Water Project Operations for Stage 1

The Stage 1 actions in the previous section provide a major step in implementing CALFED's long-term comprehensive plan to restore ecological health and improve water management for beneficial uses of the Bay-Delta system. While Stage 1 includes a wide variety of new facilities, habitats, policies, and other management actions, carefully crafted operating criteria for the State and Federal water projects remain critical. New operating criteria, together with the other Stage 1 actions, will minimize the ongoing conflict between fisheries and water diversions (see **Bay-Delta Problems/Objectives** in Chapter 2). As a first step toward specific water operations criteria, CALFED has developed a water operations strategy for Stage 1.

This proposed strategy would combine the certainty of prescriptive standards with the flexibility of active and adaptive management provided by an **environmental water account** (EWA) as described below. Prescriptive standards provide general ecosystem benefits. Active management, wherein decisions are based on real-time data, permits flexible responses to species whose needs are likely to shift greatly from year to year. Adaptive management promotes improved understanding of species whose sensitivity to entrainment is not well understood. An EWA would provide the flexibility of both active and adaptive management. CALFED will continue to refine the EWA concept and develop operating criteria in 1999, through the remainder of Phase II.

The Environmental Water Account (EWA)

The EWA concept is based upon the notion that flexible management of water operations could achieve fishery and ecosystem benefits more efficiently than a completely prescriptive regulatory approach. Regulations place specific limitations on project operations. In general, these limitations are based upon hydrological, seasonal, and biological criteria. For example, under the current export-inflow regulations, the projects are limited to diverting 35 percent of Delta inflow during February through June of most years. An EWA is not a substitute for regulation, but is a supplement to regulation. CALFED's intent is to provide flexibility to achieve environmental benefits and to provide certainty and assurances to water users.

There are a variety of potential approaches to defining and operating an EWA, all of which could provide for flexible management of water resources. For example, an EWA could be defined in terms of export restriction "credits" or strictly in terms of dollars for market acquisitions. In its evaluation of the EWA concept, CALFED considered a proposal for an EWA that treats the EWA much like a water contractor. Under this proposal, an EWA would consist of a portfolio of assets including: water; entitlement to capacity in water diversion facilities, aqueducts, storage; and money. In addition, an EWA could use transfers, options and acquisitions to obtain water.

Water could be pumped to refill its storage facilities using those rights and purchases. Water could be acquired by paying for water use efficiency or recycling projects. Variances in export standards could be granted in the interest of generating additional EWA water. Funding would be available to make use of these assets. The fishery agencies would jointly manage an EWA.

Fisheries agencies could then draw on the account to provide additional species protection. The fisheries agencies would work with the project operators in using an EWA to modify project operations in real-time. For example, if fish were detected in the vicinity of the export pumps, reductions in export pumping to protect the fish could be required. In return, the water projects could be compensated out of EWA assets, so that reduced project pumping would not result in reduced water deliveries to the State and Federal water contractors. Examples of how an EWA may be operated over the course of several years are presented below:

> If the EWA managers decided to extend the export reductions called for within VAMP for an extra month in order to protect salmon and delta smelt, the result for the State and Federal projects would be reduced storage within San Luis Reservoir. The EWA would commit to providing supplies, if necessary, out of its water assets -- a combination of surface and groundwater storage, production from conservation or recycling projects, and market purchases.
>
> If the State and Federal projects were unable to move water out of storage north of the Delta to fill San Luis, then the EWA would probably be required to fill some or all of the storage deficit in San Luis by the end of the growing season or carry over the debt to the following year. The EWA would do so using water it controlled.
>
> Alternatively, if the EWA managers felt that a temporary change in the export-inflow ratio would have minimal fisheries impacts, it could allow the projects to pump water out of the Delta above the specified export-inflow ratio for some period in order to enhance EWA assets.
>
> If the State and Federal projects could replenish San Luis storage by moving water from upstream storage later in the summer, then the risk of repaying the debt would be moved upstream. If the following winter is wet and the upstream reservoirs spill, then the debt owed by the EWA to the projects would be eliminated. However, if the reservoirs do not spill, then the EWA would be required to provide compensation using its assets the following year.

