



***OPPORTUNITIES TO IMPROVE THE "FRAMEWORK FOR ACTION"
IN THE "RECORD OF DECISION"***

Natural Heritage Institute

June 26, 2000

The Natural Heritage Institute is pleased to provide these observations on opportunities to strengthen the important achievements of the CALFED Framework for Action within the Record of Decision (RoD). NHI acknowledges the milestones that the Framework represents, and congratulates the Secretary and Deputy Secretary of Interior and Governor Davis on this progress. While the current document provides a framework for the next four years, the RoD can and should provide the groundwork for the larger opportunities and challenges that lie beyond the first phase of the CALFED implementation program. In these comments, we point out ways in which the RoD can do so while also solidifying the delicate equipoise among the stakeholder interests that the Framework so nimbly strikes. Thus, our suggestions go mostly to clarifying and assigning an appropriate emphasis to measures already included in the Framework.

While NHI is a member of the Environmental Water Caucus and also participates in the Ag-Urban Caucus, we write separately because of our special relationship as a consultant to the CALFED Bay-Delta Program, particularly on the Environmental Water Account and the Conjunctive Use components.

**ADDRESSING THE VULNERABILITY OF THE DELTA LEVEES TO
CATASTROPHIC FAILURE**

The CALFED Framework underestimates both the risk of seismic levee failure to the delta ecosystem and water supply and the opportunity to reduce this unacceptable risk by rebuilding key delta Islands back to sea level. A panel of engineers and seismologists convened by CALFED determined that there is a 20% probability of catastrophic levee failure (10 or more simultaneous levee breaches) over the next 50 years. Such a failure of the levee system would increase salinity levels throughout the Delta devastating both the delta ecosystem and water supply system. This same panel of engineers also concluded that CALFED's plan to upgrade Delta levees to PL84-99 criteria would not significantly reduce seismic vulnerability. NHI believes that a concerted subsidence reversal program to rebuild key western delta Islands to sea level could simultaneously

reduce the risk of levee failure significantly and restore thousands of acres of tidal marsh in the heart of the Delta.

The framework document fails to acknowledge the seismic vulnerability to the delta levee system and its implications for the future of the delta environment and water supply. Instead, the levee program continues to focus on traditional levee maintenance programs that degrade the environment and will do nothing to reduce seismic risk. CALFED's continued emphasis on levees neglects the underlying problem of delta island subsidence. The Framework references a levee subsidence control plan, but this refers only to subsidence that directly impacts levee stability while neglecting the chronic problem of interior island subsidence. The Framework also neglects to evaluate opportunities for reversing subsidence by rebuilding key western delta Islands to sea level, which would both, restore tidal marsh and significantly reduce the risks of delta levee failure.

Rebuilding the entirety of the subsided delta to sea level would be a daunting and perhaps impossible task, but rebuilding key islands may be the most affordable and effective way to simultaneously reduce seismic risk and restore tidal marsh. For instance, the CALFED seismic panel attributed over 40% of the risk of seismic levee failure to Sherman Island and its failure would have the largest impact on the delta's water supply and ecosystem. A concerted effort to isolate and rebuild large peninsulas on Sherman Island with cross levees and fill could reduce the risk of Sherman Island failure by 50% over the next 10 years. A review of NRCS soils maps indicates that bands of mineral soils across Sherman Island are ideally located for placement of cross levees that could protect large portions of the island from inundation associated with the failure of unengineered peripheral levees. Large amounts of mineral soil on Jersey Island, another key western delta island, also provide an opportunity to construct set back levees and rebuild large peninsulas to sea level. Innovative use of lightweight fill materials such as rice straw could facilitate the process of rebuilding peat soils back to sea level over the next few decades. The Sacramento rice industry creates over 10 million cubic yards of surplus rice straw a year, enough to fill Sherman Island, the largest delta island, to sea level in 15 years. Once rebuilt to sea level, delta islands would not only be immune to levee failure, but would also provide tens of thousands of acres of rare and valuable tidal marsh.

