Sources of Water Potentially Available for Contribution to the Environmental Water Account

Introduction

The primary purpose of this discussion paper is to identify the amount of "wet" water that could be part of an Environmental Water Account (EWA) on January 1, 2000; essentially, day 1 of stage 1. The secondary purpose is to determine if it is possible to geographically distribute the EWA such that EWA water could be used, at least in part, to accomplish each of the measures described in the U.S. Fish and Wildlife Service's and National Marine Fisheries Service's proposal (Services' proposal).

This paper does not attempt to identify quantities of water that may be available to the EWA from varying the export/inflow (E/I) ratio, or the degree to which implementation of the joint point of delivery could allow water made available by varying the E/I ratio to be exported to EWA storage sites south of the Delta or "backed" into Shasta or Oroville reservoirs. Those determinations are being made by other groups. However, this paper does identify several storage sites that can provide wet water on day 1 of stage 1, some of which could be refilled by using E/I variations in conjunction with the JPOD. In addition, this paper also identifies one storage site that will be empty on day 1 of stage 1 but could begin accepting deliveries in year 1 of stage 1.

Available Water

As described in greater detail in the section on the Services' Proposal, the EWA should be a mix of supplies located north of the Delta, south of the Delta and water purchases both north and south of the Delta. Most of the measures in the Services' Proposal can be more efficiently compensated by water south of the Delta. Therefore, this paper proposes that a significant focus of the EWA be on access to water stored south of the Delta and on storage space south of the Delta. The following table outlines the various sources of water currently stored south of the Delta that could be available to the EWA on day 1 of stage 1 and vacant storage space also south of the Delta that could be available to the EWA on day 1 of stage 1. Each potential source of water is described in greater detail in the sections following the table.

The Environmental Water Account on Day 1 of Stage 1

Convert E/I Standard into Water Supply (see modeling by others for amounts)

- Convert directly into water by reductions in pumping
- Pump above E/I and store the water in reservoirs or groundwater storage

Available Groundwater Storage (full on day 1)

- MWD/Semitropic Groundwater† 31,500

• SCVWD/Semitropic Groundwater†	31,500
• Kern Water Bank†	100,000
• MWD Surface Storage† (Monterey reservoirs)	50,000
• San Francisco/KWB	up to 17,000
Sub-total	up to 230,000
Water Purchases‡	
• $20,000,000 (assume $100/af)	200,000
• Integration of CVPIA and ERP water purchases	
• CVPIA currently has $8 M as a place holder ($70/af)	114,000
• ERP allocates $20 M in year 1 of stage 1 ($70/af)	285,500
Sub-total	up to 599,500
Total Water Available to the EWA on Day 1 of stage 1	up to 829,000
Vacant Storage Space Available to the EWA on Day 1 of stage 1	
• SCVWD/Semitropic†	200,000

† Indicates refillable storage. Total refillable storage south of the Delta on day 1 of year 1 is 413,000 acre-feet (213,000 full, 200,000 vacant).

‡ Amounts based on unlimited availability of water. Actual availability of water will vary depending hydrologic year type, and number of willing sellers.

Kern Water Bank

The Kern Water Bank (KWB) is located south of the Delta in Kern County and is operated by the Kern Water Bank Authority, a joint powers authority. The KWB has a storage capacity of approximately _____ acre-feet of which up to 100,000 acre-feet can be made available to the EWA. Water is stored in the KWB by direct delivery from the California Aqueduct or the Friant Unit of the CVP to spreading areas overlying the bank. The connection to the Friant Unit is particularly advantageous during the winter months when it is possible to deliver San Joaquin River flood flows to the bank. The average monthly recharge is approximately _____. Delivery to the bank can be made in all months of the year, but the greatest recharge capacity is during _____.

Returning water from the bank is by direct pumpback to the California Aqueduct. This method of return allows water to be placed in the aqueduct and delivered to SWP contractors downstream of the bank in exchange for decreased deliveries to those SWP contractors from San Luis. As a result, water stored in the KWB can be made available either directly to downstream

SWP contractors or to SWP or CVP contractors that normally take deliveries out of San Luis. The return capacity of the KWB is approximately _____acre-feet per month, and return can be made in all months of the year.

MWD Surface Storage

As part of the 1995 Monterrey Agreement, the Metropolitan Water District of Southern California gained the right to modify DWR's operation of Castaic Lake and Lake Paris located downstream of the A.D. Edmonston Pumping Plant. In any year of Metropolitan's choosing, Metropolitan can borrow water from the reservoirs by drawing them down below what DWR would have otherwise allowed. The borrowed water must be repaid to the reservoir by Metropolitan within five years. The Monterrey Agreement does not prohibit Metropolitan from using this operational flexibility for the benefit of the EWA. As a result, Metropolitan can make water available to the EWA from its Monterrey storage on day 1 of stage 1.

Because the water is in surface storage it is instantly available to the EWA in San Luis. To make the water available in San Luis Metropolitan would draw down one of its Monterrey Reservoirs instead of taking deliveries from San Luis. This creates a "hole" in the reservoir, and "backs" water into San Luis for the benefit of the EWA. The EWA can then reduce exports and deliver its San Luis water to any contractor, including Metropolitan, that otherwise would have received water from the pumps.

