Environmental Water Account (EWA)

The EWA is based on the notion that flexible management of water operations could achieve fishery and ecosystem benefits more efficiently than a completely prescriptive regulatory approach. The impacts of the export pumps on the environment and the needs of individual species are highly unpredictable, year by year. Therefore, efforts to simultaneously (1) reduce the environmental impacts of exports and (2) minimize the impacts of environmental protection on water supply must be tailored to individual years. Prescriptive standards cannot make these adjustments, environmental efficiency requires a live manager with his/her hands on the controls.

The EWA is an institutional mechanism to allow this kind of operational fine-tuning to take place without conflict between the environment and water users. In effect, the EWA becomes a water agency for the environment. Like any other water agency, the EWA will have various forms of property and rights at its disposal. Thus, the EWA will: (1) control storage; (2) contract with willing sellers to purchase water; (3) fund water efficiency or reclamation projects in return for the water saved; (4) have detailed agreements with the state and federal projects on the use of pumping and conveyance facilities to divert and move environmental water during periods of low environmental impact; and (5) enough money to support its activities and to provide for unforseen circumstances.

In practice, the EWA will fine-tune export operations by making trades with the state and federal projects. In concept, the arrangements will be very simple. During periods when the EWA considers that the export pumps are causing undue harm to the environment, it will direct the projects to reduce their pumping levels. In return, the EWA will commit the that same amount of water -- whether from storage, transfers, or water conservation and reclamation -- to the projects. The projects are not harmed and the environment gains added protection.

Defining and Operating an EWA

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 preliminary 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 EWA 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 (NMFS, USFWS, and CDFG) would jointly manage an EWA.

Development and Growth of EWA Assets

There are several ways to secure and grow assets of an EWA. One way is to physically put water into an environmental reservoir space, north-, south-, and/or in-Delta. In such a case, when the EWA manager authorizes real-time reductions in Delta exports, the water is moved from the environmental reservoir to water users facilities. Alternatively, an EWA can be designed to use a system of "credits" to curtail exports. Credits can be generated in a variety of ways, including flexing a prescriptive standard (at the discretion of the EWA manager), or by reducing demand (e.g. installation of low flow toilets or purchase of options to fallow land). These credits would be contingent on the availability of conveyance and storage capacity to receive the water at the time delivered . Using credits, once water is exported south-of-Delta, it is under the control of the water users. In either case, the assets of an EWA can be used to curtail Delta export pumping on a real-time basis to reduce direct and in-direct fish mortality.

EWA assets could grow by additional water options and purchases and /or storage contracts, new water conservation/reclamation programs, increased access to diversion and transport facilities, flexible management of exiting criteria as knowledge increases and trust builds, increasing the continency fund, and/or developing refillable high priority storage.

Water user assets would increase from expanded access to diversion facilities, water purchase options and transfers, conservation/reclamation programs , increased surface and groundwater storage, and water in exchange for mortality reductions.

An EWA creates strong incentive to leverage assets by all. However, the linkages between accruing and storing of assets needs to be well defined in Stage 1.

Use of EWA Assets

Fisheries agencies would jointly manage the account and draw on it 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 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.

Accounting for an the EWA

All agree that the accounting for an EWA will be complex and difficult, although no unsurmountable problems have been identified. There are several possible approaches to accounting for an EWA. Two approaches most used in the past are the discrete-volume and the contract approach. Each has its advantages and its disadvantages. Some combination of the two may eventually be the better method.

The EWA could be implemented through the management of a **discrete volume** of water on a gallon-for-gallon basis which is purchased or which comes from discrete actions such as funding the installation of one million low-flush toilets or flexing the Export/Inflow ratio as described in the 1995 State Water Quality Control Plan. Under this scenario the environmental water manager would need to find suitable storage and conveyance facilities to hold and transport their water, like any other transfer within the system. The volume of water available to the EWA would vary each year in response to the price of water, the amount of reclamation projects funded or the opportunities for flexing E/I. The EWA would lose its water if at any time the necessary storage or conveyance facilities were unavailable, unless it could be given a higher priority (water arising from the flexing of E/I might have a very high priority since it is part of complying with the Water Quality Control Plan, but purchases or other sources of water might have very low priority). Under this scenario the volume of water could be strictly defined each year with little likelihood of serious disagreement, although the accounting could become very difficult.