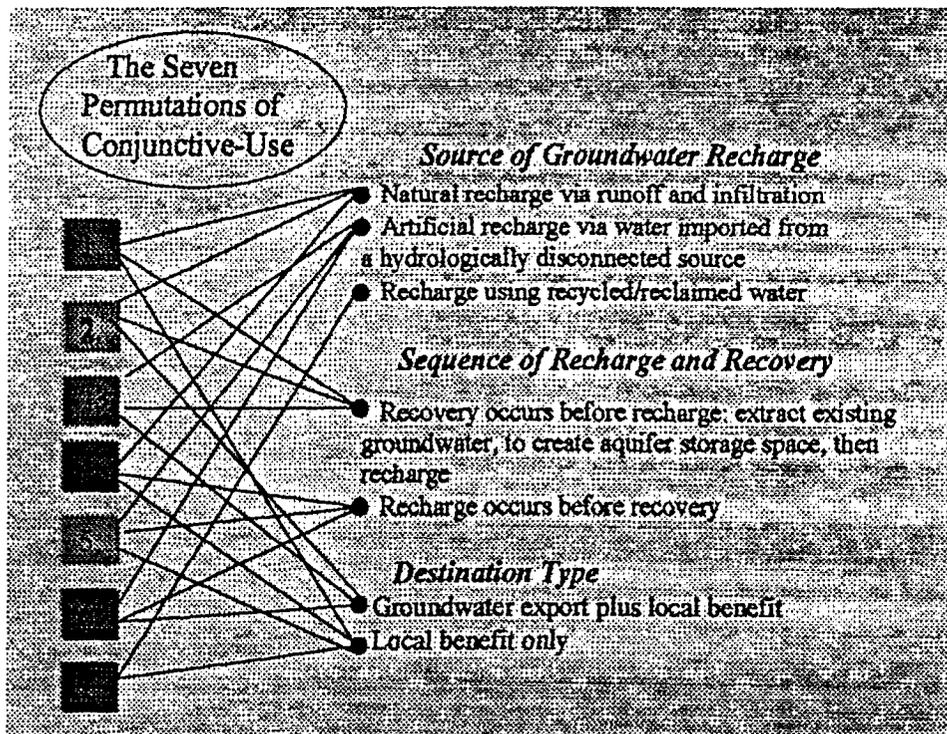
The Framework incorrectly assumes that the impacts of levee failure will be limited to short-term impacts on water quality that can be remedied by an emergency response program. A multiple levee breach scenario will almost certainly overwhelm emergency response capabilities leading to permanent inundation of western delta islands and long-term degradation of the delta environment and water supply. Unplanned inundation of delta islands will also severely limit opportunities for long-term tidal marsh restoration. CALFED's risk analysis should look beyond acute water supply impacts of levee failure and also evaluate long-term impacts on the delta ecosystem. The risk analysis should also evaluate the potential environmental risks associated with the kind of massive emergency response effort envisioned by CALFED.

The Framework provides very little detail on the allocation of funds between their various programs. Most of the money will probably go to traditional levee maintenance programs unless otherwise earmarked. The RoD should allocate equivalent resources to controlling and reversing subsidence as it intends to invest in traditional levee maintenance. This may entail significantly increasing the investment in the levee program so that there is sufficient funding to achieve near term levee maintenance objectives. The RoD should also commit to assemble a team of respected and creative engineers to assess the feasibility and efficacy of strategically rebuilding key delta islands over the next several decades.

GROUNDWATER STORAGE

This section of the Framework lays out a short-range vision of groundwater development that may be appropriate for the next few years, but does not illuminate the much larger benefits that can be achieved over the longer term through a system-wide conjunctive water management program. The RoD can at least set forth the predicates for that larger potential.

Conjunctive use means many things to many people. In fact, seven distinct types of conjunctive use projects can be defined by combining the various sources of water for groundwater banking, the possible sequences of recharge and recovery, and the possible destinations of the banked water. These permutations are displayed in the following chart:



It is apparent that, for the near term, the Framework embraces the first type, which involves local groundwater extraction for primarily local use, with recharge occurring through infiltration of seasonal runoff. The Framework does not clearly state that CALFED also embraces, over the longer-term, actively recharged conjunctive management projects that would provide new yield benefits system-wide (types 3 and 6 in the display). The source of water for artificial recharge will be the terminal reservoirs of the Central Valley water system, which are owned by USBR, DWR, the Corps of Engineers, and several non-project agricultural and urban water districts. The ambiguity as to the types of projects contemplated results from the following features of the Framework:

1. The Framework addresses only groundwater storage capacities. It does not consider the source of the water that would be banked. This creates the implication that the groundwater storage program that is contemplated is a passive recharge program that relies upon exploitation of native groundwater resources with recharge through natural infiltration. This approach would be very problematic. First, passive recharge projects have very limited potential to contribute to the water supply reliability goals of CALFED if they are operated to provide local benefits only. Indeed, such groundwater development is already being pursued where feasible. Second, exploiting native groundwater for export to service areas overlying other basins are very controversial and tend to be resisted by the groundwater users in the basin of origin.
2. Reservoir reoperation for groundwater banking (the only appreciable source of new water for conjunctive use) must be conducted in a manner that also restores downstream fluvial processes and improves flood management by reducing the need for downstream flood control structures. The Framework does not acknowledge these interactions and makes no commitment to the technical investigations that will be needed to define the optimal reoperation regimes in each of the ten controlled tributaries of the Central Valley water system.
3. The Framework appears to adopt the ISI Principles for groundwater banking. These ISI principles appropriately emphasize local control of the groundwater banking sites, which is necessary for all types of conjunctive use programs. The principles also would preserve a "priority for in-basin needs". This is also appropriate in the case of projects that exploit native groundwater for local use, and merely reflects current legal doctrines. But, to open up the potential for the larger benefits that a system-wide program could provide, it would be helpful for the RoD to clarify that the "local control" principle does not imply that local groundwater managers will also exercise control over the reservoirs that provide the source water for groundwater banking. Of course, these reservoir owners are not going to turn their facilities over to the control of local interests overlying groundwater basins. It would also be helpful if the RoD would clarify that the ISI principles do not create an absolute priority for in basin needs where the banked water is imported water (from surface reservoirs) that would not otherwise be

available in the basin. Such actively recharged projects are unlikely to materialize if the importer of the water loses it to the local groundwater pumpers. Rather, the current legal doctrines giving groundwater importers first priority in extracting that groundwater will and should continue to prevail. The local interests will, of course, share in the benefits of the imported water, either in the form of a share of that water or a cash payment for use of the unoccupied aquifer storage space. The magnitude of that share will depend on negotiations among the parties. If the local interests insist on such a large share as to make the project uneconomic, the project will not happen. In sum, the RoD needs to clarify what is meant by local control of conjunctive use projects by specifying particularly WHO controls WHAT and HOW, that is, through what mechanisms. The statement of principles as it now stands applies to exploitation of native groundwater. There is very little new yield potential in those projects.

CALFED can rectify all three of these problems by clarifying in the RoD that it envisions actively recharged groundwater banking projects, with the source water coming from reoperation of the surface water reservoirs, and with most of the banked water reintegrated into the existing water delivery system in drier years to provide system-wide benefits. This approach creates the potential for large new yield for the system, as much as 1 million acre feet per year on an annual average, because the water released from reservoirs as source water for groundwater banking would create additional capacity to capture peak flow events in those reservoirs.

CALFED can advance the technical studies on system-wide conjunctive water management by supporting and participating in the consortium of Central Valley water interests that is being organized by NHI and USBR. The study plan includes elements to investigate the potential to reoperate the terminal reservoirs of the Central Valley system to achieve the three simultaneous goals posited above, and the design of institutional arrangements that enable importation of recharge water and the export of banked water while respecting and operationalizing the imperative of local control over groundwater basins.

Reoperation of terminal surface reservoirs to generate water for groundwater banking and dry year supply augmentation is also likely to prove to be the fastest, cheapest and most environmentally acceptable option for satisfying the CALFED objective of improved water supply reliability. System-wide conjunctive management would also yield important environmental benefits:

- Conjunctive use could provide the water that will be needed for environmental restoration purposes, including the Environmental Water Account.
- Conjunctive use provides a benign alternative to improve water supply reliability for the urban and agricultural sectors
- Reoperation of reservoirs for conjunctive use could be accomplished in a manner that would restore downstream fluvial processes and provide the associated habitat benefits.

Thus, the Framework appropriately assigns groundwater storage the largest role among the water storage options proposed (500-1000 TAF by 2007). Yet, the ambiguity in the Framework as to how that storage is to be achieved may inhibit the realization of that goal unless the longer-term CALFED program is clarified in the RoD.

REGULATORY ASSURANCES

On page 22, under the topic Environmental Water Account and ESA Commitments, the Framework purports to "provide regulatory stability" by assuring CVP and SWP contractors that there will be no reduction in Delta exports for the first 4 years of stage 1 resulting from measures to protect fish under the federal and state Endangered Species Acts. The Framework goes on to say that CALFED expects to develop a multi-species conservation strategy and to extend the regulatory assurance commitment beyond the first four years and, presumably, to all covered species. As a final safety net (after the water already dedicated to fish protection and the Environmental Water Account), the CALFED agencies pledge to "make additional water available should it be needed" to prevent jeopardy under the ESA. Where that water will come from, however, is not revealed.

