC to address the high variability due to tides and other Delta influences. Other operational details will be included in an implementation plan. A 7-day mean estimate of X2 location may alleviate some of this inherent variability. June exports, in recent years, have been influenced by factors other than WQCP standards, such as delta smelt take indices. To what extent the action considers such June export considerations will be clarified in the implementation plan.

July export is a very critical month in terms of CVP-SWP allocations and operational forecasts, especially for San Luis Reservoir low point considerations and operations; therefore, coordination of CVP-SWP operations is at a premium during this time of year to meet the annual commitments of the two projects. Coordination of CVP operations with the SWP will be necessary.

DELTA ACTION 8: EVALUATE EFFECTS OF EXPORTS ON SMOLT SURVIVAL IN DECEMBER-JANUARY

Description

Perform an adaptive management experiment to determine how variation in exports in December and January affects survival of chinook salmon smolts.

Purpose

Evaluate the potential of using export reductions to increase the survival of chinook salmon smolts migrating through the Delta in winter.

Affected Species

Seaward-migrating spring-run chinook, possibly also late-fall and winter-run.

Experimental Design

Hypotheses: The survival of late-fall-run smolts from the Coleman hatchery is negatively related to exports in December and January.

The design calls for mark-recapture experiments with smolts released under varying conditions of exports. Two alternative designs were discussed. In both designs, exports would be varied between a low value (~ 2000 cfs) and a high value (~ 10,000 cfs) to provide the greatest

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difference. The first design calls for single releases in Georgiana Slough in each period, with test statistics being the survival indices from Chipps Island and the ocean fishery, and expanded take at the salvage facilities. The second calls for paired releases in the Sacramento River at Ryde and Georgiana Slough in each period, with the test statistic being as above plus the difference in survival between the two release sites. The second design is preferred. The choice of alternative will depend on the availability of tagged smolts.

The flow and export conditions should be held as constant as possible for 2 weeks during each of the two releases (one in early December, and one in early January). Delta inflow is more often under controlled conditions in December than in January, thus making stable experimental conditions more likely in December. It is critical to achieve as wide a difference (a minimum target difference of 7,000 cfs) between the low and high export levels to increase the chance of observing a potential effect of exports on survival. Ideally, the sequence of high and low exports should be alternated each year. Survival data will be gathered each year even if flows are uncontrolled or if achieving both export levels is not possible.

Ancillary work should be performed using particle-tracking and other modeling techniques to evaluate flow patterns under the alternative conditions.

Triggers

A preliminary November 1 plan of operation, at a 70-percent exceedance hydrological condition, will be prepared by Reclamation and DWR for implementation of this action. If the actual hydrologic conditions at time of implementation of the action is drier than projected, the action will be reevaluated. Interior analysis indicates that this action can be implemented in 70 to 80 percent of years with no water supply impacts.

Implementation

Reclamation and the FWS will develop an implementation plan and annual operational plans in coordination with the State. Implementation design should be structured around target exports and the potential flexibility of CVP-SWP operations to achieve the targets on an individual annual basis. This may necessitate some coordination action through CALFED Ops and SWRCB to grant additional operational flexibilities to facilitate experimental conditions.

UPSTREAM RESERVOIR ACTIONS #1 THROUGH #4

Description

Upstream Actions #1- #4 are intended to provide improved flows in the CVP-controlled streams of Clear Creek, Sacramento, American, and Stanislaus rivers. See Implementation Section below for details.

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Purpose

In general, the improved flows in the CVP-controlled streams will provide improved spawning and rearing habitat for salmon and steelhead, improve survival of downstream migrating chinook salmon smolts, and assist in meeting the needs of estuarine species.

Affected Species

Fall-run, late fall-run, winter-run and spring-run chinook salmon, steelhead, striped bass, American shad, sturgeon, delta smelt, and other estuarine species.

Experimental Design

One of the assumptions regarding upstream actions is that improved flows in the fall will provide improved spawning habitat, and improved flows in the winter and spring will provide improved rearing habitat and survival of downstream migrating fish through the Delta. Ongoing monitoring and evaluation will continue.

Triggers

Generally, the objective minimum reservoir release to the stream for fishery restoration purposes will be determined by CVP reservoir storage condition or a combination of reservoir storage and projected inflow. Each reservoir facility has its own set of triggers integrated into the reservoir management descriptions.

Implementation

In previous years, the FWS has identified minimum flow objectives for a CVP stream for a specific period of time, that Reclamation would attempt to integrate into CVP operations. The completed (b)(2) water management plan and accompanying CVP-OCAP will guide the planning and integration of the upstream actions with the Delta actions and CVP reservoir operations on a monthly basis, consistent with the approach set out in the May 30, 1997, Revised Draft AFRP. Future implementation of these actions will need to consider the potential operational interaction between the Trinity River Division operations and the rest of the CVP, when and if a new Trinity River flow regime is developed and implemented.

The initial implementation criteria (including storage, flow, and stability criteria) for these four streams are given on the following pages and are consistent with the monthly modeling. They will be implemented based on real-time operational information and coordination between Reclamation and the FWS.

- **Upstream Action #1** - Minimum instream flow requirements below Whiskeytown shall be based on thresholds of Clair Engle storage in TAF as shown below. Stability criteria shall

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dictate that November and December flows equal or exceed October's flow. The stability criteria shall also dictate that February through May flow equal or exceed January's flow.

Month	Criteria

October	If (End-of-Sep Storage) > 1.40MAF, then use 200 cfs
	If (End-of-Sep Storage) > 0.75MAF, then use 150 cfs
	If (End-of-Sep Storage) < 0.75MAF, then use 100 cfs

November	If (End-of-Oct Storage) > 1.40MAF, then use 200 cfs
	If (End-of-Oct Storage) > 0.70MAF, then use 150 cfs
	If (End-of-Oct Storage) < 0.70MAF, then use 100 cfs

December	If (End-of-Nov Storage) > 1.40MAF, then use 200 cfs
	If (End-of-Nov Storage) > 0.80MAF, then use 150 cfs
	If (End-of-Nov Storage) < 0.80MAF, then use 100 cfs

January	If (End-of-Dec Storage) > 1.15MAF, then use 200 cfs
	If (End-of-Dec Storage) > 0.85MAF, then use 150 cfs
	If (End-of-Dec Storage) < 0.85MAF, then use 100 cfs

February	If (End-of-Jan Storage) > 1.30MAF, then use 200 cfs
	If (End-of-Jan Storage) > 0.90MAF, then use 150 cfs
	If (End-of-Jan Storage) < 0.90MAF, then use 100 cfs

March	If (End-of-Feb Storage) > 1.45MAF, then use 200 cfs
	If (End-of-Feb Storage) > 1.00MAF, then use 150 cfs
	If (End-of-Feb Storage) < 1.00MAF, then use 100 cfs

April	If (End-of-Mar Storage) > 1.60MAF, then use 200 cfs
	If (End-of-Mar Storage) > 1.20MAF, then use 150 cfs
	If (End-of-Mar Storage) < 1.20MAF, then use 100 cfs

May	If (End-of-Apr Storage) > 1.60MAF, then use 200 cfs
	If (End-of-Apr Storage) > 1.20MAF, then use 150 cfs
	If (End-of-Apr Storage) < 1.20MAF, then use 100 cfs

June	If (End-of-May Storage) > 1.10MAF, then use 150 cfs If (End-of-May Storage) < 1.10MAF, then use 100 cfs
July	If (End-of-Jun Storage) > 1.00MAF, then use 150 cfs If (End-of-Jun Storage) < 1.00MAF, then use 100 cfs
August	If (End-of-Jul Storage) > 0.90MAF, then use 150 cfs If (End-of-Jul Storage) < 0.90MAF, then use 100 cfs
September	If (End-of-Aug Storage) > 0.80MAF, then use 150 cfs If (End-of-Aug Storage) < 0.80MAF, then use 100 cfs

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- **Upstream Action #2** - Minimum instream flow requirements below Keswick for October through April shall be based on thresholds of Shasta storage in TAF as shown below. Stability criteria shall dictate that November, December, February, March & April's flows be at least 90 percent of their preceding month's flow. The stability criteria shall also dictate that January's flow be at least 80 percent of December's Keswick flow. The stability criteria shall be ignored if the preceding month's flow was above 6000 cfs.