Another option for management of the EWA is to create a new **contractual** arrangement with the State and federal water projects. CALFED is expected to generate a substantial quantity of newly available water through its water use efficiency program, the NoName group's tools, and through enhancements to reclamation and watershed management. For the present State and Federal contractors this 'new water' will augment their current deliveries. A new contract would allow the EWA to acquire water, for its own use, in a comparable fashion. This contract could vary with hydrology from year to year, as with most present contractors. Such a contract would use the same storage and conveyance features as all other contracts and would allow EWA water to be planned for and managed more easily. As long as the time and place of delivery did not conflict with the times and places of delivery of other users, conflict could be minimized. One suitable place of use for the EWA contract would be San Luis Reservoir on September 30 of each year. Such a guaranteed delivery could then be used in transfers to achieve all the actions desired of an EWA. Under this scenario the actual volume of the contract in a given year might not be exactly the same as the volume produced by the CALFED program, but intensive modeling could ensure that the contract size was correct on average.

Management of the EWA could also include a combination of the above approaches. Alternatively, EWA management could transform from the discrete-volume approach to the contractual approach as all parties gained confidence about the volume of water actually produced by the CALFED program.

Potential Attributes 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. Potential attributes of the EWA include:

1. Increased Flexibility - The flexibility to provide the greatest level of environmental protection at a time when fish are most threatened may be difficult to craft as a fixed standard. EWA operations could be a more flexible and efficient tool for providing protections 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. An EWA could 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 could 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 may be enhanced because an account could 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 could 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.

Primary Concerns with an EWA

Some primary concerns with the EWA are:

1. How can protection be afforded to species early in the water year when the account may be empty?

The difficulty of 'pre-pumping' any environmental water has generally resulted in an inability to use the flexibility provided in the 1995 WQCP, which left a lot of scope in managing exports to the 'Ops Group.' Without some way for the environment to assure the other water users that changes in operations would be made without endangering their supplies, project operators have worked to minimize risks to contract deliveries. Even when the take of endangered species has exceeded the number authorized by the biological opinions, the Accord's assurances to water users has resulted in little action to reduce take until assurances can be provided that the actions won't interfere with deliveries.

To address this need the EWA must have some way to assume any risk that fish protective measures might put on deliveries. This 'insurance' could be water or money or both that could compensate for any actual impacts on exporters. Alternatively, if the EWA held contractual rights to some volume of water, it could trade those rights for whatever environmental actions were needed.

With the use of the Joint Point of Diversion and increased pumping capacity at the State facilities, San Luis Reservoir will fill in the vast majority of years, generally by March. In any year when San Luis Reservoir fills, environmental actions taken prior to the date of filling will not require any decrease in the volume of water in the EWA. Thus, having the collateral to assume the risk will usually be adequate to justify substantial reductions in pumping during the Fall and Winter months.

2. How can environmental water be stored for later use in a system limited by storage?

The storage space that has been identified in some south of delta reservoirs and ground water basins is crucial to success of the 'gallon-for-gallon' approach to the EWA. The alternative 'contractual' approach integrates the responsibility for managing EWA water with that of all other contractors. In either case, water alone is insufficient for an effective EWA; access to storage and facilities is crucial.

Water coming from CALFED's reclamation and water use efficiency programs represents a reduction in demand and, thus, does not require the use of storage and conveyance facilities. Water savings from these programs also represents a 'refillable' portion of the EWA, because the savings are generated anew each year

3. How can protection be ensured when protective needs exceed the water available?

Such a condition could come from either an overall shortage of water, an EWA with inadequate assets, or a year of exceptional fish sensitivity.

Under drought conditions, many actions of the EWA actually become easier because shortage of water results in reduced export operations and greater scope for moving exports away from times of fish concern and into other times of the year.

