

## WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION

ASSET DESCRIPTION <sup>1</sup>	EXAMPLES OF HOW ASSETS COULD BE APPLIED
<b>INCREASED BANKS PUMPING CAPACITY</b>	<ul style="list-style-type: none"> <li>• Increase pumping capacity to 6,680 cfs Nov – March + 1/3 SJR.</li> <li>• Increase pumping capacity to 7,180 cfs Jul-Sep</li> </ul>
<b>RIGHT TO BORROW SURPLUS PROJECT CAPACITY</b>	<ul style="list-style-type: none"> <li>• EWA would borrow San Luis Reservoir capacity</li> </ul>
<b>MARKETS (WILLING SELLERS)</b>	<ul style="list-style-type: none"> <li>• Purchase of water for multiple purposes</li> <li>• Purchase of in-Delta water</li> <li>• Purchase PG&amp;E reoperation water (30,000-100,000 af)</li> <li>• Groundwater Substitution: Shift surface water users in the Sac Valley to groundwater</li> </ul>
<b>JOINT POINT OF DIVERSION</b>	<ul style="list-style-type: none"> <li>• Implement JPOD</li> </ul>
<b>FLEXING THE E/I RATIO</b>	<ul style="list-style-type: none"> <li>• Change the application of the E/I ratio</li> </ul>
<b>SOURCE SHIFTING</b>	<ul style="list-style-type: none"> <li>• Core Peak: Pay user to shift demand to alternative source</li> </ul>
<b>GROUNDWATER STORAGE SOUTH OF THE DELTA</b>	<ul style="list-style-type: none"> <li>• Kern Water Bank</li> <li>• Semitropic</li> <li>• Options: Acquire options on water north and south of the Delta</li> </ul>
<b>RIGHT TO BORROW PROJECT STORAGE</b>	<ul style="list-style-type: none"> <li>• EWA would borrow SWP and CVP water supplies</li> </ul>
<b>BORROWING ARRANGEMENTS WITH NON-PROJECT AGENCIES</b>	<ul style="list-style-type: none"> <li>• Investigate potential for storage capacity access on tributaries on no-harm basis</li> </ul>
<b>IN-DELTA AGRICULTURAL DRAINAGE REDUCTION</b>	<ul style="list-style-type: none"> <li>• Relocate/reroute Delta agricultural drains or hold water for discharge on outgoing tides or for high flow periods to manage salinity, selenium, TDS</li> </ul>
<b>LAND RETIREMENT</b>	<ul style="list-style-type: none"> <li>• Retire lands which contribute to drainage problem</li> </ul>
<b>INTERTIE DELTA MENDOTA CANAL TO CALIFORNIA AQUEDUCT</b>	<ul style="list-style-type: none"> <li>• 400 cfs capacity</li> <li>• Need to determine real benefit of intertie when linked to other assets - staging issue</li> </ul>

<sup>1</sup> A number of the summaries of potential Early Stage 1 Assets have not been completed and/or are being reevaluated for consideration. These assets include: Improved Tracy Fish Facility Fish Screens, ERP, Reservoir Reoperation, Acquisition of Delta Islands, Pumping to Storage, Controlling Algal Growth in Clifton Court Forebay, Blending, and Crop Shifting.

# WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION

## INCREASED BANKS PUMPING CAPACITY

**Project Description:** During August and September of 1999, the State Water Project moved an additional 38,000 AF of State Water Project water from Lake Oroville into San Luis Reservoir by obtaining approval to exceed the allowable export rate. Although the SWP is capable of pumping 10,300 cfs at its Banks Pumping Plant, it is constrained to a lower pumping rate because the inflow to Clifton Court Forebay is constrained to 6,680<sup>2</sup> cfs from mid-March to mid-December by an agreement with the U.S. Army Corps of Engineers. Outside that window, the inflow to Clifton Court Forebay may be increased by an amount equal to one-third of Vernalis flow when it is 1,000 cfs or higher. This summer, the USACE approved an increase of 500 cfs to allow the Clifton Court Forebay inflow to be 7,180 cfs from August 6 to September 30. Next year, a similar proposal is being developed to allow the additional 500 cfs pumping from July 1 through the end of September in the event the added capacity could be used to fill San Luis Reservoir. This asset, increasing the allowable inflow to Clifton Court Forebay, could be expanded beyond water year 2000 to allow for greater operational flexibility and the possibility to capture additional water that is surplus to the Delta. Two specific alternatives are presented below which could be implemented in Early Stage One.

**Alternative One -- Increase exports to 6,680 plus "1/3 Vernalis flows from November 1- March 15":** As noted above, the SWP is capable of pumping 10,300 cfs at its Banks Pumping Plant. However, it can only utilize the additional export capability, beyond a nominal rate of 6,680 cfs, from mid-December to mid-March. During that window, the amount of additional inflow allowed is one-third of the Vernalis flow when the San Joaquin River flow is 1,000 cfs or higher. This alternative would expand that window by 45 days starting on November 1.

**Project Costs:** The costs are believed to be minimal at this time.

**Timing:** Timing necessary to obtain approvals is limited.

**Project Benefits:** See graph for water supply benefits.

**Assumed Duration of Project Benefits:** This alternative could probably be functional in about one year and could remain in place in perpetuity. This alternative would be replaced or have its usefulness diminished by other assets that increase the pumping capability of Banks later in Stage 1.

**Assumed Operational Restrictions:** During wet conditions, spring-run yearlings may be emigrating through the Delta.

**Impacts on Others:** The permitting requirements discussed below should ensure that impacts to others will not occur.

---

<sup>2</sup> This maximum is based on a 3-day running average inflow to Clifton Court Forebay.