Month	Criteria
Oct-Dec	If (End-of-Sep Storage) > 3.0 MAF, then use 5500 cfs
	If (End-of-Sep Storage) > 2.9 MAF, then use 5250 cfs
	If (End-of-Sep Storage) > 2.8 MAF, then use 5000 cfs
	If (End-of-Sep Storage) > 2.7 MAF, then use 4750 cfs
	If (End-of-Sep Storage) > 2.6 MAF, then use 4500 cfs
	If (End-of-Sep Storage) > 2.5 MAF, then use 4250 cfs
	If (End-of-Sep Storage) > 2.4 MAF, then use 4000 cfs
	If (End-of-Sep Storage) > 2.3 MAF, then use 3750 cfs
	If (End-of-Sep Storage) > 2.2 MAF, then use 3500 cfs
	If (End-of-Sep Storage) < 2.2 MAF, then use 3250 cfs
January	If (End-of-Dec Storage) > 3.2 MAF, then use 5500 cfs
	If (End-of-Dec Storage) > 3.1 MAF, then use 5250 cfs
	If (End-of-Dec Storage) > 3.0 MAF, then use 5000 cfs
	If (End-of-Dec Storage) > 2.9 MAF, then use 4750 cfs
	If (End-of-Dec Storage) > 2.8 MAF, then use 4500 cfs
	If (End-of-Dec Storage) > 2.7 MAF, then use 4250 cfs
	If (End-of-Dec Storage) > 2.6 MAF, then use 4000 cfs
	If (End-of-Dec Storage) > 2.0 MAF, then use 3750 cfs
	If (End-of-Dec Storage) > 1.5 MAF, then use 3500 cfs
	If (End-of-Dec Storage) < 1.5 MAF, then use 3250 cfs
February	If (End-of-Jan Storage) > 3.3 MAF, then use 5500 cfs
	If (End-of-Jan Storage) > 3.2 MAF, then use 5250 cfs
	If (End-of-Jan Storage) > 3.1 MAF, then use 5000 cfs
	If (End-of-Jan Storage) > 3.0 MAF, then use 4750 cfs
	If (End-of-Jan Storage) > 2.9 MAF, then use 4500 cfs
	If (End-of-Jan Storage) > 2.8 MAF, then use 4250 cfs
	If (End-of-Jan Storage) > 2.7 MAF, then use 4000 cfs
	If (End-of-Jan Storage) > 2.2 MAF, then use 3750 cfs
	If (End-of-Jan Storage) > 1.75 MAF, then use 3500 cfs
	If (End-of-Jan Storage) < 1.75 MAF, then use 3250 cfs

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Month	Criteria

March	If (End-of-Feb Storage) > 3.4 MAF, then use 5500 cfs
	If (End-of-Feb Storage) > 3.3 MAF, then use 5250 cfs
	If (End-of-Feb Storage) > 3.2 MAF, then use 5000 cfs
	If (End-of-Feb Storage) > 3.15 MAF, then use 4750 cfs
	If (End-of-Feb Storage) > 3.1 MAF, then use 4500 cfs
	If (End-of-Feb Storage) > 3.05 MAF, then use 4250 cfs
	If (End-of-Feb Storage) > 3.0 MAF, then use 4000 cfs
	If (End-of-Feb Storage) > 2.4 MAF, then use 3750 cfs
	If (End-of-Feb Storage) > 2.0 MAF, then use 3500 cfs
	If (End-of-Feb Storage) < 2.0 MAF, then use 3250 cfs

April	If (End-of-Mar Storage) > 3.8 MAF, then use 5500 cfs
	If (End-of-Mar Storage) > 3.7 MAF, then use 5250 cfs
	If (End-of-Mar Storage) > 3.6 MAF, then use 5000 cfs
	If (End-of-Mar Storage) > 3.5 MAF, then use 4750 cfs
	If (End-of-Mar Storage) > 3.4 MAF, then use 4500 cfs
	If (End-of-Mar Storage) > 3.3 MAF, then use 4250 cfs
	If (End-of-Mar Storage) > 3.2 MAF, then use 4000 cfs
	If (End-of-Mar Storage) > 2.4 MAF, then use 3750 cfs
	If (End-of-Mar Storage) > 2.0 MAF, then use 3500 cfs
	If (End-of-Mar Storage) < 2.0 MAF, then use 3250 cfs

May-August	Use 3250 cfs
September	If (End-of-Aug Storage) >2.0 MAF, then use 6000 cfs If (End-of-Aug Storage) <2.0 MAF, then use 4500 cfs

- **Upstream Action #3** - Minimum instream flow requirements below Nimbus shall be based on thresholds of Folsom storage in TAF for October through February as shown below. Minimum instream flow requirements below Nimbus shall be based on thresholds of STOR+INFLO for March through September, where STOR is defined as the beginning-of-month Folsom storage in TAF and INFLO is defined as the forecasted inflow from the current month through September in TAF. The inflows shall be based on a 50 percent forecast. Stability criteria shall dictate that November, December, & January's flows be at least 80 percent of their preceding month's flow. The stability criteria shall also dictate that February & March's flow be at least 90 percent of their preceding month's flow. The stability criteria are ignored if the preceding month's flow was above 4500 cfs.

C-045720

C-045720

Month	Criteria

October	If (End-of-Sep Storage) >500 TAF, then use 2500 cfs
	If (End-of-Sep Storage) >463 TAF, then use 2250 cfs
	If (End-of-Sep Storage) >425 TAF, then use 2000 cfs
	If (End-of-Sep Storage) >350 TAF, then use 1750 cfs
	If (End-of-Sep Storage) >300 TAF, then use 1500 cfs
	If (End-of-Sep Storage) >275 TAF, then use 1250 cfs
	If (End-of-Sep Storage) >265 TAF, then use 1000 cfs
	If (End-of-Sep Storage) >255 TAF, then use 750 cfs
	If (End-of-Sep Storage) <255 TAF, then use 500 cfs

November	Same as October
December	Same as October

January	If (End-of-Dec Storage) >500 TAF, then use 2500 cfs
	If (End-of-Dec Storage) >425 TAF, then use 2250 cfs
	If (End-of-Dec Storage) >350 TAF, then use 2000 cfs
	If (End-of-Dec Storage) >300 TAF, then use 1750 cfs
	If (End-of-Dec Storage) >290 TAF, then use 1500 cfs
	If (End-of-Dec Storage) >285 TAF, then use 1250 cfs
	If (End-of-Dec Storage) >280 TAF, then use 1000 cfs
	If (End-of-Dec Storage) >275 TAF, then use 750 cfs
	If (End-of-Dec Storage) <275 TAF, then use 500 cfs

February	If (End-of-Jan Storage) >600 TAF, then use 2500 cfs
	If (End-of-Jan Storage) >350 TAF, then use 2000 cfs
	If (End-of-Jan Storage) >300 TAF, then use 1750 cfs
	If (End-of-Jan Storage) >225 TAF, then use 1250 cfs
	If (End-of-Jan Storage) <225 TAF, then use 500 cfs