Adequacy of the EWA to deal with most environmental conditions that are expected to arise is almost purely a policy issue. Recent simulations by biologists and operators using historical salvage data and modeled export operations seem to suggest that an EWA of around 400 TAF is necessary (see Initial Evaluation of An EWA section). Clearly, the larger it is the greater assurance can be that substantial reductions in entrainment can be achieved but the greater the conflict with other water users.

In years of exceptional fish sensitivity, the EWA will need to focus its efforts on those species that are at greatest risk in that year. Thus, expected salmon escapement or the abundance of adult delta smelt could be used to focus protective measures. In addition, option contracts might need to cover a variety of contingencies: some options might be able to call on water 5 out of 10 years and some others might only be usable 2 out of 10 years. These less frequent option contracts could represent a back-up insurance policy for an effective EWA.

Often overlooked is the fact that any protective methods will fail under some conditions. During the recent simulations a number of actions were taken to protect fish that would have been lost under the proposed regulatory approach. Even when QWEST is positive and E/I ratios are low, fish are entrained at the facilities in varying numbers. The degree of confidence one has in the effectiveness of regulatory actions will determine whether such entrainment should be addressed by an EWA.

Other institutional and operational problems that may not easily solved:

- How to insure that an account has sufficient assets to insure environmental restoration.
- How to insure that the manager of the account makes environmentally appropriate decisions.
- How to account for the water owed to the environment.
- How to establish an initial baseline of assets for the environmental account.

Basic Decisions Needed for an EWA

There are basic decisions and clarifications needed before an EWA can be implemented. Some of the more important are:

1. What are the default operational rules?-Use of an EWA is grounded on the premise that there is clarity and certainty about the water currently available or committed to the environment, and that water managed under the EWA supplements this amount. Because there is intense disagreement on this point, establishing a water baseline for default operations is essential.

2. How big should the account be and what is the makeup of assets?- In general the EWA should be a working combination of water, storage, options, and financial resources that allow for non-contentious management for supply, fish, and water quality. The account should be large enough that when used will move the program progressively towards recovery of the species. The size and the mix of assets of the EWA may be adjusted over the life of Stage 1 as it is learned how to best manage the EWA for fishery protection, water supply and water quality.

3. How are facilities shared?- Agreement on sharing of the conveyance of storage and conveyance facilities, and the priorities for sharing are essential for an EWA to operate. San Luis storage, sharing of pumping above default rules, and coordination of recharge and extraction of ground water storage are key examples of agreements needed. Sharing future export/storage facilities as capacity increases needs to be factored into the overall EWA package.

4. How would EWA carryover from year to year?- In general, it appears that the low point in San Luis is unlikely to be a constraint on the timing of debt (EWA owes more water than in the account) repayment. Rather, debts might be carried for as much as an additional year, even if the collateral is in the groundwater. Export reductions in the spring could translate into increased release from upstream reservoirs in the summer and fall, thus lowering carryover storage upstream - i.e., the first year a debt is carried does not result in reduced deliveries. If the next winter is dry and Oroville/ Shasta do not spill, to avoid impacts on temperature control the debt would be repaid.

5. How is EWA related to upstream water?- There will be upstream environmental accounts. Changes in Delta operations may have upstream storage and yield implications. All operations will be based upon the "no harm" principle. If EWA operations in the Delta cost water upstream (something that may not be known until the next winter), the EWA is responsible for finding compensation water. Similarly, if EWA operations in the Delta increase net supplies, the EWA will control this water. The EWA, ERP, and CVPIA water purchase program will be integrated. Upstream EWA water may be used to satisfy instream flow targets and may be exported (at the discretion of the EWA manager) to generate water in export areas. ERP and CVPIA purchases may be used to pay off upstream and export EWA debts to the water users. The key point is that all environmental water acquisition and operations should be integrated to generate maximum benefits.