# **WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION**

## **INCREASED BANKS PUMPING CAPACITY (CON'T)**

**Permits or Other Approvals Needed:** In addition to endangered species consultation with NMFS, FWS, and DFG, a Section 10 Rivers & Harbors Act permit would be needed.

**Procedure for Obtaining Permits and Other Approvals:** See above.

**Implementation Responsibility:** DWR.

**Necessary Cooperating Parties:** NMFS, FWS, DFG, ACOE.

**Alternative Two -- Increase exports to 7,180 cfs between July 1 and September 30:** This measure, by itself, does not increase total water supply. However, under specific conditions it may allow the Central Valley Project and SWP to move more water from northern California reservoirs into San Luis Reservoir, leaving additional space in those upstream reservoirs to capture extra winter runoff. Under dry hydrologic conditions, there already exists sufficient capacity at Banks to move SWP water. However, under wet conditions the pumping capacity is fully utilized; increasing Banks pumping in this case may provide additional flexibility.

**Project Costs:** Initially, capital costs should be minimal. However, some dredging and infrastructure changes may be necessary in future years. DWR staff believes that short-term operational adjustments could be made to avoid potential problems with water levels, but such avoidance measures limit the use of the expanded pumping capability.

Operational costs are likely to be minimal for the SWP. However, there would be costs for using this alternative, in conjunction with joint point of diversion, to move CVP supplies.

**Timing:** Timing necessary to obtain approvals is limited.

**Project Benefits:** See graph for water supply benefits.

**Assumed Duration of Project Benefits:** The next three years. This alternative could be implemented very quickly, within one year. However, it is likely that it would be replaced or have its usefulness diminished by other assets that increase the pumping capability of Banks later in Stage 1.

**Assumed Operational Restrictions:** Increased pumping during the irrigation season could exacerbate water level conditions in the South Delta. In addition to placing and operating the three temporary rock agricultural barriers, it may be necessary to reduce the pumping during periods of low tide conditions. The USACE will also require consultation with fishery agencies on potential endangered species concerns. Another

# **WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION**

## **INCREASED BANKS PUMPING CAPACITY (CON'T)**

possible restriction on its use would be during periods of high delta smelt salvage. In 1999, delta smelt salvage continued into the first part of July at high rates.

**Impacts on Others:** The permitting requirements discussed below should ensure that impacts to others will not occur.

**Permits or Other Approvals Needed:** In addition to endangered species consultation with NMFS, FWS, and DFG, a Section 10 Rivers and Harbors Act permit would be needed. It is believed the necessary environmental documentation could be completed prior to the start of Stage 1.

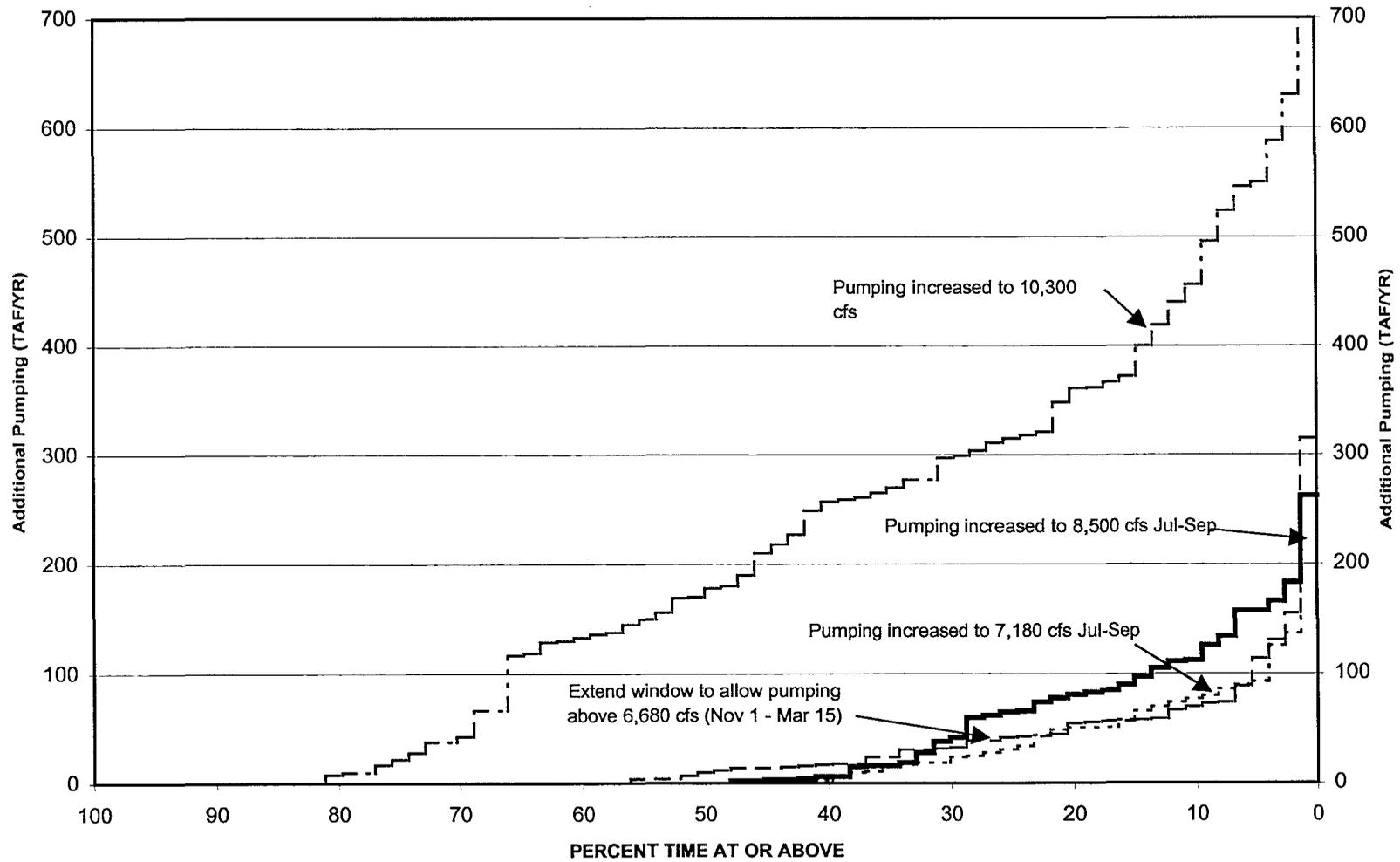
**Procedure for Obtaining Permits and Other Approvals:** See above.