C-045721

C-045721

Month	Criteria
March	If (STOR+INFLO) >2850 TAF, then use 4500 cfs
	If (STOR+INFLO) >2766 TAF, then use 4250 cfs
	If (STOR+INFLO) >2683 TAF, then use 4000 cfs
	If (STOR+INFLO) >2600 TAF, then use 3750 cfs
	If (STOR+INFLO) >2516 TAF, then use 3500 cfs
	If (STOR+INFLO) >2433 TAF, then use 3250 cfs
	If (STOR+INFLO) >2350 TAF, then use 3000 cfs
	If (STOR+INFLO) >2025 TAF, then use 2750 cfs
	If (STOR+INFLO) >1700 TAF, then use 2500 cfs
	If (STOR+INFLO) >1500 TAF, then use 2250 cfs
	If (STOR+INFLO) >1300 TAF, then use 2000 cfs
	If (STOR+INFLO) >1150 TAF, then use 1750 cfs
	If (STOR+INFLO) >1000 TAF, then use 1500 cfs
	If (STOR+INFLO) > 967 TAF, then use 1250 cfs
	If (STOR+INFLO) > 933 TAF, then use 1000 cfs
	If (STOR+INFLO) > 900 TAF, then use 750 cfs
	If (STOR+INFLO) > 700 TAF, then use 500 cfs
	If (STOR+INFLO) < 700 TAF, then use 250 cfs
April	If (STOR+INFLO) >2450 TAF, then use 4500 cfs
	If (STOR+INFLO) >2383 TAF, then use 4250 cfs
	If (STOR+INFLO) >2316 TAF, then use 4000 cfs
	If (STOR+INFLO) >2250 TAF, then use 3750 cfs
	If (STOR+INFLO) >2183 TAF, then use 3500 cfs
	If (STOR+INFLO) >2116 TAF, then use 3250 cfs
	If (STOR+INFLO) >2050 TAF, then use 3000 cfs
	If (STOR+INFLO) >1800 TAF, then use 2750 cfs
	If (STOR+INFLO) >1550 TAF, then use 2500 cfs
	If (STOR+INFLO) >1350 TAF, then use 2250 cfs
	If (STOR+INFLO) >1150 TAF, then use 2000 cfs
	If (STOR+INFLO) >1075 TAF, then use 1750 cfs
	If (STOR+INFLO) >1000 TAF, then use 1500 cfs
	If (STOR+INFLO) > 967 TAF, then use 1250 cfs
	If (STOR+INFLO) > 933 TAF, then use 1000 cfs
	If (STOR+INFLO) > 900 TAF, then use 750 cfs
	If (STOR+INFLO) > 700 TAF, then use 500 cfs
	If (STOR+INFLO) < 700 TAF, then use 250 cfs

C-045722

C-045722

Month	Criteria
May	If (STOR+INFLO) >2050 TAF, then use 4500 cfs
	If (STOR+INFLO) >1932 TAF, then use 4250 cfs
	If (STOR+INFLO) >1816 TAF, then use 4000 cfs
	If (STOR+INFLO) >1700 TAF, then use 3750 cfs
	If (STOR+INFLO) >1600 TAF, then use 3500 cfs
	If (STOR+INFLO) >1500 TAF, then use 3250 cfs
	If (STOR+INFLO) >1400 TAF, then use 3000 cfs
	If (STOR+INFLO) >1200 TAF, then use 2750 cfs
	If (STOR+INFLO) >1000 TAF, then use 2500 cfs
	If (STOR+INFLO) > 950 TAF, then use 2250 cfs
	If (STOR+INFLO) > 900 TAF, then use 2000 cfs
	If (STOR+INFLO) > 850 TAF, then use 1750 cfs
	If (STOR+INFLO) > 800 TAF, then use 1500 cfs
	If (STOR+INFLO) > 775 TAF, then use 1250 cfs
	If (STOR+INFLO) > 750 TAF, then use 1000 cfs
	If (STOR+INFLO) > 725 TAF, then use 750 cfs
	If (STOR+INFLO) > 600 TAF, then use 500 cfs
	If (STOR+INFLO) < 600 TAF, then use 250 cfs
June	If (STOR+INFLO) >1800 TAF, then use 4500 cfs
	If (STOR+INFLO) >1750 TAF, then use 4250 cfs
	If (STOR+INFLO) >1700 TAF, then use 4000 cfs
	If (STOR+INFLO) >1600 TAF, then use 3750 cfs
	If (STOR+INFLO) >1500 TAF, then use 3500 cfs
	If (STOR+INFLO) >1400 TAF, then use 3250 cfs
	If (STOR+INFLO) >1300 TAF, then use 3000 cfs
	If (STOR+INFLO) >1266 TAF, then use 2750 cfs
	If (STOR+INFLO) >1133 TAF, then use 2500 cfs
	If (STOR+INFLO) >1000 TAF, then use 2250 cfs
	If (STOR+INFLO) > 950 TAF, then use 2000 cfs
	If (STOR+INFLO) > 900 TAF, then use 1750 cfs
	If (STOR+INFLO) > 800 TAF, then use 1500 cfs
	If (STOR+INFLO) > 775 TAF, then use 1250 cfs
	If (STOR+INFLO) > 750 TAF, then use 1000 cfs
	If (STOR+INFLO) > 725 TAF, then use 750 cfs
	If (STOR+INFLO) > 600 TAF, then use 500 cfs
	If (STOR+INFLO) < 600 TAF, then use 250 cfs

C-045723

C-045723

Month	Criteria
July	If (STOR+INFLO) >1400 TAF, then use 2500 cfs
	If (STOR+INFLO) >1300 TAF, then use 2250 cfs
	If (STOR+INFLO) >1200 TAF, then use 2000 cfs
	If (STOR+INFLO) >1000 TAF, then use 1750 cfs
	If (STOR+INFLO) > 800 TAF, then use 1500 cfs
	If (STOR+INFLO) > 775 TAF, then use 1250 cfs
	If (STOR+INFLO) > 750 TAF, then use 1000 cfs
	If (STOR+INFLO) > 725 TAF, then use 750 cfs
	If (STOR+INFLO) > 600 TAF, then use 500 cfs
	If (STOR+INFLO) < 600 TAF, then use 250 cfs
August	If (STOR+INFLO) >1200 TAF, then use 2500 cfs
	If (STOR+INFLO) >1100 TAF, then use 2250 cfs
	If (STOR+INFLO) >1000 TAF, then use 2000 cfs
	If (STOR+INFLO) > 900 TAF, then use 1750 cfs
	If (STOR+INFLO) > 800 TAF, then use 1500 cfs
	If (STOR+INFLO) > 700 TAF, then use 1250 cfs
	If (STOR+INFLO) > 600 TAF, then use 1000 cfs
	If (STOR+INFLO) > 550 TAF, then use 750 cfs
	If (STOR+INFLO) > 500 TAF, then use 500 cfs
	If (STOR+INFLO) < 500 TAF, then use 250 cfs
September	If (STOR+INFLO) > 800 TAF, then use 2500 cfs
	If (STOR+INFLO) > 750 TAF, then use 2250 cfs
	If (STOR+INFLO) > 700 TAF, then use 2000 cfs
	If (STOR+INFLO) > 600 TAF, then use 1750 cfs
	If (STOR+INFLO) > 500 TAF, then use 1500 cfs
	If (STOR+INFLO) > 400 TAF, then use 1250 cfs
	If (STOR+INFLO) > 350 TAF, then use 1000 cfs
	If (STOR+INFLO) > 325 TAF, then use 750 cfs
	If (STOR+INFLO) > 300 TAF, then use 500 cfs
	If (STOR+INFLO) < 300 TAF, then use 250 cfs

- **Upstream Action #4** - Minimum instream flow requirements below Goodwin Dam on the Stanislaus River shall be based on the criteria in the Two-Year Interim Stanislaus Agreement (attached), until Interior's current efforts to develop long-term criteria are completed, consistent with the Revised Draft AFRP.