6. What is the fungibility of EWA assets?- Except for the linkage between the EWA and the ERP water purchase program, water and financial resources dedicated for the EWA cannot be reallocated to other ERP programs without the consent of all agencies with ESA responsibilities -- USFWS, NMFS, DFG. However, EWA water may be sold in order to help fund other EWA assets, such as storage facilities or water option contracts. Another possibility would be that EWA, ERP, and CVPIA water acquisition assets could be made more fungible. For example, habitat might come to be seen as more important than water. If so, then locking away environmental assets in water could be suboptimal. On the other hand, it is unlikely that major shifts in priorities will appear over the next 7 years and locking in environmental water assets may by an important factor in regulatory agency willingness to grant regulatory stability.

7. What are the operating/accounting procedures?- The fundamental principle is "no harm". This applies both to the EWA and the water users. The EWA is responsible for compensating those impacted by EWA operations. EWA operations that do not harm the water users do not require compensation (e.g., if San Luis fills despite EWA operations, then no compensation is required.). The EWA will be required to pay for any incremental power costs resulting from its operations.

The EWA would operate on a fiscal year that runs from one low point in San Luis to another. Nominal delivery of EWA water to San Luis on September 30 of each year would permit clearer accounting and payback.

EWA may call for export reductions based upon the expected delivery of water to its account within its "fiscal" year. Deliverable quantities include:

1. Expected contract allocations from the state and federal projects; plus
2. EWA water in surface storage; plus
3. EWA groundwater storage that can be extracted in time to compensate water users within the EWA fiscal year; plus
4. Water generated by efficiency or reclamation projects within the "fiscal" year; plus
5. The amount of callable water option contracts within the current year; minus
6. The amount of water already expended in the current year.

If EWA calls for export reductions between the end of the "fiscal" year and the high point in San Luis, then the amount of export reductions that must be made up is the lesser of (1) the unfilled portion of San Luis and (2) the amount of export reductions required. Thus, if San Luis fills, EWA debts to the projects are erased.

The EWA may make arrangements to carry over debt across "fiscal" years, using voluntary arrangements. For example, if San Luis has significant carryover storage and no users will be harmed by a delayed payback, then the debt may be carried into the next winter. If San Luis fills, then the debt will be erased. Similarly, the EWA may use its assets as collateral for multi year loans (e.g., it may use groundwater storage as collateral for a long term loan of water from MWD).

8. What are the Environmental priorities for state and federal conveyance and storage facilities?-Example priorities for conveyance could be , in descending order:

1. Firm contract deliveries -- including contract deliveries for the EWA.
2. EWA water generated by increased operational flexibility.
3. Non firm deliveries to contractors
4. Reserved space for market transfers, including EWA transfers
5. EWA operations -- e.g., shifting water from one storage site to another.

Priorities for project storage are unclear since that storage does not necessarily need to come from the state and federal projects. In general, unless the EWA is granted higher priority within the projects through negotiation, EWA water stored within the state and federal storage facilities will be the first to spill.

Development of priorities for access to existing facilities will be very complex. Water users may feel that non-firm water deliveries are part of the existing system. Therefore, placing these deliveries below EWA water will cause them harm. On the other hand, regulatory agencies may see EWA operations as a substitute for standards, which would imply an higher priority than contract deliveries. Negotiation of a priority system is effectively the same as negotiating a new COA and will take time to put into final form. In the short term, less formal arrangements might be possible.

9. Who is the decision making authority?- Near term authority for decision making of EWA resides in USFWS, NMFS, DFG. Operational decisions are generally worked out in Ops Group with advise from the Data Assessment team (DAT) and the NoName Group. Where time is essential, a subgroup may make decisions. Day 1 assets (non spill storage, options) are secured by SWP and USBR in consultation with USFWS, NMFS, DFG. Longer term institutional arrangements are still to be negotiated.

Many stakeholders have expressed the concern that even near-term control over the EWA by the regulatory agencies is problematic, since it might undermine a high priority stakeholder proposal -- the establishment of a single authority for implementation of the entire CALFED ecosystem program. It might be possible to implement the EWA through a single eco entity, provided that ultimate responsibility and authority for protecting endangered species remains with the regulatory agencies.