**Implementation Responsibility:** DWR.

**Necessary Cooperating Parties:** NMFS, FWS, DFG, ACOE.

# WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION

### Water Supply Assets: Increased Pumping at Banks Pumping Plant (1995 Level of Development with Interruptible Supplies)



D-059800

# **WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION**

## **RIGHT TO BORROW SURPLUS PROJECT CAPACITY**

**Project Description:** This is primarily an Environmental Water Account asset. State Water Project and Central Valley Project sharing concepts are already well established through the Coordinated Operations Agreement, existing agreements for the joint use facilities (San Luis Reservoir, San Luis Canal, and O'Neill Forebay, etc.). The tool includes access to unused pumping, conveyance, and storage capacity. At issue are the circumstances under which the EWA might access unused capacity and the relative priority of the EWA relative to others who might also wish to access surplus capacity. For example, what would the priority for use of surplus capacity? These are all issues for negotiation and cannot be determined in advance.

**Timing:** Access could be granted immediately.

**Project Costs:** The EWA would, at a minimum, be responsible for increased net operating costs. Additional costs are a subject for negotiation.

**Project Benefits:** This access is essential if the EWA is to modify Project operations without impact on water users. Therefore, Project benefits include most of the biological benefits of the EWA.

**Assumed Duration of Project Benefits:** No intrinsic time limitation. However, if Project demand grows, surplus capacity could decline. Also, if regulatory requirements or infrastructure changes, the amount of surplus capacity might increase or decrease.

**Assumed Operational Restrictions:** Negotiable. The use of surplus capacity must not harm existing users. Also, the need to reserve space for the transfer market could restrict EWA use of surplus capacity.

**Impacts on Others:** Given the operational restriction above, impacts should be neutral or positive.

**Permits or Other Approvals Needed:** No permits should be needed for use of the capacity.

**Procedure for Obtaining Permits and Other Approvals:** (See above).

**Implementation Responsibility:** The Department of Water Resources and U.S. Bureau of Reclamation, and whatever institution or institutions operate the EWA.

**Necessary Cooperating Parties:** The DWR and Reclamation, and whatever institution or institutions operate the EWA.

# WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION

## MARKETS (WILLING SELLERS)

**Project Description:** USBR and DWR have acquired significant amounts of water supplies from willing sellers pursuant to their roles in implementing the CVPIA and Governor's Water Bank, respectively. The impact on water supplies caused by the delta smelt take in 1999 was partially offset by water acquisitions the USBR pursued to provide benefits in upstream tributaries. During 1999, USBR purchased 50,000 AF from South San Joaquin and Oakdale Irrigation Districts. This water was retained in New Melones Reservoir as Central Valley Project water and released as necessary to provide benefits to steelhead. Although it did not result in any direct change in exports, it allowed the CVP and State Water Project to maintain the projected level of pumping without making additional releases from north of the Delta reservoirs. In addition, USBR has recently pursued acquiring water from interested sellers representing Yuba County Water Authority, and Kern County Water Agency.

Two parties have been identified who are willing to sell south of the Delta water supplies in Water Year 2000. These parties are Vidler Water Company, Incorporated and Kern County Interests with 6,300 AF and 100,000 AF, respectively.

**Timing:** Key elements would be negotiating the terms, and environmental documentation. Recent water acquisitions have required up to 6 months to implement.

**Project Costs:** Purchase prices would need to be negotiated. In 1999, prices for acquiring water ranged from \$50/AF (north of the Delta) to \$230 (south of the Delta). \$10M of FY 2000 federal 'non-ecosystem' monies have been secured for water purchases.

**Project Benefits:** As discussed above, water acquisitions can be scheduled in a manner that benefits both water supplies and fisheries:

**Assumed Duration of Project Benefits:** Benefits would not necessarily be limited to during the term of the acquisition. Acquired water could be banked and used for environmental and/or water supply purposes at a later time.

**Assumed Operational Restrictions:** North of the Delta purchases which would be exported south of the Delta would need to utilize available pumping capacity.

**Impacts on Others:** The acquisitions would need to be structured to minimize impacts to others water supplies and water quality.

**Permits or Other Approvals Needed:** Environmental documentation will be required and consultation on endangered species may also be required.

**Procedure for Obtaining Permits and Other Approvals:** See above.

**Implementation Responsibility:** DWR and USBR

**Necessary Cooperating Parties:** Participating water districts, DWR, USBR, CDFG, NMFS, and USFWS.

03/05/02, Appendix A

ES-7

# WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION

## JOINT POINT OF DIVERSION

**Project Description:** Since the Delta Accord was signed in December 1994, Reclamation and DWR have utilized available capacity at the other's pumping facility to export water. This joint point of diversion, also called JPOD, required approval by the State Water Resources Control Board and was generally limited to operations that had benefits for fisheries<sup>3</sup>. While JPOD can serve the needs of either project, it holds far greater potential for the Central Valley Project.

In addition to allowing the CVP to capture additional excess flows, JPOD could provide a means for the CVP to transfer water from upstream storage into San Luis Reservoir during dry periods. Under dry conditions, there is generally capacity at Banks that could be made available to USBR to move water from northern storage (Shasta and Folsom) to San Luis Reservoir. For example, during November 1999, the SWP could have pumped 30,000 acre-feet of CVP water.