Regulatory stability is surely desirable, and should emerge as one of the benefits of CALFED program. However, the CALFED program should not promise more than it can deliver. There are two irreducible facts that need to be acknowledged: first, CALFED cannot suspend the operation of the Endangered Species Acts and, second, the amounts and locations of water-dependent protective measures that will be needed cannot be anticipated with any degree of certainty. In fact, the devastating effects of the delta export pumps, combined with other factors, are causing additional species of anadromous and delta resident fishes to become listed every few years. We simply do not know enough about the magnitude, timing and location of environmental water needs to be able to issue regulatory blank checks. That is why the Vernalis Adaptive Management Program was adopted. It is designed to quantify over the next 12 years the spring inflow requirements and export restrictions that will be necessary to protect fall run salmon. The CALFED ERPP adaptive management program will reveal, over time, the other measures that may be necessary to recovery endangered fishes.

The state and federal agencies and the state and federal water projects that they run are already oversubscribed. They simply do not have unclaimed water in storage to make good on a pledge to provide whatever supplemental water may become necessary to prevent jeopardy to species. In theory, the projects do have the ability to purchase ESA compliance water. But that depends on the existence of willing sellers in the right place at the right time.

More realistic than a pledge to insulate the project contractors from further ESA requirements would be mechanism to indemnify these contractors for the undelivered water supply in the event that future application of the ESA curtails such deliveries. The compensation would be calculated at the cost of replacement water to that contractor. However, it is not apparent why the state and federal agencies should foot the entire bill

for underwriting such regulatory risks. Why not dedicate the user fees proposed in the Framework to paying the "premiums" for such a regulatory indemnification arrangement, and limit the amount of potential indemnification to the sums collected through such fees? That would place the cost of insurance on the insured, where it appropriately lies under the "beneficiaries pay" principle, create an incentive for the water users to support the user fee, and provide real rather than illusory regulatory assurance.

This is not a large issue over the next four years, but it becomes a very large issue if CALFED is thinking of making the assurance arrangement proposed in the Framework a permanent one extending over all of the species covered in a multi-species conservation strategy. The RoD should deal with this issue forthrightly and propose assurances that square with the legal realities and the scientific uncertainties.

WATER USE EFFICIENCY AND CONSERVATION

The level of commitment to efficiency improvements is commendable, but the economic logic is illusive. We have several suggestions for making this component more viable in the RoD:

- CALFED is proposing to invest some \$3 billion in water efficiency improvements over the 7 years of Phase I, by far the most expensive single component of the plan. It is twice as large as Ecosystem Restoration or Storage, for instance. Yet, the Framework is silent as to the destination of the saved water. If the public is to bankroll these initiatives, presumably, under the "beneficiary pays" principle, at least some of the benefits should accrue to the public, perhaps in the form of water for the Environmental Water Account. This point raises the serious question of whether the desired results could not be achieved more surely and more efficiently by simply giving these funds to the EWA to enable it to purchase the water from the agricultural water districts and thereby create market incentives for more efficient use. This can be far more effective than spending public funds to bridge the gap between the level of water conservation investments that are cost-justified from the vantage point of the grower or district, and the level of investment that is cost-justified from the vantage point of the public at large. CALFED should at least compare the costs and benefits of subsidized technology investments vs. subsidized environmental water purchases before resolving the best approach in the RoD. In any event, public investments in water conservation should accrue to the public benefit.
- Using market incentives to improve efficiency of agricultural use clearly warrants serious consideration. This technique (and the Framework's proposed technique of subsidizing investments in conservation) will clearly work much better if the saved water is stored for use in drier years. Thus, conservation needs to be linked to water markets and to groundwater storage to provide the optimal strategy. This linkage has been described in many papers that NHI has sent to CALFED over the years. Here is a summary:

Today, California farmers are about as efficient as is economically justified, given the artificially low prices they pay for water. To improve efficiencies, the value of irrigation water would have to be increased to make it worthwhile (and economically rational) for farmers (and their districts) to invest more in efficiency measures and technologies. In theory, this could be done by raising the cost of water, but that would not be acceptable to the farmers. The alternative is to raise the value of water in agriculture without raising the cost. That is what water markets can do. If the market value of water is higher than its irrigation value (which is the case where water is applied inefficiently or on low-value crops), it is worthwhile for the farmer (or district) to invest more in water conservation or crop shifting. This incentive is greatly increased if the conserved water can be stored for use during years of relative scarcity.