10. Who pays?-The decision of who pays for the assets and administration of an EWA is complex. The water baseline, priorities of use of conveyance and storage facilities, initial account size and asset mix, and many of the other basic decisions list above are inputs into the determination of who pays.

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.

Key assumptions used in this analysis include:

- Default SWP and CVP operations include provisions of the 1994 Bay-Delta Accord, upstream and in-Delta AFRP actions, new Trinity in-stream flow requirements, unlimited joint point of diversion, and 200 TAF of groundwater storage operated for SWP water supply.
- Banks Pumping Plant exports may be increased to 8,500 cfs at the discretion of the EWA Manager. The increased capacity is used to facilitate temporal-shifting of exports for increased environmental protection. In this scenario, Banks Pumping Plant increases to 8,500 cfs were not used to supplement water supply.
- EWA assets used in this scenario:
  - 300 TAF groundwater storage account.
  - 50 TAF surface storage account.
  - 100 TAF of transfers available for purchase each year.

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.

Water supply benefits, compared to two baselines, are shown in Table 1. These benefits are provided by unlimited joint point of diversion and the 200 TAF of SWP ground water storage assumed in the default operations study. Some nominal additional water supply benefits could be obtained by using 8,500 cfs Banks Pumping Plant capacity for SWP and CVP use. This would likely provide some increase in long-term average deliveries (on the order of 50 TAF), but only minimal increase in critical period deliveries.

Water supply deliveries were not directly impacted by EWA operations. However, as a result of EWA operations SWP and CVP storage deficits exceeded EWA assets by up to 230 TAF (see Figure 1). If unbalanced by additional EWA assets, these storage deficits could cause reductions in SWP and CVP water supply allocations under actual operations. In this simulation the 100 TAF purchase option was only exercised once, in the final year. Based on the experience gained in this simulation, the group agreed that purchase options should be exercised more frequently or other assets, such as water made available from

conservation and recycling, should be
considered. Additional EWA assets would be necessary to avoid reductions in project water supply allocations resulting from accumulated storage deficit.

Table 1
Water Supply Benefits

(Impacts in TAF per year)	Long-Term Average	Critical Period
Relative to Accord + All AFRP + Trinity	100	70
Relative to Accord + Upstream AFRP	-100	-120

The benefits to fisheries of this EWA operation included:

- All AFRP actions were implemented.
- New Trinity Flows were implemented.
- Additional export and outflow temporal-shifting (100 to 500 TAF per year) was provided for increased environmental protection, based on real-time monitoring and salvage information.

The group concluded that although this was a limited, sample operational evaluation, an EWA appropriately sized and constructed could provide desired fisheries protection and water supply benefits.

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.

Agricultural and Urban Group Evaluation

A group representing agricultural and urban water users conducted a second evaluation of EWA operations. While assumed EWA assets were similar, the default SWP and CVP operations study varied from the default assumed by the CALFED Agency and Stakeholder Group.

Key assumptions used in the Agricultural and Urban Group Evaluation include:

- Default SWP and CVP operations include provisions of the 1994 Bay-Delta Accord, upstream AFRP actions, unlimited joint point of diversion, Banks Pumping Plant capacity of 10,300 cfs, and a 400 cfs intertie between the Delta-Mendota Canal and the California Aqueduct.
- First priority for use of unlimited joint point of diversion, increased Banks Pumping Plant export capacity, the Delta-Mendota Canal and the California Aqueduct intertie, and use of ground water recharge facilities is reserved for SWP and CVP purposes.
- EWA Assets used in this scenario:
  - 300 TAF groundwater storage account.
  - 50 TAF surface storage account.
  - 100 TAF available purchase each year.
- EWA Manager may shift exports and flows to provide in-Delta AFRP actions and additional environmental protections.

Water supply benefits, compared to two baselines, are shown in Table 2. These benefits are provided by unlimited joint point of diversion, 10,300 cfs Banks Pumping Plant capacity, and the 400 cfs Delta-Mendota Canal and the California Aqueduct intertie.