C-045724

C-045724

APPENDIX B

C-045725

C-045725

APPENDIX B -- SUMMARY OF SIMULATED CVP AND SWP DELIVERY IMPACTS BY YEAR TYPE

SUMMARY OF SIMULATED CVP DELIVERY IMPACTS BY YEAR TYPE*
(Negative value indicates a decrease in CVP deliveries)

Year types based on Sac Basin 40-30-30	Bay-Delta Accord Scenario Versus Base Scenario March-February Total (TAF)	3406(b)(1)+(b)(2) Scenario Versus Bay-Delta Accord Scenario March-February Total (TAF)	3406(b)(1)+(b)(2) Scenario Versus Base Scenario March-February Total (TAF)
N YEARS	21	21	21
WET MAX	-194	-390	-390
WET AVG	**-9**	**-139**	**-148**
WET MIN	0	0	0
N YEARS	9	9	9
A N MAX	-390	-195	-390
A N AVG	**-76**	**-43**	**-119**
A N MIN	0	0	0
N YEARS	14	14	14
B N MAX	-611	-669	-700
B N AVG	**-173**	**-226**	**-399**
B N MIN	113	148	110
N YEARS	16	16	16
DRY MAX	-717	-748	-1138
DRY AVG	**-434**	**-271**	**-705**
DRY MIN	0	24	-293
N YEARS	9	9	9
CRT MAX	-925	-816	-925
CRT AVG	**-416**	**-202**	**-617**
CRT MIN	0	330	0
Run Name	**800B_D68**	**800V_D23**	**800V_D23**

* Operations and proposed actions are not carried out on a year-type basis. Impacts are generally multiyear consequences. The results displayed above are a rough approximation of the impacts to the deliveries of implementing the measures. Some of the biological triggers included in the measures cannot be easily or usefully modeled. It is anticipated that the triggers generally will cause the actual impacts to be less than the modeled impacts. Measure 8 has not been included in these model results because in most years, Measure 8 will have no impacts to deliveries. Measure 2, as modeled, reflects the current VAMP discussions, and as such, includes some purchase water (or "(b)(3)" water).

C-045726

C-045726

SUMMARY OF SIMULATED SWP DELIVERY IMPACTS BY YEAR TYPE*

(Negative value indicates a decrease in SWP deliveries)

Year types based on Sac Basin 40-30-30	Bay-Delta Accord Scenario Versus Base Scenario March-February Total (TAF)	3406(b)(1)+(b)(2)) Scenario Versus Bay-Delta Accord Scenario March-February Total (TAF)	3406(b)(1)+(b)(2) Scenario Versus Base Scenario March-February Total (TAF)
N YEARS	21	21	21
WET MAX	0	0	0
WET AVG	0	0	0
WET MIN	0	0	0
N YEARS	9	9	9
A N MAX	0	0	0
A N AVG	0	0	0
A N MIN	0	0	0
N YEARS	14	14	14
B N MAX	-520	-346	-694
B N AVG	0	-50	-50
B N MIN	520	0	346
N YEARS	16	16	16
DRY MAX	-859	-282	-687
DRY AVG	-324	2	-322
DRY MIN	0	339	339
N YEARS	9	9	9
CRT MAX	-693	0	-519
CRT AVG	-286	169	-117
CRT MIN	173	348	346
Run Name	**800B_D68**	**800V_D23**	**800V_D23**

* Operations and proposed actions are not carried out on a year-type basis. Impacts are generally multiyear consequences. The results displayed above are a rough approximation of the impacts to the deliveries of implementing the measures. Some of the biological triggers included in the measures cannot be easily or usefully modeled. It is anticipated that the triggers generally will cause the actual impacts to be less than the modeled impacts. Measure 8 has not been included in these model results because in most years, Measure 8 will have no impacts to deliveries. Measure 2, as modeled, reflects the current VAMP discussions, and as such, includes some purchase water (or "(b)(3)" water).

C-045727

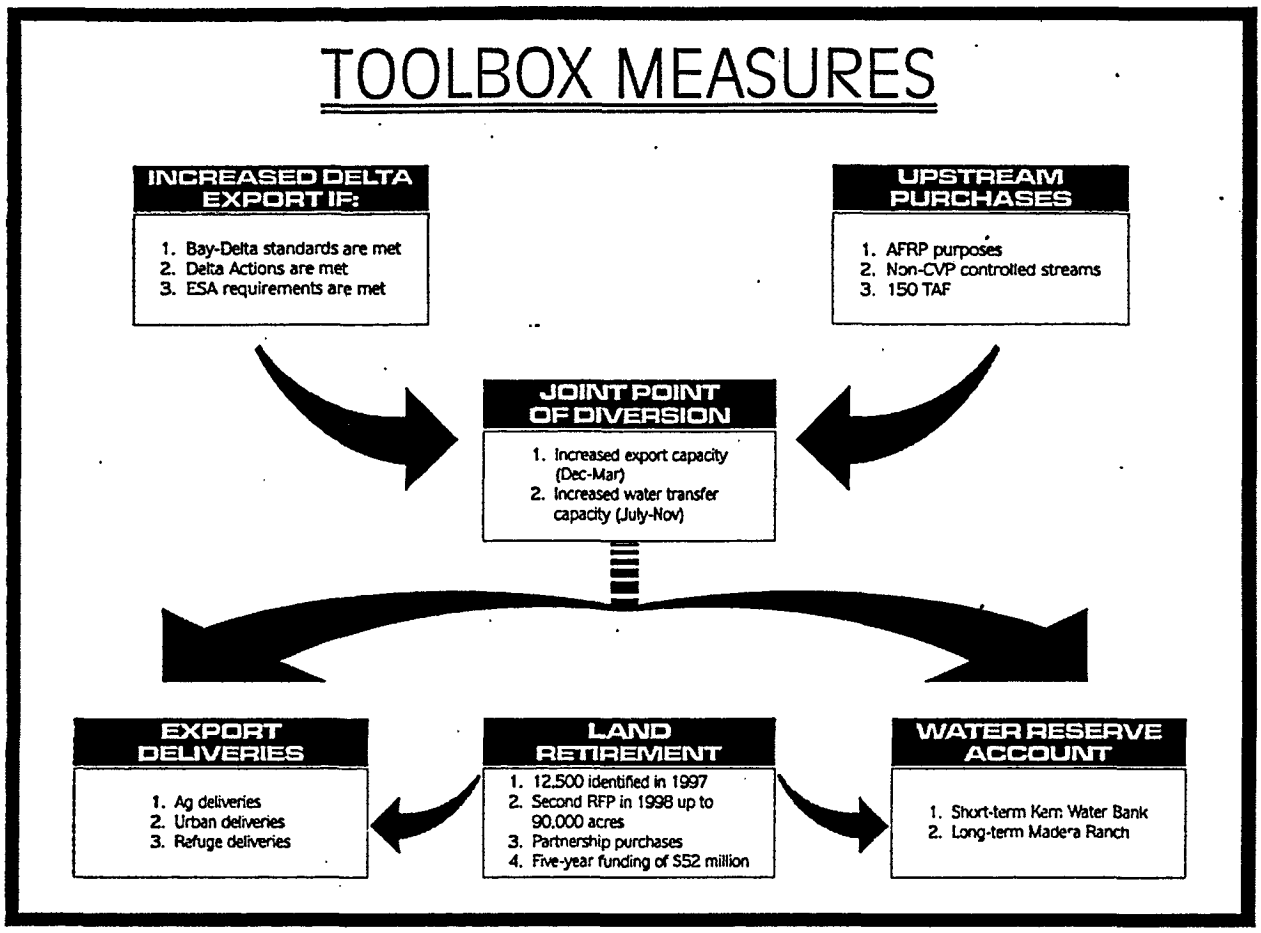
C-045727

APPENDIX C

C-045728

C-045728

APPENDIX C -- TOOLBOX MEASURES



JOINT POINT OF DIVERSION

Description

Under current operations, the Central Valley Project (CVP) can pump only 4,200 cubic feet per second (cfs) of permitted capacity because of conveyance constraints downstream of the Tracy Pumping Plant (Tracy). By implementing the "joint point of diversion," the 400 csf not currently being pumped by the CVP could be pumped by the State Water Project (SWP) at the Banks Pumping Plant (Banks) and delivered for CVP uses. In addition, capacity above 400 cfs is available at Banks at times when the Bay-Delta standards and the Delta Actions are being met and the State side of San Luis Reservoir is full. This capacity can be used by the CVP, with the concurrence of the California Department of Water Resources (CDWR), for environmental, agricultural, and urban exports. Under joint point operations, pumping at Tracy would remain at 4,200 cfs. Pumping at Banks is limited to 6,700 cfs in most months in compliance with the 1981 Public Notice 5820A ("Four Pumps Agreement") issued by the U.S. Army Corps of Engineers.