Today, there is not much incentive to make investments that could save water but that would pay off only over several years, because the market for conserved water is intermittent. In years when there is a lot of water available, the incentives to conserve are low because the demand for (and therefore the market value of) the water is relatively low. Conversely, in dry years, there is not much potential for saving water for future years because the water is needed for present consumption.

However, if water districts or government agencies offer to buy back entitlements from growers during wetter than average years (and thereby bolster the market prices) for resale during drier years, multi-year investments in water conservation become worthwhile and the value of conserved water is maximized. The purchased water must be stored, either in groundwater banks or through arrangements with surface reservoirs. When it is extracted in drier years, it is resold to the growers as a supplement to surface water deliveries and at prices that recoup the initial purchase costs plus the storage and administrative costs. This is a powerful dry year coping strategy for the growers, assuring improved reliability of supplies for the agricultural district. It is also a powerful water conservation incentive because it provides market opportunities in wetter years, when demand and therefore prices are otherwise relatively low, as well as in drier years, when demand and therefore prices naturally provide strong market incentives to conserve. For these reasons, CALFED should propose incentives for district buy-back programs in the RoD.

- On page 27 of the Framework, CALFED acknowledges that “in order to promote water use efficiency measures in the agricultural sector, end users need to be able to beneficially participate in an active water transfer market”. It then “recognizes that one barrier to an effective water transfer market is the lack of incentive for individual landowners to utilize available water conservation technologies because any water savings frequently accrue not to the landowner but to the irrigation district or water supply agency”.

The problem of conserved water reverting to the "common pool" is actually easily addressed through the type of district buyback program described above. This is the concept of agricultural water districts offering to buy back water from their growers for district-to-district transfers. A district-to-district electronic trading system, utilizing that approach, is actually already operating on the west side of the San Joaquin River, within the San Luis & Delta Mendota Water Authority. It is called WaterLink, and it is the creature of a collaboration between NHI, the University of California, USBR, and SL&DMWA.

POTENTIAL FOR CONFLICT BETWEEN MEASURES TO IMPROVE DRINKING WATER QUALITY AND ENVIRONMENTAL RESTORATION

Improving drinking water quality at the source is an important objective for both the urban and environmental constituencies. Indeed, the historic policy preference in favor of prevention strategies over treatment is a bedrock principle for environmentalists. Yet, it is also important to develop and select source water quality options that avoid conflict with the other prime environmental objective of CALFED, ecosystem restoration. By short-circuiting the comparative technical assessment of the three initial delta conveyance alternatives due to political pressure, CALFED is now being forced to look at options that pose the potential for a higher degree of conflict than might have otherwise been the case. A commitment to finding ways to reduce or avoid this potential should be a prominent feature of the RoD. The two ideas for improving drinking water quality at the source with a high potential for environmental conflict are:

Screened diversion at Hood

The proposed Hood connector will block salmon as they migrate upstream and are attracted to the water flowing through the connector. This is a serious problem with no obvious solution. For this reason, CALFED's Integrated Development Team (IDT), in 1997, not only downgraded this option, but actually rated it below the existing delta configuration. The Diversion Effects on Fisheries Team (DEFT) also found this alternative to be environmentally inferior. Nevertheless, the connector has reemerged in the CALFED Framework as an option to improving urban water quality. The marginal improvement in export water quality afforded by the Hood connector would impose a high risk upon migrating salmon. On the premise that CALFED's proposals should follow, not defy, its own analyses, we suggest that this conflict needs to be resolved, or this option should be dropped.

MWD water quality exchange within the San Joaquin Valley

The concept of exchanging part of MWD's entitlement to delta water for lower salinity water out of the San Joaquin Valley's east-side rivers is attractive in many ways. However, CALFED must recognize that these exchanges could jeopardize efforts to rewater the mainstem San Joaquin River to restore its anadromous fishery. The potential for conflict is apparent in view of the analysis already performed by NHI which shows

that one way, perhaps the best way, to rewater the River without adversely impacting the Friant irrigators also involves an exchange of delta water for releases from Millerton. See, *Feasibility Study of A Maximal Program of Groundwater Banking in California*, at pp. 39-48 (at NHI website: www.n-h-i.org). Therefore, CALFED must not pursue the goals of San Joaquin River restoration and the MWD water exchange in isolation. The opportunity to bring this dead reach of the River back to life is too important and exciting to fall victim to one of many options for improving MWD's water quality.