Table 2
Water Supply Benefits

(Impacts in TAF per year)	Long-Term Average	Critical Period
Relative to Accord + All AFRP + Trinity	400	300
Relative to Accord + Upstream AFRP	200	110

This simulation assumes facilities are in place that would not likely be available in the initial stages of implementation of the EWA. Assuming that Banks Pumping Plant capacity is limited to 8,500 cfs, the Delta-Mendota Canal and the California Aqueduct intertie is not available, and accounting for implementation of new Trinity in-stream flow requirements, water supply deliveries would be decreased on the order of 100 TAF in both long-term and critical period averages compared to the values shown in Table 2.

Use of the EWA in this simulation provides the following benefits to fisheries:

- All AFRP actions (upstream and in-Delta) are implemented, with the exception that the July export reduction action is implemented only in dry and critical years.
- Additional water supply available for environmental purposes (beyond in-Delta AFRP actions) averages about 130 TAF in non-wet years. Most of this additional benefit is provided by implementing the 100 TAF purchase option. In this simulation, the option was implemented in about 80 percent of all years.

While this evaluation assumed different default operations and priorities for use of facilities than assumed by the CALFED Agency and Stakeholder Group evaluation, the conclusions reached are similar. Improvements in both environmental protection and water supply benefits could be provided through implementation of a EWA with assets similar to those described here. Additional EWA assets may be necessary to provide both environmental protection and water supply benefits at desired levels.

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. An EWA could 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.
2. Investigate various approaches for implementing an EWA.
3. 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.

4. Determine how the EWA assets will shift and grow during Stage 1.
5. Determine sharing methods of initial water export improvements (e.g., South Delta improvements).
6. Determine sharing methods of additional Stage 1 water export improvements.
7. Determine EWA rights to use existing and future storage and conveyance facilities.
8. Develop accounting methodologies.
9. Assure that water quality impacts of operational changes to protect fish are adequately dealt with within the CALFED water quality program.
10. Secure adequate, assured funding to support EWA operations at defined levels.
11. Allocate costs of this program.
12. Define institutional control of EWA, including governance, public participation, linkages to CMARP, and decision making process.
13. 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 1998-99 water year.
2. If all the operational, institutional, and assurance issues identified above and others identified during the pilot-project are satisfactorily resolved, CALFED proposes developing and implementing a long-term EWA as soon as possible.

EWA Strawman Scenario

The following EWA scenario illustrates the types of sharing of water and assets available to an EWA.

INITIAL STARTING POINT
Assume that the following actions are being implemented:
- o Accord
- o VAMP
- o All AFRP
- o Trinity

SNAPSHOT: YEAR 1

ACTION	EWA ASSETS	WATER USER SHARE
Convert E/I Standard into water supply[1]	All benefits go to EWA	
JPOD	JPOD supplies associated with E/I elimination[2]	JPOD supplies not associated with E/I relaxation
Expand Banks to 8.5 kcfs	Expanded Banks supplies associated with E/I elimination	Expanded Banks supplies not associated with E/I elimination
200 kaf high priority, refillable storage. Initial storage = full.	Controlled by EWA[3]	
	Integrate/ coordinate ERP water purchases/ CVPIA water purchases with EWA.	
	$20 million contingency reserve[4]	

	Arrangements w/ water users for carryover of debt across water years.[5]	

SNAPSHOT: YEAR 4

Same as Year 1 with the following changes:

ACTION	EWA SHARE	WATER USER SHARE
Expand Banks to 10.3 kcfs	Expanded Banks supplies associated with E/I elimination	Expanded Banks supplies not associated with E/I elimination
200 kaf Delta island storage	Controlled by EWA[6]	
400 kaf storage south of Delta		Controlled by water users
200 kaf water purchase program	100 kaf	100 kaf
Pay for installation of 1,000,000 toilets	EWA receives water supply benefits for 10 year period.	
	Upgrade to $40 million reserve[7]	

SNAPSHOT: END OF STAGE 1

Same as Year 4 with the following changes.