**Timing:** Timing necessary to develop a plan to avoid impacts to other uses of water and to receive approval from the SWRCB.

**Project Costs:** Cost will be about \$15/AF, if JPOD is used to recover San Luis Res. Storage.

**Project Benefits:** See graph for water supply benefits.

**Assumed Duration of Project Benefits:** Immediate. Most benefits to fisheries would occur during a single water year. However, in some instances water could be carried over or banked and used in the following year.

**Assumed Operational Restrictions:** Use of JPOD would be allowed only when increased pumping would not harm fisheries, the Delta ecosystem, water levels, or water quality benefits. Use of JPOD would also be subject to conditions placed on it by the project that has the excess conveyance capacity.

**Impacts on Others:** No net effect to water supply, as pumping is shifted from one time to another.

**Permits or Other Approvals Needed:** The draft water right decision, released on December 3, 1999 by the SWRCB, establishes a process for approving JPOD.

**Procedure for Obtaining Permits and Other Approvals:** See above.

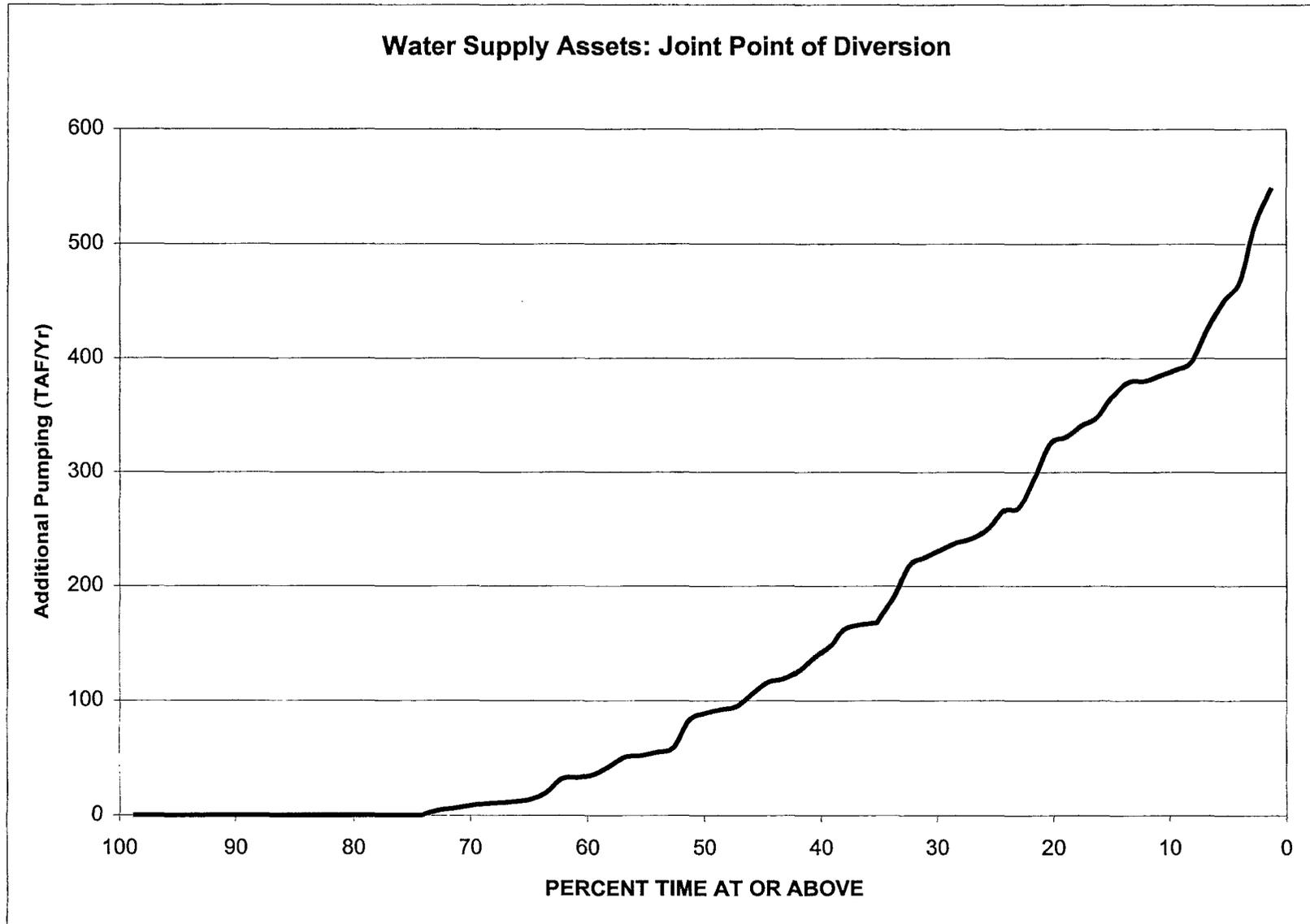
**Implementation Responsibility:** USBR and DWR.

**Necessary Cooperating Parties:** U.S Fish and Wildlife Service, NMFS, Department of Fish and Game, and South Delta Interests

---

<sup>3</sup> Reclamation and DWR have pursued approval from the SWRCB to utilize JPOD under urgent conditions such as canal failures.

# WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION



# WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION

## FLEXING THE E/I RATIO

**Project Description:** This asset results from modifying the Export/Inflow ratio as described in the Water Quality Control Plan to allow exports over existing E/I standards. EWA water derived from relaxing the E/I ratio would be used to curtail exports at a later date. Water would be pumped if excess pumping capacity is available at the state or federal facilities. Water would be stored in excess storage at San Luis Reservoir or shifted to groundwater if available.