Of course, real operations would be much more complicated, with the EWA managers spending assets to protect fish part of the year; diverting water to rebuild assets over other parts of the year; shifting water between surface storage and groundwater storage, and trying to anticipate

and accommodate biological needs. Clearly, high-quality fisheries monitoring through the CMARP is essential for the ultimate success of the EWA approach.

Water quality concerns must also be considered in management of an EWA. Operational changes to enhance the protection of aquatic resources and export supplies have the potential to affect water quality. Management of the EWA must be coordinated with operation of the State and Federal water projects and the CALFED Water Quality Program to provide water quality improvements for all users (see **Water Quality** section in Chapter 4).

The Advantages of An EWA

For a given quantity of environmental water dedicated to environmental protection, an appropriately sized EWA with the appropriate combination of assets could be more protective than traditional standards. The potential benefits of the EWA include:

1. Increased Flexibility - The traditional approach to standards setting is to set minimum requirements under specified conditions -- for example, full closure of the Delta Cross Channel for fixed time periods or a specific export-inflow ratio for a given month. The flexibility to provide the greatest level of protection at a time when the fish are actually most threatened may be difficult to craft as a fixed standard. EWA operations can be a more flexible and efficient tool for handling such situations for certain species.

2. Increased Protection for Species From Entrainment Even During Favorable Hydrological Conditions - As an example, delta smelt adults following a dry year are believed to be particularly vulnerable. Entrainment of such fish in January or February could be a problem, despite apparently beneficial hydrologic conditions.

3. Focused Protection - It is difficult to predict which species will be at greatest risk at a given time in the future. EWA operations decisions provide the ability to tailor operations to protect those species most at risk in a given time and situation.

4. More Efficient Use of Water - Because of the wide range of hydrologic and environmental conditions that can be encountered in the Delta, it is difficult to craft a standard that efficiently protects species under all circumstances. The EWA will allow operations to be tailored to the specific circumstances at hand.

5. Greater Opportunities to Experiment and Learn From Previous Operations - Opportunities to conduct experimental manipulations will be enhanced because EWA assets can be used to address potential impacts to other beneficial uses. An EWA will also allow rapid translation of new scientific insights into improved operations. The information provided by

CMARP will be critical to successful adaptive management.

6. More Incentives for Efficiency - The incentive for getting maximum benefit from a given resource comes from having finite resources. An EWA would encourage efficient use of its assets.

7. Better Coordination of Maximum Benefits - An EWA will provide opportunity to coordinate with actions of others (ERP habitat restoration, CVPIA, etc). EWA decisions can take into account diverse events taking place at the same time, such as hatchery releases, large natural production of juveniles, unexpected toxicity events, etc.

8. Potential for Reduced Conflict Between the Environment and Water Users - The EWA managers and water users would have a common interest in improving system infrastructure, system flexibility, biological monitoring and scientific analysis in order to obtain water benefits for both. With a properly sized EWA, there would be an adequate amount of water to provide the necessary species protection and reliable water supplies, thereby minimizing conflict.

Environmental Risks Associated with An EWA

Even though the EWA may provide more environmental protection at a lower water cost than regulatory standards, it does carry some risks. The adequacy of the EWA to deal with most environmental conditions that are expected to arise is a function of the amount and type of the assets controlled by the EWA and its operating and financial rules. The more assets included in the EWA, the less frequently it would be short of water and financial resources needed to protect the environment. The EWA assets could be used to hedge against particularly stressful years by being more conservative in the use of assets when conditions are favorable. Finally, a reserve fund or insurance policy could be maintained to back up the EWA during occasional periods when its normal resources are unequal to the task of environmental protection. Ultimately, however, there still may be a few periods when environmental protection is not optimal. The account must be sized so that these periods are few in number and without drastic impacts to fisheries so that regulatory assurances may be provided.

Initial Evaluation of An EWA

To gain insight into how and whether an EWA could provide adequate fish protection while not adversely affecting water quality or water supply benefits, a group including CALFED Agency staff and stakeholders walked through a month-by-month simulation of one EWA operations scenario over four water years. The simulation was conducted using a base operation study as a default for State and Federal water project operations in the absence of an EWA. Changes in operations were simulated considering a set of assumed assets of the EWA and historic fish

salvage records.