Joint point operations could be further enhanced through the operational flexibility provided by an intertie between the Delta-Mendota Canal and the SWP Aqueduct. This would allow the CVP to pump its full permitted amount of 4,600 cfs at Tracy and then convey the water to San Luis through the SWP Aqueduct. As a result, operational flexibility is improved by allowing water to be pumped at either Banks or Tracy in the event either pumping plant is having a "take" impact on a listed species.

Either scenario, joint point or joint point with intertie, provides increased capacity to export water from the Delta during fall and winter months when excess water exists and when the Bay-Delta standards, Delta Actions, and Endangered Species Act (ESA) requirements (including any final Spring-run Chinook Salmon Protection Plan adopted by the California Fish and Game Commission[1]) are being met. Joint point also provides capacity for either of the projects to move additional water from northern storage through the export facilities.

Interior's proposed request for use of the joint point of diversion does not include its use to facilitate water transfers associated with Interior purchases on upstream tributaries. Each water transfer will require a separate State Water Resources Control Board (SWRCB) approval action since the place of use and point of diversion is being changed. Interior believes that its potential water transfer transactions will generally occur in different times of the year than the anticipated use of joint point under this request.

[1]For purposes of the present analysis, Interior has assumed that the California Fish and Game Commission will adopt the Spring-run Chinook Protection Plan prepared by the CALFED Operations Group dated October 27, 1997. Under the proposed Protection Plan, operational actions are to be taken in response to environmental or monitoring indicators. Operational responses are similar to those required within the Winter-run Chinook Salmon Biological Opinion.

Modeling by Reclamation indicates that over the 72-year hydrology, implementation of the joint point will allow for an increase in export capability of up to an average of 250,000 acre-feet. The long-term average assumes that all Bay-Delta standards are met, all Delta Actions are implemented, and the State side of San Luis Reservoir is full. The additional water available for export would be stored in the Federal share of San Luis Reservoir, conveyed to a groundwater basin as San Luis fills, used for the environmental purposes outlined below, or delivered for agricultural or urban use. SWP interruptible deliveries, and water transfers by SWP contractors would have first priority to the San Luis storage capacity. While some storage capacity in the Federal side of San Luis Reservoir exists, new groundwater storage capacity south of the Delta will also be developed as discussed in the Water Reserve Account section.

Proposed Use of Joint Point of Diversion

Interior proposes to submit a request to the SWRCB to use the joint point of diversion under the following conditions and for the following purposes:

(1) Interior will request to pump additional water 250,000 acre-feet using the joint point. This amount will be pumped when the Delta is in an excess flow condition (as discussed above). Interior also recognizes that use of the joint point of diversion will be contingent on the cooperation of the CDWR.

(2) Interior proposes that the additional water pumped would be available for environmental, agricultural, and urban use including: (a) CVP deliveries, (b) wildlife refuge supplies; and (c) banking in the Water Reserve Account for later environmental; agricultural, or urban use.

(3) Water pumped under joint point operations would be proportionally shared as it is pumped. The SWP gain or loss due to implementation of these measures will be considered in determining how the benefits will be shared.

(4) Interior proposes that this request cover the 5-year period beginning January 1998 contingent on SWRCB approval.

Timing of Implementation

Implementation of joint point does not require construction of new facilities. Under SWRCB Water Rights Decision 95-6 (WR95-6) the CVP and SWP can modify pumping operations for fisheries benefits. WR95-6 requires that DWR and the CVP submit a plan describing the modified pumping operations to the CALFED Operations Group (Ops Group) and the Ops Group must approve the plan. Once approved by the Ops Group, a formal letter is submitted to the SWRCB for approval. Interior believes that a plan can be submitted to the Ops Group during its next meeting on December 4, 1997, and the plan could be approved by the SWRCB by December 31, 1997.

Estimated Cost

Based on current rates for SWP wheeling and CVP electric energy, the estimated cost of implementing the joint point is approximately $21 per acre-foot for water pumped by the SWP for the benefit of the CVP. If the intertie is constructed, it is estimated to cost $8 million.

Potential Funding Sources

Funding for costs associated with implementation of the joint point of diversion may be available from several sources. To the extent that the joint point provides water for storage in the Water Reserve Account for later environmental use, the costs associated with making that water available may be funded through any of several environmental funding sources. Table 1 is a partial list of potential funding sources. Interior will determine which of these funds can be most appropriately used to fund the joint point by February 15, 1998.

Table 1

Funding Source	Description	Availability
CVPIA Restoration Fund	Established in the CVPIA for specifically enumerated purposes and water purchases.	Immediately
CVP O&M Funds	Funds available for operation and maintenance of CVP facilities	Immediately
Bay-Delta Environmental Enhancement and Water Security Act	Funding available for long-term CALFED programs. May be used for directed projects or early implementation of CALFED projects.	Immediately
Prop 204 - CVPIA State Cost Share	Funds available for state share of CVPIA projects	Immediately

Environmental Benefits

Increased export capacity is critical to establishing any Water Reserve Account south of the Delta. As described in the Water Reserve Account section, a portion of the water exported from the Delta through the joint point could be delivered temporarily to a Water Reserve Account in San Luis Reservoir from which it may be used for environmental purposes. As the annual filling of San Luis Reservoir progresses, environmental water temporarily stored in San Luis can be moved to groundwater storage as part of the Water Reserve Account. Reclamation analysis indicates that the joint point could allow for early filling of San Luis Reservoir in many years which results in added operational flexibility for environmental benefits. In addition, the use of

the joint point of diversion facilitates delivery of water supplies to wildlife refuges south of the Delta.

Water Supply Benefits

Implementation of joint point results in additional export capability, much of which will be used for deliveries to CVP contractors. Water may be exported during times when the Bay-Delta standards, Delta Actions, and ESA requirements are being met. The portion of the water exported but not delivered to the Water Reserve Account will be used for contract deliveries, stored in San Luis Reservoir, or in groundwater storage developed by others. The potential to fill San Luis Reservoir early in many years provides the flexibility to deliver additional water supplies at times when there are fewer environmental impacts.

LAND RETIREMENT

Description

The CVPIA Land Retirement Program is limited to willing buyer/willing seller transactions with a preference for drainage-impaired lands in the CVP service area. Land retirement purchases will occur in two different ways: (1) Reclamation will purchase the land and water and make the water available for direct environmental benefit or delivery into storage as part of the Water Reserve Account, or (2) Reclamation will purchase the land only and the water will remain with the water district. Under either method, land retirement purchases will be based on fair market value.

In response to the Request for Proposals (RFP) issued by Reclamation in 1997, there were 31 offers to sell drainage-impacted lands totaling 27,500 acres, of which Reclamation anticipates funding purchases of approximately 12,500 acres. Funding for purchases from willing sellers under an on-going RFP process will be approximately $50 million over the next 5 years.

Additional funding may be available from districts that choose to partner with Reclamation in land retirement purchases. Under such arrangements, Interior will jointly investigate the possibility of purchasing additional lands on the west side of the San Joaquin Valley with willing partners. Under these partnerships, Interior will use the water acquired during wet years for either direct environmental benefit (including refuge supplies) or for storage in the Water Reserve Account. During other year types the water will be available for use by the partner.