**Timing:** The WQCP allows for flexing of the E/I ratio. This would likely occur in the fall/winter months, but may occur into the winter/spring period.

**Project Costs:** Costs are expected to be negligible.

**Project Benefits:** This measure would allow for increased fishery protection if standards are relaxed during those times when fisheries are not an issue. Export reductions could then occur at times more beneficial to fisheries. Benefits to water supply is expected to be zero. Water quality could be affected if quality of water pumped is different than the pumping foregone.

**Assumed Duration of Project Benefits:** Immediate. Most benefits to fisheries would occur during a single water year. However, in some instances water could be carried over or banked and used in the following year.

**Assumed Operational Restrictions:** Relaxation of the E/I ratio would be allowed only when increased pumping would not harm fisheries, the Delta ecosystem, or water quality.

**Impacts on Others:** No net effect to water supply, as pumping is shifted from one time to another.

**Permits or Other Approvals Needed:** Process is already in place, as described in the WQCP Table 3, footnote 22.

**Procedure for Obtaining Permits and Other Approvals:** As described in the WQCP Table 3, footnote 22, fishery agencies would recommend variations to E/I limit within the operations group. If there are no objections the action can be implemented immediately. The recommended actions require approval from CALFED Policy Group only if there is disagreement on the action. The SWRCB is notified of any variation; if the Executive Director does not object to the variation within 10 days, the variations will remain in effect.

**Implementation Responsibility:** U.S. Bureau of Reclamation and California Department of Water Resources

**Necessary Cooperating Parties:** U.S. Bureau of Reclamation and California Department of Water Resources

# WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION

## SOURCE SHIFTING

**Project Description:** Single or multi-year agreements with selected south-of-the-Delta water users to shift to non-CVP/SWP supplies during environmentally sensitive periods (and shift back to CVP/SWP supplies during less sensitive times) could be useful toward adding to the overall flexibility of the SWP/CVP system. For example, in years when CVP delivery allocations are limited due to the San Luis Reservoir low-point condition (mid August), arrangements by other South-of-Delta users to shift demands from pre low-point to post low-point could facilitate higher CVP deliveries or additional fish protection actions.

This asset is primarily intended to enhance real-time management of the system with substantially less conflict. Rescheduling 50-100 TAF/year for operational flexibility is probably feasible in a given year, depending on hydrology and perceived risk. Demand shift agreements can be for single or multiple years. Multiple year arrangements offer more flexibility to the CVP/SWP system but involve more costs and risks for the contractor who must shift to local resources for a longer period of time. By extending the time period for pay back (even one winter), it is much more likely that pay back can occur during “surplus” conditions and therefore not trigger the need for additional tools. The exception to this is when the subsequent year is very dry (no occurrence of surplus water). In this case, another tool would be needed to ensure pay back.

**Timing:** Short-term demand-shift arrangements could be secured quickly (on the order of a couple of months)  
Longer-term arrangements are more complicated, and would therefore take longer to secure.

**Project Costs:** Source shifting arrangements that are paid back within the same year will vary in cost depending on hydrology, carryover storage and risk perceived by the contracting agency. It is reasonable to assume that south-of-Delta arrangements on the order of \$25 - \$75/AF could be secured during Stage 1. Multiple-year arrangements would be more expensive.

**Project Benefits:** Shifting selected demands from pre low-point to post low-point can help maintain water deliveries to some contractors while allowing additional fish protection actions. The degree of benefits would depend on the magnitude of the shift and timing of the pay-back water.

**Assumed Duration of Project Benefits:** It is likely that demand-shift arrangements would be available on a year-by-year basis throughout Stage 1 in years when unusual circumstances (i.e. drought) do not exist.

**Assumed Operational Restrictions:** The key restriction would be the timing of the payback water. The shorter the payback period, the less flexibility afforded. Also, it is likely that substantial penalties would be incurred if payback were not achieved on schedule.

# WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION

## SOURCE SHIFTING (CON'T)

**Impacts on Others:** Source shifting arrangements would need to be crafted to ensure no injury to others during the payback period. For example, payback water should not compete with (or reduce) other project contractual obligations, such as entitlement or interruptible water deliveries. Guarantees are needed to assure that subsequent SWP or CVP delivery allocations are not negatively impacted. In addition, payback should be complete during times of higher water quality and lower environmental sensitivity.

**Permits or Other Approvals Needed:** Since source shifting is completely within existing SWP and CVP contracting authorities and permits, it should be possible to implement these arrangements with approval of USBR and DWR.

**Procedure for Obtaining Permits and Other Approvals:** Negotiated agreements with USBR, DWR, and the contracting entity.

**Implementation Responsibility:** USBR, DWR and the contracting entity.

**Necessary Cooperating Parties:** Contracting entity.

# WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION

## GROUNDWATER STORAGE SOUTH OF THE DELTA

**Project Description:** Groundwater banking is a form of conjunctive use that involves the storage of surplus or wet-year water in groundwater basins that have existing storage space. Currently, a number of basins both north and south of the delta have available storage for groundwater banking. In Early Stage One, opportunities for groundwater banking will be limited to currently operating programs. A few existing groundwater banking programs such as the Semitropic and Kern water banks are currently, or in the past, have offered to lease storage space.

**Project Costs:** Groundwater banking costs will vary with the infrastructure required to operate the project. Some projects will utilize spreading basins, while others may use injection wells. In lieu projects, where surface water is provided so that groundwater pumping could be reduced, will also be considered. Additional infrastructure could include conveyance facilities, diversions, pump stations, filtration plants, and extraction wells.

Preliminary cost estimates for each of the projects listed above are currently being developed. In general, cost estimates for groundwater banking projects can range from \$100 to \$400 per acre-foot. Costs to lease storage in the Semitropic program have been identified as \$270/AF.