Thus, we suggest that the RoD establish a clear priority for San Joaquin River restoration over the MWD exchange. The exchange should be authorized only to the extent that the basic hydrology, existing infrastructure, and new infrastructure can support it after the needs of the San Joaquin River have been met. CALFED's pledge to "work to assure that these efforts are consistent with overall programs to restore the upper San Joaquin River" is a step in the right direction, but does not amount to a commitment to resolve potential conflicts in the use San Joaquin basin water in favor of restoring the River as a first priority. There are other sources of clean water for MWD, but there is only one source of water to restore fishery flows in the upper San Joaquin River, and that is releases from Millerton Reservoir.

GOVERNANCE OF ECOSYSTEM RESTORATION PROGRAM

The proposal to institutionalize the CALFED umbrella as an implementation oversight body appears to have considerable merit. However, CALFED continues to ignore the pressing need for a single purpose institution to implement the ecosystem restoration program (ERP) and the Environmental Water Account (EWA). The need for this institution is perhaps the single major recommendation that virtually all participating stakeholder groups have agreed upon in the past. Existing agencies are simply not equipped to take on these responsibilities. Only a new entity will be able to

- (1) Reduce duplication during implementation. On the order of 10 agencies will need to develop their own expertise to implement similar activities unless implementation is consolidated.
- (2) Contract for services quickly and efficiently. Government contracting is a nightmare.
- (3) Reduce overhead costs. Money will disappear into staff and overhead unless the program is consolidated into a single-purpose entity with no interest in shifting restoration money to other purposes.
- (4) Develop a managerial (as opposed to a regulatory) personality. Most of the CALFED agencies approach restoration from a regulatory perspective. What is needed here is very different. Restoration involves taking actions to improve conditions, rather than regulating others to reduce damage.

Despite these advantages, the Framework is virtually silent on the governance of the EWA and ERP. The RoD should commit to the creation of such institutions.

CONCLUSION

Here is a checklist of opportunities to improve the Framework for Action that should be enshrined in the Record of Decision:

- Acknowledge the probabilities of catastrophic failure of the delta levee system from seismic events within the next 50 and 100-year timeframes (25 and 40 % respectively, according to CALFED's *Seismic Vulnerability of the Sacramento-San Joaquin Delta Levees* report, December 1998).
- Commit to assemble a team of respected and creative engineers to assess the feasibility and efficacy of strategically rebuilding key delta islands over the next several decades.
- Reorient funding to give equal priority to subsidence reversal demonstration projects compared with levee maintenance (i.e., dedicate \$444 million to subsidence reversal over the next 7 years).
- Commit to an actively recharged groundwater banking program with system-wide benefits, utilizing source water generated by reoperation the terminal reservoirs of the Central Valley water system for increased capture of flood flows, restoration of downstream fluvial processes, and improved flood management.
- Restate the ISI principles to accommodate such a program on a voluntary, consensual basis.
- Commit CALFED to support and participate in the consortium effort to investigate the technical potential for system-wide conjunctive water management.
- Provide regulatory stability by establishing an indemnification program that makes clear that future application of the Endangered Species Acts will proceed according to existing legal requirements and scientific criteria.
- Assure that water conserved through public subsidies for water use efficiency improvements will be an asset of the Environmental Water Account (at least in part).
- Compare the costs and benefits of directing those public subsidies instead into a water purchase fund for public purposes (e.g., ecosystem restoration) such that market incentives for efficiency improvements are enhanced.

- Propose an irrigation district buyback and inter-annual storage program to improve market incentives for water conservation and to provide a dry year coping strategy.
- Couple the buyback program with an electronic inter-district water trading system to overcome the "common pool" barrier to out-of-district transfers by farmers
- Redesign the Hood connector to eliminate the adverse effects on anadromous fish, or select another option for improving drinking water quality at the source.
- Make a clear commitment to give priority to fishery restoration over drinking water quality in considering the reoperation of the Friant unit and delta water exchanges. If necessary, reconsider other options for accommodating the drinking water quality improvement objective of CALFED.
- Establish a governance institution for the Environmental Water Account and for the Ecosystem Restoration Program that is single purpose, has high caliber technical capacity, and includes the non-governmental stakeholders.

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