In 1998, Reclamation will issue a second RFP to identify additional lands for purchase during the next 5 years. That RFP will attempt to identify (consistent with the current budget) an additional 40,000 acres of land. The CALFED water quality program has set a target of 90,000 acres for land retirement, and acquisitions under the second RFP would be coordinated with CALFED. If the response to the 1998 RFP exceeds the funding that is currently budgeted, Reclamation will seek additional sources of funding including CVPIA and CALFED funds for land retirement.

Amount of Water

The disposition of water from the Land Retirement Program depends on whether Reclamation acquires land and water, or only the land. It is not anticipated that a significant amount of water will be made available to the Reclamation from the Land Retirement Program.

Timing

The CVPIA Land Retirement Program currently exists. The current program includes numerous steps such as solicitation of offers, selection, appraisals, National Environmental Policy Act (NEPA) analysis, and negotiation for purchases. An estimated 12,500 acres will be retired in 1998 at the appraised value subject to availability from willing sellers.

Estimated Cost

Proposals submitted to the CVPIA Land Retirement Program in 1997 ranged from $1,500 per acre to $6,200 per acre, with an average price of about $2,600 per acre for land sold with water.

Potential Funding Sources

Funding for the CVPIA Land Retirement Program is budgeted as a Restoration Fund and energy and water appropriation expenditure. Table 2 is a list of potential funding sources for land retirement. Interior will determine which of these funds can be most appropriately used to fund land retirement purchases by February 15, 1998.

Table 2

Funding Source	Description	Availability
CVPIA Restoration Fund	Established in the CVPIA for specifically enumerated purposes and water purchases.	Immediately
Energy and Water Appropriations	Funding available to Interior for specific water related projects	2-year lead time
Bay-Delta Environmental Enhancement and Water Security Act	Funding available for long-term CALFED programs. May be used for directed projects or early implementation of CALFED projects.	Immediately
Conservation Reserve Program (1996 Farm Bill)	Funds available to provide monetary incentive to retire highly erodible and environmentally sensitive land.	Revolving enrollment periods

Environmental Benefits

Environmental benefits include: (1) taking drainage-impacted land out of production and reducing salt and selenium loading, (2) creating upland habitat, and (3) shifting demand for water from agricultural use on predominantly drainage-impacted lands to storage in the Water Reserve Account or other environmental needs. Water districts that retain water made available through land retirement will be prohibited from using the water on drainage-impacted lands.

Water Supply Benefits

The CVPIA Land Retirement Program will allow for financial participation by water districts. Participating districts will benefit by retaining the water for use in improving their supply reliability on nondrainage-impacted lands.

WATER PURCHASES ON SACRAMENTO RIVER TRIBUTARIES

Description

Water purchases from willing sellers on tributaries upstream of the Delta will be made during below normal, above normal, and wet years to meet flow requirements previously identified by the U.S. Fish and Wildlife Service (FWS). These upstream water purchases will be structured to achieve tributary flow requirements as identified in the FWS *Draft Guidelines for Allocation of Water Acquired Pursuant to Section 3406(b)(3) of the Central Valley Project Improvement Act.* By upstream tributaries, Interior means those streams tributary to the Sacramento River, San Joaquin River, and the Delta.

Purchased water will be scheduled to meet the identified upstream anadromous fish needs. Once the upstream purpose has been achieved, the purchased water will be available for export from the Delta provided the Bay-Delta standards, ESA requirements, Delta Actions, and any applicable spring-run protections are being met. Water exported from the Delta will be delivered to the Water Reserve Account as described in the Water Reserve Account section or delivered for agricultural or urban uses.

Amount of Water

Water purchases on the upstream tributaries are expected to make available approximately 150,000 acre-feet of water to meet previously identified, high priority Anadromous Fish Restoration Program (AFRP) flows. This water will come from a combination of water purchases negotiated with willing sellers. The actual source of the water will be determined during negotiations with individual sellers.

Interior has currently identified 320,000 acre-feet of water for AFRP purposes (Table 3). Interior will continue to negotiate purchases on upstream tributaries until: (1) contracts are executed for

150,000 acre-feet of high priority AFRP flows on upstream tributaries, (2) the high priority AFRP flows on all upstream tributaries have been achieved, or (3) no willing sellers can be identified on streams where high priority AFRP flows are not being met.

Table 3
Potential AFRP Purchases On Sacramento River Tributaries

			All Standards Being Met			No Water, No Capacity			Transfer Capacity Available					All Standards Being Met
Location & Quantity	AFRP Priority	Purpose	January	February	March	April	May	June	July	August	September	October	November	December
Feather														
36	1	S&I										12	12	12
24	2	R&O				12	12							
36	3	I&R	12	12	12									
Yuba														
9	1	R&O				9.5	9.5							
28	2	I&R	9.5	9.5	9.5									
12	3	O-S						9	9	9	9			
5	4	S&I										1.6	1.7	1.7
14	5	R&O				7.5	7.5							
9	6	I&R	9	9	9									
56	11	O-S						16	16	16	16			
Bear														
40	1	S&I										13.3	13.3	13.4
9	2	R&O				4.5	4.5							
32	3	I&R	10.7	10.7	10.7									

S&I = Spawning and Incubation
I&R = Incubation and Rearing
R&O = Rearing and Out-migration
O-S = Over-sumering

Interior fully recognizes the political and institutional hurdles it must overcome to successfully purchase water on upstream tributaries. For this reason Interior is continuing to identify high priority AFRP flow needs on other upstream tributaries and will pursue negotiation of those purchases concurrently with negotiations for purchase of 150,000 acre-feet of the 320,000 acre-feet already identified. Interior intends to specifically focus on identifying AFRP needs and obtaining water on Mill and Deer Creeks in an effort to provide improved flows for spring-run spawning.

In addition to the important concerns of Boards of Supervisors, Water Districts, and local communities, Interior also recognizes that SWRCB approval of these purchases will be required, and DWR approval will be required on the Feather River. It is with these limitations in mind that Interior is continuing to identify high-priority AFRP purchases on other upstream tributaries.

Since release of the October 31, 1997, draft Administrative Proposal, Interior has contacted potential water sellers on the streams identified in Table 3. Through these contacts, Interior has determined that there is a willingness on the part of several entities to open discussions for negotiation of purchases in the amounts and on the timing outlined in Table 3. While none of these parties has yet committed to sell water to Interior and all have identified several issues of concern, Interior is encouraged by the willingness of these entities to discuss Interior purchases for AFRP flows.

Estimated Cost

The cost of water during the 1991, 1992, and 1994 drought water banks was $125 per acre-foot, $50 per acre-foot, and $50 per acre-foot, respectively. More recently, Reclamation has been successful in purchasing water on Sacramento River tributaries during wet and above normal years at a cost of $50 per acre-foot.

In recent discussions with entities on the tributaries identified in Table 3, Interior has learned that purchase prices in the range of $50 per acre-foot are likely. While actual prices paid by Interior will be determined during individual negotiations with water sellers, it is expected that the negotiated price will approximate $50 per acre-foot.

Timing

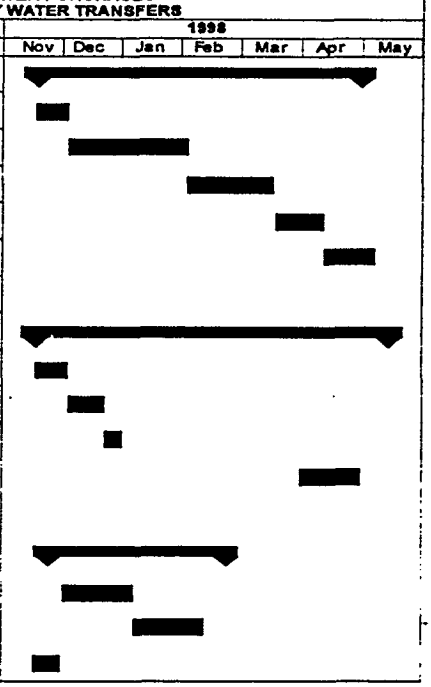
Based on recent Reclamation experience, short-term water purchases on Sacramento River tributaries could be implemented during 1998. The precise timing and duration of implementing water purchases will be dependent on any necessary NEPA or California Environmental Quality Assessment (CEQA) requirements.