**Timing:** Since Early Stage One groundwater banking activities would most likely only utilize existing groundwater storage programs, timing issues should be limited to negotiations and environmental permitting requirements.

**Project Benefits:** The primary benefit of groundwater banking is additional storage to the system. Added storage will improve system flexibility and increase water supply reliability. An additional benefit will be improved groundwater basin management. Properly managed projects should not result in water quality impacts. Groundwater banking is generally environmentally neutral, and in many cases such projects can create wetland habitat and other environmental benefits.

**Assumed Duration of Project Benefits:** With proper operation and maintenance, groundwater banking projects can continue indefinitely.

**Assumed Operational Restrictions:** The key operational restrictions include availability of water to be banked, recharge rates, land availability for spreading basins, and extraction rates.

**Impacts on Others:** Improperly managed groundwater banking projects can result in third-party impacts, including changes in water table elevations, water quality degradation, and subsidence.

**Permits or Other Approvals Needed:** SWRCB temporary change in place of use permits, pursuant to Water Code Section 1725, may be required. Additionally, many counties have adopted ordinances that require permits for exportation of groundwater.

# **WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION**

## **GROUNDWATER STORAGE SOUTH OF THE DELTA (CON'T)**

There is some uncertainty regarding the applicability of Water Code sections 1220 and 1011.5 with respect to some import/export groundwater banking projects.

**Procedure for Obtaining Permits and Other Approvals:** Developing a contract between banking partners, addressing third party impacts, applying for SWRCB and local permits, complying with CEQA/NEPA.

**Implementation Responsibility:** The contracting parties.

**Necessary Cooperating Parties:** Contracting parties, local landowners and permitting

# WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION

## RIGHT TO BORROW SURPLUS PROJECT STORAGE

**Project Description:** The EWA would have the right to borrow stored Project water on a “no harm” basis. The Projects would have the right to borrow stored EWA water on a “no harm” basis. For example, the EWA might cause San Luis Reservoir storage levels to drop as a result of export reduction in the spring to protect fish. That is, the EWA might borrow water in San Luis Reservoir. The EWA would then be obligated to pay back the borrowed water before the shortfall caused any losses for water users. Payback might be required as soon as the following August, should San Luis have a low point problem. In other years, payback might be delayed through the next winter. Should San Luis Reservoir fill during the next winter, the debt would be erased. Similarly, the Projects might borrow EWA water in storage. For example, if EWA has water in San Luis Reservoir during the summer, the Projects would be able to borrow this water in order to make greater deliveries without running into a low point problem. The borrowed water would need to be paid back whenever the EWA next needed to cut exports. The concept of “no harm” implies that the EWA and the Projects must have sufficient collateral in order to pay off the loan before harm occurs. The Projects do not have a collateral problem, since they may pay back the EWA simply by reducing export pumping. The EWA collateral problem is significant, however. Groundwater storage, agreements for supply shifting with MWD, Kern, and Santa Clara, efficiency purchases, etc. all represent assets that might allow the EWA to take on debt.

**Timing:** Access could be granted immediately.

**Project Costs:** Whoever borrows water in storage would be responsible, at a minimum, for any increase in net operating costs. Additional costs are a subject for negotiation. Loans not paid off in a timely way might be subject to penalty charges.

**Project Benefits:** This access is essential if the EWA is to modify Project operations. Therefore, project benefits include most of the biological benefits of the EWA.

**Assumed Duration of Project Benefits:** No intrinsic time limitation. However, if Project demand grows, then less water might become available for borrowing. If regulatory requirements change, the ability to borrow water might increase or decrease. Also, with new infrastructure, EWA ability to borrow and repay water should improve. For example, if Banks pumping capacity were shifted to 10.3 kcfs, then the EWA could repay debts in San Luis with upstream water more easily, and would more frequently have its debts in San Luis erased over the following winter.

**Assumed Operational Restrictions:** Negotiable. Water debts must not harm existing users. This limits the amount of water that can be borrowed and forces the EWA to operate so as to repay the loan in a timely fashion.

**Impacts on Others:** Given the operational restriction above, impacts should be neutral. However, water debt will inevitably increase the risk that water users will receive less water than expected. This outcome must be made unlikely and damages paid should harm be inflicted.

**WATER MANAGEMENT ASSETS  
FOR EARLY STAGE ONE IMPLEMENTATION**

**RIGHT TO BORROW SURPLUS PROJECT STORAGE (CON'T)**

**Permits or Other Approvals Needed:** No permits should be needed for use of project storage.

**Procedure for Obtaining Permits and Other Approvals:** See above.

**Implementation Responsibility:** The Department of Water Resources and U.S. Bureau of Reclamation, and whatever institution or institutions operate the EWA.

**Necessary Cooperating Parties:** State and federal contractors will, presumably, need to be comfortable with borrowing criteria.

# WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION

## BORROWING ARRANGEMENTS W/ NON-PROJECT AGENCIES

**Project Description:** This is primarily an EWA tool. Most interactions between the EWA and non-Project agencies will be through markets. Indeed, capacity borrowing is really just another kind of market interaction. However, it is different enough from standard arrangements for water purchases that it is worth discussing. The most obvious kind of capacity worth borrowing is storage capacity. Local projects frequently have empty space in surface or groundwater storage. This capacity could provide benefits to the EWA without any impact on the local project. The problem is in backing water up into these reservoirs. It can be done sometimes, however. For example, if the EWA released water from Mendota Pool during the VAMP period, this would allow other San Joaquin Tributary agencies to reduce their releases, thus increasing storage upstream on the Tuolumne or Merced Rivers. The local agencies might be willing to give the EWA control over this water (provided that they continued to receive payment for the water). The water could then be released on a schedule dictated by the EWA. Similarly, after the SWRCB enforces its WQCP through a water rights order, it may be possible to back water into other local reservoirs by agreeing to assume some downstream obligation on a temporary basis. Of course, it is always possible to acquire water in upstream storage through direction purchase.