SCVWD/Semitropic Storage and MWD/Semitropic Storage

SCVWD and MWD have contracted with the Semitropic Water Storage District to store SWP water in Semitropic's groundwater basin. The program is an in-lieu storage program that allows SCVWD and MWD to deliver surface water to Semitropic, who in turn delivers the surface water to its users in exchange for a decrease in groundwater pumping in an equivalent amount. As a result, SCVWD and MWD gain rights to an equivalent amount of groundwater. In general terms water can be stored in Semitropic during the irrigation season and extracted during September through March. In addition, Semitropic can deliver water back to SCVWD or MWD by exchange of its SWP entitlement at San Luis. The amount of exchange water available for return to SCVWD and MWD varies depending on the hydrologic year type. During wet years SCVWD and MWD can return up to 70,000 acre-feet by exchange at San Luis and up to 90,000 acre-feet by direct pumpback. However, because none of the exchange water would be available in a dry year, this paper assumes the only water available on day 1 of stage 1 will be pumpback water.

City and County of San Francisco

During the drought the City and County of San Francisco stored 17,000 acre-feet of water in the Kern Water Bank in anticipation of a later need. San Francisco has never used this water and it remains in storage in the KWB, even though the agreement between the Kern County Water Agency and San Francisco has expired. Both KCWA and San Francisco have indicated a willingness to make this water available to the EWA on day 1 of stage 1.

The Services' Proposal

The Services' Proposal includes fishery protection measures that can be accomplished by either one of, or a combination of, reservoir releases, export reductions, or water purchases. As an example, the 1962 LOD for X2 could be accomplished by either increasing releases from upstream reservoirs to move X2, or by reducing exports. Alternatively, some measures can only be accomplished by reductions in pumping (e.g. the VAMP export restrictions, or the 10-day export reduction), and others only can be accomplished through water purchases (e.g. increased VAMP flows at Vernalis). However, for most of the measures, one method of accomplishing the action is more efficient and therefore preferred. This paper articulates a mix of EWA water sources based on the most efficient way of accomplishing the specific measure.
he Services' Proposal includes the following measures:

<table>
<tr><td>OCT</td><td>NOV</td><td>DEC</td><td>JAN</td><td>FEB</td><td>MAR</td><td>APR</td><td>MAY</td><td>JUN</td><td>JUL</td><td>AUG</td><td>SEPT</td></tr>
<tr><td colspan="4">Min. Outflow</td><td colspan="5">1962 LOD for X2</td><td colspan="3">Min. Outflow</td></tr>
<tr><td colspan="4">0.65 E/I</td><td colspan="5">0.35 E/I</td><td colspan="3">0.65 E/I</td></tr>
<tr><td></td><td colspan="3">DCC Closure</td><td colspan="2">10-day</td><td colspan="3">VAMP</td><td colspan="2">X2</td><td></td></tr>
<tr><td colspan="4"></td><td colspan="2">Q-west>1000</td><td colspan="3">HOR</td><td colspan="3"></td></tr>
<tr><td colspan="4">Q-west > 0</td><td colspan="5">Q-west > 0</td><td colspan="3"></td></tr>
</table>

<u>1962 LOD for X2</u>

Under current CVP and SWP operations X2 can be met either by export reductions or increased releases from Shasta, Folsom or Oroville, with a strong preference for export reductions. Therefore, it is most advantageous to have much of the EWA water necessary to accomplish this measure stored in areas south of the Delta to compensate for the anticipated export reductions.

Possible sources of EWA water that could be used to reduce exports in years implementing the

D-015564

D-015564

1962 LOD for X2 has an impact on exports include:

- Actual water currently stored in the ground south of the Delta and available on day one of stage 1

• Kern Water Bank	100,000
• MWD Surface Storage	up to 50,000
• MWD /Semitropic Groundwater Storage	31,500
• SCVWD / Semitropic Groundwater Storage	31,500
• City and County of S.F. Groundwater Storage	up to 17,000
	up to 230,000

- Groundwater storage space available south of the Delta on day one of stage 1.

• SCVWD	200,000

- In addition, the E/I ratio could be varied to compensate for these impacts.

Possible sources of EWA water stored in Shasta and/or Oroville that could be used to accomplish the X2 objective by reservoir releases include:

- Allowing pumping for export to consumptive users above the E/I ratio thereby reducing releases from Shasta. The reduction in releases creates stored water in the upstream reservoir for the EWA (see modeling by others on E/I variation to determine potential amounts).
- Purchasing water downstream of Shasta for delivery to consumptive users south of the Delta and reducing releases from Shasta in an equivalent amount. The water not released from Shasta is part of the EWA. Downstream purchases may result from purchases under the ERP and be used for this purpose. (See Attachment A for a description of the amount of money available on day 1 of stage 1 for water purchases)

10-Day Export Reduction

The Services' Proposal would implement up to an additional 10-days of export reductions during February and March. This measure could be implemented for a consecutive 10-day period or could be split up and used whenever fish are near the pumps (e.g. 4 days in February and 6 days in March, etc.). Reducing exports during February and March will reduce the ability of the CVP and SWP to fill San Luis Reservoir. If San Luis ultimately fills before the irrigation season begins, then there is no impact of the 10-day reduction, and therefore no impact for the EWA to repay. However, if San Luis does not fill, then the EWA would repay that water by providing

D-015565

D-015565

water from EWA water stored south of the Delta.