Reclamation has developed Table 4 to describe the necessary timing for implementation of upstream purchases. Table 4 includes the timing necessary for identification, negotiation, environmental review, and approval of water purchases on upstream tributaries. Interior recognizes that changes in this schedule may be necessary to accommodate unique circumstances of individual purchases.

Table 4

UPSTREAM WATER PURCHASES
1998 TEMPORARY WATER TRANSFERS

ID	Task Name	Duration
1	Environmental Assessment	117d
2	Award Contract	14d
3	Prepare Review (30d)	45d
4	Public Review (30d)	30d
5	Prepare Final EA	14d
6	EA Approval	14d
7		
8	Water Purchase Agreement	128d
9	Prepare Draft Agreement	14d
10	Negotiate Agreement	14d
11	Finialize Agreement	5d
12	Agreement Signed/Exec	21d
13		
14	SWRCB Petition	73d
15	Prepare Petition	30d
16	SWRCB Public Notice	30d
17	SWRCB Approval	14d



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Potential Funding Sources

Funding for upstream water purchases to meet AFRP purposes could potentially come from a variety of sources. Table 5 is an un-prioritized list of those sources. Interior's preliminary review indicates that these sources may be available to assist in funding purchases of flows for AFRP purposes. A determination of the availability of these funds for purchasing AFRP flows will be completed prior to February 15, 1998.

Table 5

Funding Source	Description	Availability
CVPIA Restoration Fund	Established in the CVPIA for specifically enumerated purposes and water purchases.	Immediately
Energy and Water Appropriations	Funding available to Interior for specific water related projects	2-year lead time
Bay-Delta Environmental Enhancement and Water Security Act	Funding available for long-term CALFED programs. May be used for directed projects or early implementation of CALFED projects.	Immediately
Land and Water Conservation Fund	Funding available for land and water acquisition.	Federal budget cycle
State CVPIA Cost Share	Funding for state share of CVPIA restoration efforts.	January, 1997
Prop 204 - Sacramento Valley Water Management and Habitat Protection	Funding available for water management and habitat improvements in the Sacramento Valley	January, 1997

Environmental Benefits

Water purchases on the upstream tributaries will provide a variety of benefits for anadromous fish, including spawning, incubation, rearing, out-migration, and over-summering. In addition, AFRP water purchases on the Sacramento River tributaries will increase flows in the lower Sacramento River to benefit anadromous fish by supplementing the current upstream actions being implemented by Interior since 1993.

Water Supply Benefits

Water made available through water purchases on upstream tributaries will be available for export during periods when the Bay-Delta standards, Delta Actions, applicable spring-run requirements, and ESA requirements are being met.

WATER RESERVE ACCOUNT

Description

Interior proposes creating a Water Reserve Account for environmental, agricultural, and urban uses. In the short-term (1998-2000), the Water Reserve Account could consist of up to 450,000 acre-feet of groundwater banked in the Kern County Water Agency service area; 300,000 acre-feet would be available in the first year, and 150,000 acre-feet would be available in the second year. In the long-term (beyond 2000), the Water Reserve Account could consist of up to 350,000 acre-feet of water banked in the Madera Ranch Groundwater Banking Project located in Madera County. Under either the Kern County or Madera Ranch programs, the Water Reserve Account would be used to store water made available through implementation of the joint point of diversion. Interior continues to study the possibility of developing a portion of the Water Reserve Account in areas north of the Delta.

Water could be placed into storage in the Water Reserve Account from several sources. Water that Interior buys as part of the Land Retirement Program could be placed in the Water Reserve Account. In addition, a portion of the water available as a result of implementation of the joint point of diversion could be placed into the Water Reserve Account.

As currently envisioned, the Water Reserve Account would include up to 200,000 acre-feet of water for environmental uses. Potential uses include: (1) implementation of additional measures or implementation of measures to a fuller extent than originally planned in the same year the water is stored, (2) banking water for use at a later time when new environmental needs arise or when currently identified environmental needs are greater; and (3) providing water for direct delivery to water users in exchange for reduced exports to gain environmental benefits in the Delta or for unforeseen environmental emergencies.

Environmental water can be stored in the Federal portion of San Luis on a space-available basis. Interior estimates that at least 50,000 acre-feet of storage capability will be available at San Luis throughout the year in 40 percent of water years. Environmental water stored in San Luis will be released pursuant to the direction of the FWS for whatever purposes it directs, including water sales or exchanges with proceeds used for other environmental measures.

If environmental water stored at San Luis must be "spilled" to make storage space available for users with more senior storage rights, Reclamation will provide advance notice to FWS. FWS, in consultation with Reclamation, will decide what action should be taken, including any of the following:

(1) The water can be transferred to groundwater storage south of the Delta for subsequent environmental uses.

(2) If the timing is appropriate, the water could be used to provide additional San Joaquin River instream flows in excess of the Vernalis Adaptive Management Plan (VAMP) flows, as long as those additional flows are consistent with the VAMP experimental purposes.

(3) If the timing is appropriate, the water could be used to provide Level 4 water supplies to south-of- Delta wildlife refuges.

(4) If the timing is appropriate, the water could be given to water contractors relying on San Luis supplies in exchange for reduced export pumping during environmentally sensitive times.

(5) The water can be sold to Reclamation or other water users and stored in groundwater storage, with proceeds used for other environmental measures.

If the FWS Regional Director finds there is no environmental reason to deliver additional environmental water to the San Luis Reservoir or other environmental storage sites south of the Delta, the Regional Director may chose to reduce or eliminate the environmental share of new joint point of diversion pumping.

The Water Reserve Account will also include up to 200,000 acre-feet of water for agricultural and urban uses including increased deliveries to consumptive uses compensated at the appropriate contract rate (including Restoration Fund charges).

Short-term Water Reserve Account - Kern County Program.

Overview. The Kern County Program is intended to provide the ability to establish the Water Reserve Account in the short-term while the long-term Madera Ranch Project is being developed and constructed. The program will commence in 1998 and extend through 2000. The program will make up to 300,000 acre-feet of water available from the Water Reserve Account for environmental, agricultural, and urban use.

Borrowing. The Kern County Program will provide Interior with the ability to borrow water previously stored in Kern County groundwater basins. During the first year of recovery, up to 300,000 acre-feet may be borrowed from previously stored supplies. Up to an additional 150,000 acre-feet may be borrowed in the second year. The amount of water available in the third year is limited to the amount of water returned to the program by Interior for storage.

Replacement of Borrowed Water. Borrowed water must be replaced by Interior.

Storage in Advance of Recovery. Interior may store water in advance of recovery to preclude the necessity of borrowing water.

Payment for Water. Interior will pay the Kern County Water Agency (KCWA) an up-front option payment to secure the ability to borrow water. Interior will also pay a negotiated price in

the year water is taken, and is responsible for obtaining the power necessary to recover and convey the water.

The KCWA and its member units have developed a preliminary assessment of the amount of water that can be made available through their current groundwater storage programs. This water is currently stored in groundwater basins in Kern County and can be withdrawn in the amounts described in Table 6.