**Timing:** Agreements would need to be negotiated with local agencies in control of upstream storage.

**Project Costs:** The EWA would be responsible, at a minimum, for any increase in net operating costs. Additional costs are a subject for negotiation.

**Project Benefits:** This tool would enhance the ability of the EWA to store water and, even more important, to generate instream flows on non-Project tributaries.

**Assumed Duration of Project Benefits:** No intrinsic time limitation.

**Assumed Operational Restrictions:** Presumably, EWA water in local reservoirs would be the first water to spill, once flood control levels were reached.

**Impacts on Others:** Given the operational restriction above, impacts should be neutral or positive, since the EWA would generally increase local storage levels.

**Permits or Other Approvals Needed:**

**Procedure for Obtaining Permits and Other Approvals:** In general, the operational changes are already within the discretion of participating local agencies.

**Implementation Responsibility:** Whatever institution or institutions operate the EWA.

**Necessary Cooperating Parties:** Local water agencies.

# WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION

## IN-DELTA AGRICULTURAL DRAINAGE REDUCTION Time Drainage Discharge to Outgoing Tides

**Project Description:** Limit drainage discharge from in-Delta islands to only the part of the tide cycle that would result in the smallest volume reaching municipal intakes. This phase in the tide cycle could be different from one island to the other, and vary between different discharge locations on the same island. Quantitative assessments for this approach have not been done in any detail. However, existing drainage ditches on Delta islands might have enough capacity to withhold discharge for 12 or more hours. Assuming (1) an average discharge as high as 5 cubic-foot-per-second (cfs) and (2) only one mile of drainage ditch 20 feet wide for every 1,000 acres of irrigated field, the water level in the drainage ditch would rise only 2 feet over 12 hours.

**Timing:** One to four years

**Project Costs:** Three cost components are identified:

- *Additional pump capacity and automation equipment at each pump facility to control drainage discharge to the appropriate part of the tide cycle* A rough cost estimate for equipment if additional pumps are required would be twenty million dollars, assuming an installation cost of \$200,000 for a 20 cfs (a 75 horse-power pump) for an additional capacity of 2,000 cfs Delta-wide. The cost for automation equipment is probably small. Even for an equipment and installation cost of \$1,000 for each one of the 600 discharge pumps in the delta, the total cost would be under a million dollars.
- *Additional power cost for those pumping shifted to peak rate hours* This additional energy cost is hard to predict due to the deregulation of the electric power market in the next three to four years. At current capacity and usage charges in PG&E peak and off peak rates for summer months (April 15 to October 15), a shift of 1,000 cfs from off-peak to peak rate pumping would cost an additional \$315,000 per year. A pump-lift of 20 feet and a pump efficiency of 50% are assumed.
- Any dredging of existing drainage ditches to increase holding capacity (limited because of the slip circle, among other considerations) and/or creation of holding ponds. The possibility of creating wetlands to be used as holding/storage ponds requires further investigation.

**Project Benefits:** The potential reduction in in-Delta drainage reaching urban intakes and the improvement in water quality have not been quantified.

**Assumed Duration of Project Benefits:** Duration of project.

# WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION

## IN-DELTA AGRICULTURAL DRAINAGE REDUCTION Time Drainage Discharge to Outgoing Tides (Con't)

**Assumed Operational Restrictions:** This approach will not reduce impacts of in-Delta drainage at urban intakes during wet weather events unless accompanied by significant storage facilities. This is due to the much larger volume of runoffs involved – most islands have to pump continuously to avoid or reduce flooding during rain events. The operational flexibility during irrigation season varies from island to island. Storage capacity on individual islands could vary substantially, and some islands may not have sufficient flexibility to with-hold discharge over a significant portion of a tide cycle.

**Impacts:** Impacts on agricultural operations could be minimized if automation equipment could be set up and existing drainage conveyance facilities have enough capacity for the discharge over a few hours.

**Permits or Other Approvals Needed:** Cooperation of local land-owners is critical.

**Implementation Responsibility:** DWR

**Necessary Cooperating Parties:** Cooperation of local land owners is critical.

**Other considerations:** A study to quantify and optimize project parameters and benefits should be carefully done as the next step if the approach is to be considered further. This study should be performed using Delta flow and transport models (FDM or DSM2) and MWQI (the Municipal Water Quality Investigation Program of DWR) data on drainage water quality. A survey of the drainage conveyance and pumping facilities in Delta islands, especially those in Central and South Delta, is necessary before this study proceeds.

### **APPENDIX. *Parameters used in power cost estimates***

#### **PG&E charges**

Capacity: \$3.70/kW/month off peak, \$13.35/kW/month peak

Usage: \$57.70/MW-hr off peak, \$87.10/MW-hr peak

Peak hours are noon to 6 pm, April 15 to October 15. Off-peak hours at all other times.

#### **Conversions**

7.48 gallons per cubic foot

3.785 litres per gallon

1 kg per litre water

1 W = 1 Joule/second = 1 Newton-meter/second = 1 kg m<sup>2</sup>/s<sup>3</sup>

# **WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION**

## **CVPIA LAND RETIREMENT PROGRAM 5 Year Demonstration Project**

**Project Description:** CVPIA, Section 3408(h) authorizes Interior to purchase land from willing sellers which would, if permanently retired from irrigation, reduce drainage, enhance fish and wildlife resources, and make water available for CVPIA purposes. The Land Retirement Program (LRP) may assist with the recovery of threatened and endangered species in the San Joaquin Valley and will be a positive move towards resolving water quality issues of the San Joaquin River by reducing drainage-related problems. Interior is pursuing a 5-year Demonstration Project to study the impacts of retiring 15,000 acres on groundwater levels, groundwater and surface water quality, soil chemistry and biota. Water acquired will be used for the environmental purpose of rehabilitation of upland habitat on the demonstration lands. Alternative water uses would need to be evaluated after the five year demonstration project.