For this scenario, the EWA was assumed to consist of several hundred thousand acre-feet of water, primarily in the export areas, including surface and groundwater storage, water option contracts, production from an urban efficiency program, and water that might be generated by adjusting the export-inflow ratio standard. Moreover, in this scenario, an expanded SWP diversion capacity (up to 8,500 cfs) was assumed to generate additional water.

The four years simulated included a variable hydrologic sequence of alternating wet years and dry years. The simulation was conducted only once, assuming no foresight as to hydrological or biological conditions.

This simulation exercise yielded the following insights and findings:

1. With the proper mix of assets, both fisheries protection and water supply benefits can be achieved with implementation of an EWA.
2. Experience in managing the simulated EWA would allow more efficient use of EWA assets.
3. Monitoring data provided through CMARP would help guide EWA decision-making. CMARP would have to be closely linked to operation of the EWA to help anticipate and avoid or reduce impacts of project operation.
4. Surface storage facilities allow more flexibility than groundwater storage. Groundwater recharge rates limit opportunities to refill the account, while groundwater extraction rates limit use of the account.
5. In-Delta storage would also provide flexibility.
6. There are benefits to holding options on water north as well as south of the Delta, just as there are benefits to having access to storage north and south of the Delta. The EWA assets considered in this exercise limit the ability to fill local storage deficits at key times both north and south of the Delta.
7. Additional option contracts with south of Delta exporters would be helpful.
8. A better mix of tools is needed to provide assurances.
9. Consideration must be given to how managing the EWA could affect attraction flows needed for upstream migrant salmon.
10. While flows and exports were managed in this simulation to benefit fisheries, the exercise did not allow for directly evaluating potential biological benefits or impacts of actions taken.

General Conclusions

Based on this simulated EWA evaluation and on the related discussions, CALFED can make some preliminary conclusions about how an EWA can be structured and operated. These include:

1. An EWA approach holds significant promise in achieving both fisheries protection and water supply benefits
2. Ultimate authority for decisions on how the EWA is used will rest with the DFG, USFWS, and NMFS. These agencies will establish an open process for EWA decision-making that provides for coordination with the operation of the SWP and CVP and the meaningful involvement of the affected stakeholders and other agencies.
3. The EWA will be used to achieve flexible operation of additional environmental protections.
4. Water must be available from the account for environmental use at the beginning of Stage 1.
5. Funding must be assured through time and must be adequate to secure water needed through Stage 1.
6. To the extent that operation of the EWA involves purchase of water, those purchases must be feasible and timely.
7. Decisions on the use of EWA water will require monitoring and research.
8. Management of the EWA must be coordinated with operation of the State and Federal water projects and the CALFED Water Quality Program to provide water quality improvements for all users (see **Water Quality** section in Chapter 4.)

Issues to be Addressed in 1999

Although an EWA has significant potential, a number of major issues and details will need to be evaluated and resolved before this approach can be fully implemented. These include:

1. Determine which environmental protections would be provided through prescriptive standards and which would be provided through an EWA. CALFED envisions using the ESA only in conjunction with the export-inflow ratio, and not for other existing standards.
2. Determine how much (1) existing surface and groundwater storage; (2) water purchase contract water; and (3) water generated from co-funding efficiency or reclamation projects will be needed by an EWA as of the first day of EWA operations.
3. Determine how the EWA assets will shift and grow during Stage 1.
4. Determine sharing methods of initial water export improvements (e.g., South Delta improvements).
5. Determine sharing methods of additional Stage 1 water export improvements.
6. Determine EWA rights to use existing and future storage and conveyance facilities.
7. Develop accounting methodologies.
8. Assure that water quality impacts of operational changes to protect fish are adequately dealt with within the CALFED water quality program.
9. Secure adequate, assured funding to support EWA operations at defined levels.
10. Allocate costs of this program.

11. Define institutional control of EWA, including governance, public participation, linkages to CMARP, and decision making process.
12. Determine existing and reliability of existing legal mechanisms to assure intended use of EWA water released for instream purposes.

CALFED Proposal

CALFED believes that the EWA concept should be further evaluated and developed as soon as possible. To that end, CALFED proposes:

1. A pilot-project EWA should be developed and implemented during the current water year;

2. Assuming that issues identified above and in the pilot-project are satisfactorily resolved. CALFED proposes developing a long-term EWA. This EWA should be in place before the ROD on the CALFED Program.