Table 6

Source	SWP Allocation (Acre-Feet)				
	30%	20%	15%	10%	0%
Kern Water Bank	118,800	118,800	118,800	118,800	118,800
Semitropic Water Storage Dist.	119,400	100,800	90,000	90,000	90,000
KCWA In-lieu Programs	71,400	60,100	54,500	48,800	37,600
Total	309,600	279,700	263,300	257,600	246,000

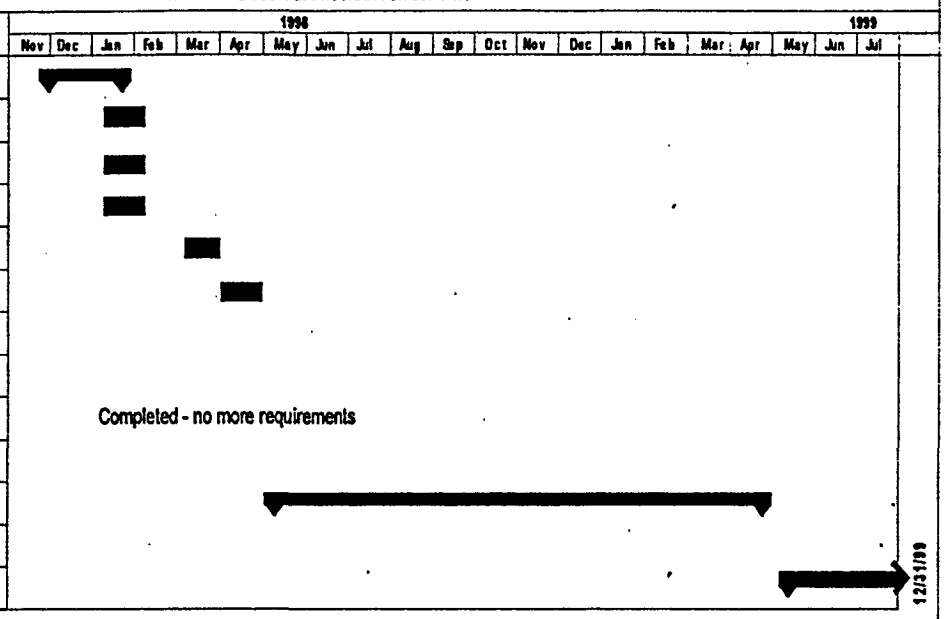
Timing for Implementation

Because the Kern County Program involves water already in groundwater storage, this program provides the best, quickly available source of water for the Water Reserve Account. Preliminary discussions with the KCWA indicate that an agreement for the short-term Water Reserve Account could be negotiated and executed before February 15, 1998 (see Table 7).

Table 7

KCWA WATER SUPPLY PROGRAM FOR USF & WS

ID	Task Name	Duration
1	KCWA Water Supply Program Agreement	
2	Negotiate Agreement (KCWA & DOI, F&W)	70d
3	KCWA/Local approval	30d
4	DWR approval	30d
5	SWC approval	30d
6	Execute Agreement	15d
7	Payment to KCWA	30d
8		
9	KCWA Environmental Requirements	
10		
11	Construction of Local facilities	365d
12		
13	First Possible Initial Recovery	73d



Long-term Water Reserve Account - Madera Ranch Groundwater Banking Project.

Overview. Reclamation is currently investigating the Madera Ranch Groundwater Banking Project in a two-phase process with the intent to use it as the long-term Water Reserve Account. Phase I of the process will begin in November 1997, and Phase II will begin in March 1998. At the conclusion of Phase I in February 1998, Reclamation will have developed sufficient information to determine the suitability of Madera Ranch as a Water Reserve Account.

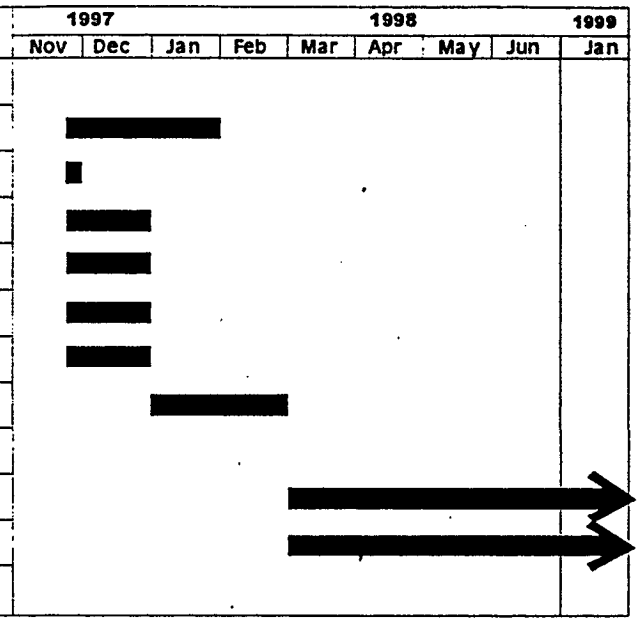
Storage Capacity. The Madera Ranch Groundwater Banking Project has a total storage capacity of up to 390,000 acre-feet. Water can be delivered from the San Luis Reservoir or the Mendota Pool though conveyance facilities constructed as part of the project. Water would be placed in groundwater storage through spreading facilities also constructed as part of the project. Up to 24,000 acre-feet per month can be conveyed and stored under the current design proposal.

Withdraw Capacity. The Madera Ranch Groundwater Banking Project will be capable of returning 200 cfs for either environmental, agricultural, or urban use. Water would be returned from the environmental share for environmental use or from the water-user share for agricultural and urban use.

Timing of Implementation

Table 8

ID	Task Name	Duration
1	Phase 1	
2	Geohydrologic Testing	73d
3	Evaluate Flood Channel Diversion	11d
4	Plan NEPA/CEQA	42d
5	Develop Partnership Options	42d
6	Operations Studies	42d
7	Pursue Environment	42d
8	Document Go/No Go	59d
9	Phase 2	
10	NEPA/CEQA Compliance	305d
11	Negotiation for Purchase/Lease	305d
12	Construction (Begins 1/1/99	



Potential Funding Sources

Potential funding sources vary depending on whether funds are being sought for the short- or long-tern Water Reserve Account. Because the long-term Water Reserve Account will require construction of facilities and possible purchase of land, there is the possibility of funding through normal energy and water appropriations. Table 9 is a list of the potential funding sources identified to date.

Table 9

Funding Source	Description	Availability
Bay-Delta Environmental Enhancement and Water Security Act	Funding available for long-term CALFED programs. May be used for directed projects or early implementation of CALFED projects.	Immediately
CVPIA Restoration Fund	Established in the CVPIA for specifically enumerated purposes and water purchases.	Immediately
State CVPIA Cost Share	Funding for state share of CVPIA restoration efforts.	Immediately

Table 9		
Funding Source	Description	Availability
Energy and Water Funds	Authorized and appropriated for specific water related projects.	2-year lead time

Environmental Benefit

The Water Reserve Account provides environmental benefits by providing up to 200,000 acre-feet of water for in-Delta use or storage south of the Delta for later use in meeting environmental needs. Water in the Water Reserve Account can be used to meet environmental needs in the Delta by delivering water directly to water users and reducing pumping by an equivalent amount. Water could also be used to increase flows in the San Joaquin River by direct releases from the long-term Water Reserve Account.

Water Supply Benefit

As currently envisioned, the Water Reserve Account includes water for up to 200,000 acre-feet of agricultural and urban supplies.

TIME SHIFTING

The Toolbox Group noted that time-shifting of water deliveries is primarily a tool that can enhance the real-time management of the system resulting in substantially less conflict between water-user needs and the environment. As a specific example, time-shifting can enhance the performance of the joint point tool by allowing users south of the Delta to forego taking water in the spring months when impacts to fish are greatest, and then make up the water later in the year because of the increased capacity as a result of the joint point. In addition, time-shifting may be used as a tool to minimize the impacts of the joint point on the ability of water users to carryover or reschedule supplies in San Luis Reservoir. Finally, time-shifting is an important tool to maintain the low point in San Luis Reservoir and provide operational reliability for public health and safety and other critical purposes. Time-shifting requires compensation for the additional risk assumed by the water users that shift their demands.

Interior has determined that as a tool, time-shifting is best used on a limited basis in real-time management situations to address unforeseen environmental or operation circumstances.