**Issues:** A variety of issues have been identified through scoping and ongoing discussions with water districts, growers, environmental organizations, state and federal agency representatives. These issues include: physical impacts of land retirement; potential to rehabilitate lands to upland habitat; risk of wildlife exposure to contaminants; disposition of water, socio-economic impacts; air quality; and post-retirement land use (adaptive management)

**Timing:** Additional NEPA will be required to implement a larger land retirement program up to 90,000 acres. This will take several years after the 5 year demonstration project is completed.

**Project Costs:** Capital costs will include the acquisition of retired land over the next 10 to 15 years. This could be as high as \$25 million dollars for acquisition costs. Habitat restoration costs at this time are unknown.

**Project Benefits:** The benefits of the project is to reduce drainage, enhance fish and wildlife resources, and make water available for CVPIA purposes.

**Assumed Duration of Project Benefits:** Land Retirement may or may not provide permanent benefits. Water allocations within a district from retired lands will be variable from year to year due to drought or other factors. Also, the water associated with retired lands could be transferred to a district's supplemental supply and used on non-drainage problem lands. During the 5 year demonstration project, acquired water will be used on-site for habitat rehabilitation efforts, or if in excess of Interior's needs on-site, water may be transferred to another user within the District for CVPIA purposes to be used on non-drainage problem lands, or may be transferred out of the district for CVPIA purposes, primarily to enhance fish and wildlife resources.

**Assumed Operational Restrictions:** It is not know if the government has the authority to sell water allocations from retired lands. It may be able to exchange these allocations with the district or other districts.

# **WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION**

## **CVPIA LAND RETIREMENT PROGRAM 5 Year Demonstration Project (Con't)**

**Impacts on Others:** The lands proposed for acquisition are underlain by perched water tables, which are highly saline and contain high concentrations of selenium, a naturally-occurring trace element which has been shown to be toxic to many species of wildlife. The water acquired for this Demonstration Project will be used for environmental purposes of rehabilitating project lands to upland wildlife habitat and will be applied in such a manner so it will not contribute to deep percolation to the shallow groundwater underlying the project lands. Water acquired in excess of Interior's projected need to rehabilitate the retired lands may be sold to eligible landowners within the districts on an annual basis to be applied for irrigation purposes on non-drainage impacted lands, or may be transferred to other CVPIA purposes. Additional environmental analysis on the specifics of any proposed transfers will be completed prior to the occurrence of any transfer of water to ensure compliance with the National Environmental Policy Act and the Endangered Species Act as well as other legal requirements. There will be no impact on CVP water supplies, as the proposed action does not affect CVP operations or availability of water supplies.

**Permits or Other Approvals Needed:** NEPA and/or CEQA requirements would be required to transfer or sell water allocations from retired lands under Section 3408(h). ESA requirement would need to be addressed if changes in land use were to take place.

**Procedure for Obtaining Permits and Other Approvals:** Estimated time required to obtain all approvals could be as little as 90 days to as much as a year depending on amount of water being transferred and location of transferred water from retired lands.

**Implementation Responsibility:** The responsibility for implementing the disposition of water from retired lands falls under the managing agency or operator of the property. Management of annual water allocations from the local water district would be the responsibility of the managing agency.

**Necessary Cooperating Parties:** Cooperation with FWS under ESA requirements for the transfer of project water from retired lands outside a water district will be critical. This action would fall under the CVPIA Water Transfer Guidelines. Cooperation with the local Board of Supervisors would be required if water is transferred outside the county jurisdiction.

# WATER MANAGEMENT ASSETS FOR EARLY STAGE ONE IMPLEMENTATION

## INTERTIE DMC TO CALIFORNIA AQUEDUCT

**Project Description:** 400 cfs intertie (designed for 600 cfs for redundancy) between the DMC and the California Aqueduct. Allows Tracy P.P. to pump at full capacity (4600 cfs) during months when normal operations limit capacity to 4200 cfs.

**Project Costs:** \$10 million estimated capital costs. \$1.5 million estimated annual O&M costs. \_\$/AF

**Timing:** Environmental documentation: 1 year. Water Rights: fits within existing USBR rights. Construction: 1 year

**Project Benefits:** 125 TAF maximum increased pumping per year. (400 cfs/day for 5 months, November-March). Yield of project estimated at \_AF in dry period, and \_ AF for 71 year average.

**Assumed Duration of Project Benefits:** If unlimited JPOD is granted, the water supply benefits of intertie would be decreased when the SWP is not using all of its capacity (this is also true when the CVP is pumping less at Tracy than it can convey through the Delta Mendota Canal). However, when the SWP is pumping at its maximum allowable rate, even if that rate is at the rated capacity of Banks Pumping Plant, the intertie will provide a benefit when the CVP is pumping at the rate that may be conveyed through the DMC. Facilities are designed for about a 10 year life.

**Assumed Operational Restrictions:** Operate intertie in the months of November-March to existing Delta criteria, including take provisions of current Biological Opinions. Others?

**Impacts on Others:** Potential of about 400 cfs higher exports from Delta in months of November-March.

**Permits or Other Approvals Needed:** Assumed to fit within existing USBR water rights permit. NMFS, F&G, USFWS consultation on endangered species? 404 permit?

**Procedure for Obtaining Permits and Other Approvals:** USCOE issues 404 permit. NMFS, F&G, USFWS issues Biological Opinions.

**Implementation Responsibility:** USBR

**Necessary Cooperating Parties:** DWR for operations. Fishery agencies to monitor implementation of Biological Opinions.