Sources of EWA supply that could be delivered to consumptive users to compensate for impacts from up to 10-days of pumping reductions in February and March include:

- Actual water currently stored in the ground south of the Delta and available on day one of stage 1

• Kern Water Bank	100,000
• MWD Surface Storage	up to 50,000
• MWD /Semitropic Groundwater Storage	31,500
• SCVWD / Semitropic Groundwater Storage	31,500
• City and County of S.F. Groundwater Storage	up to 17,000
	up to 230,000

- Groundwater storage space available south of the Delta on day one of stage 1.

• SCVWD	200,000

- In addition, the E/I ratio could be varied to compensate for these impacts.

Vernalis Adaptive Management Plan

Flows up to 110,000 acre-feet will be provided by the SJRG, and exports at Tracy and Banks will be curtailed from April 15 to May 15 to meet the targets established in the VAMP agreement as currently configured and presented to the SWRCB. The Services' Proposal would increase the time period over which the VAMP could be implemented from 31 days up to 75 days. Under the Services' proposal there would be increases in both flows and export reductions in most years.

Increased Flows - Increasing flows at Vernalis can only be accomplished by purchasing water from operators of surface storage reservoirs on the Stanislaus, Merced, and Toulumne rivers; generally members of the SJRG. The EWA would accomplish this by using the $20 million reserve account supplemented by the $20 million available as part of the ERPP water purchase program and the $8 million currently budgeted for the CVPIA AFRP water purchase program. These three sources of funding would be available on day 1 of stage 1 assuming CALFED is successful in completing the ROD by December 31, 1999 and appropriations are is sufficient to meet the currently defined CVPIA Restoration Fund budget.

Increases in Export Reductions - Increases in export reductions can be compensated either by moving EWA water out of Shasta or Oroville and allowing it to be exported, or by delivering

D-015566

D-015566

EWA water to consumptive users south of the Delta that otherwise would have received water from San Luis reservoir.

Sources of EWA supply that could be delivered to consumptive users in years there are impacts from implementing the VAMP agreement include:

- Actual water currently stored in the ground south of the Delta and available on day one of stage 1

• Kern Water Bank	100,000
• MWD Surface Storage	up to 50,000
• MWD /Semitropic Groundwater Storage	31,500
• SCVWD / Semitropic Groundwater Storage	31,500
• City and County of S.F. Groundwater Storage	up to 17,000
	up to 230,000

- Groundwater storage space available south of the Delta on day one of stage 1.
  - SCVWD 200,000
- In addition, the E/I ratio could be varied to compensate for these impacts.

Ramping up X2

The Services' Proposal includes a requirement to ramp up exports from the 1962 LOD for X2 to the minimum flows required by the 1995 WQCP. This results in an impact on exports as compared to the current standards which allow exports to be increased immediately on July 1. To compensate for this impact EWA water must be available south of the Delta.

Sources of EWA supply that could be delivered to consumptive users in years there are impacts from ramping X2 include:

- Actual water currently stored in the ground south of the Delta and available on day one of stage 1

• Kern Water Bank	100,000
• MWD Surface Storage	up to 50,000
• MWD /Semitropic Groundwater Storage	31,500
• SCVWD / Semitropic Groundwater Storage	31,500
• City and County of S.F. Groundwater Storage	up to 17,000
	up to 230,000

D-015567

D-015567

- Groundwater storage space available south of the Delta on day one of stage 1.
  - SCVWD 200,000
- In addition, the E/I ratio could be varied to compensate for these impacts.

Q-west

The Services' Proposal includes a positive Q-west criteria in October through January, a Q-west of 1000 or greater in February and March of dry years, and a positive Q-west in February through June in all non-dry years. Implementing this Q-west criteria results in export reductions and decreases ability to move water from Shasta and Oroville to San Luis by "cutting off" releases from Shasta and Oroville from being exported.

Sources of EWA supply that could be delivered to consumptive users in years there are impacts from ramping X2 include:

- Actual water currently stored in the ground south of the Delta and available on day one of stage 1

• Kern Water Bank	100,000
• MWD Surface Storage	up to 50,000
• MWD /Semitropic Groundwater Storage	31,500
• SCVWD / Semitropic Groundwater Storage	31,500
• City and County of S.F. Groundwater Storage	up to 17,000
	up to 230,000

- Groundwater storage space available south of the Delta on day one of stage 1.
  - SCVWD 200,000
- In addition, the E/I ratio could be varied to compensate for these impacts.

D-015568

D-015568