ACTION	EWA SHARE	WATER USER SHARE

Enlarge Shasta	50% share new storage and power revenue	50% share new storage and power revenue
400 kaf south of Delta storage	50% share new storage	50% share new storage
Clifton Court Screens		Transfer of some EWA assets (water and/or storage) to water users.[8]
	Upgrade to $60 million reserve	

WATER QUALITY LINKAGES

Delta and export water quality is partly a function of the pattern of Delta export pumping over the year. Because the EWA would modify these export pumping patterns, it could alter Delta and export water quality. How can we factor in water quality considerations, as we implement an EWA? The following approaches comprise are one possible approach. What else could work?

- Set Delta water quality standards at levels to protect in-Delta uses. Existing standards may already accomplish this task. Then, if EWA proposes changes in operations that would require additional releases of water to maintain Delta water quality standards, EWA would be responsible for finding replacement water for the Projects.
- For exports, water quality could be factored in through incentives/disincentives. For example, if the EWA wishes to build up south of Delta supplies by pumping water during periods of low water quality, then it may be forced to relinquish a portion of its new water to the water users as compensation. Similarly, if the EWA increases pumping during periods of high water quality, the water users might reward the EWA providing extra water to the EWA. In this way, water quality considerations would be incorporated into the decision making process within the EWA.

KEY POLICY/ TECHNICAL ISSUES

- What is hardwired? What is flexible? The strawman assumes that VAMP, Delta AFRP and Trinity are part of the landscape. Water users then receive a number of water supply enhancements. The net effect will look different depending upon the baseline chosen as a vantage point. An alternative would be to not hardwire VAMP and the Delta AFRP or to force the EWA to pay for these actions out of its own assets. In turn, the EWA might require a larger share of future water acquisition. The key issue, then, is not the particular sharing formulas, but whether CALFED can produce enough benefits to satisfy the various sides. The sharing formulas can then be adjusted to make the end result come out right.

o Can all of the actions presented be implemented on this time line? What does it take to implement them? Are processes underway to assure implementation?

o Environmental benefits. User benefits tend to be defined fairly well by the average and dry year delivery values. Environmental benefits from the EWA are more difficult to quantify. The existence of environmental storage and water purchase agreements south of the Delta will allow for major modifications in export operations -- frequently no cost to the EWA (e.g., because San Luis fills). Additional analysis will be needed before the full benefits of the EWA can be estimated.

o The division of costs

o Regulatory stability

NOTES

1. The proposal is for the EWA to receive a contract allocation from the projects each year, based upon some rough calculation based upon hydrology and project storage levels. Another alternative would be to retain the E/I standard, then allow the EWA to relax the standard to generate credits. This would require a daily accounting system. Both approaches appear to be possible and should be roughly equivalent.

2. That is, water moved using the JPOD above the current E/I standards would become environmental water. This could be done on a contract basis, using modeling, or using a daily accounting system (which would track the E/I ratio on a daily basis).

3. There was broad agreement at the meeting that at least some of this storage should be surface storage to allow for rapid extraction if needed.

4. One weakness with a simple contingency fund is the difficulty in turning money into environmental protection in an emergency situation. This may imply that the contingency fund should be linked to prenegotiated arrangements, such as option contracts for water, or pre negotiated penalty payments to the Projects if the EWA requires pumping reductions without the water to repay them.

5. E.g., EWA makes an agreement with the SWP or MWD to carry a loan until the following winter. If the winter is wet, the EWA loan can be repaid without the need to tap pre existing EWA assets.

6. Delta storage attached to the export pumps appears to be far more useful to the EWA as a tool to allow changes in the export pumping patterns than as a yield producing tool for the water users.

7. Export water users expressed some concern about the size of the reserve account, arguing that the entry of this much money into the water market could drive up prices for other water users.

8. This concept has received little discussion. However, if new screens significantly reduce the mortality at the export pumps, arguably the Projects should receive some of the benefits of this reduction via increased supplies, particularly if they help fund the screens.