OVERSIGHT HEARING ON THE FUTURE WATER NEEDS OF CALIFORNIA UNDER CALFED, CALFED FINANCING, THE MONITORING AND PERFORMANCE STANDARDS OF CALFED, AND CALFED PUBLIC PARTICIPATION

OVERSIGHT HEARING

BEFORE THE

SUBCOMMITTEE ON WATER AND POWER

OF THE

COMMITTEE ON RESOURCES
HOUSE OF REPRESENTATIVES

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OVERSIGHT HEARING ON THE FUTURE WATER NEEDS OF CALIFORNIA UNDER CALFED, CALFED FINANCING, THE MONITORING AND PERFORMANCE STANDARDS OF CALFED, AND CALFED PUBLIC PARTICIPATION

TUESDAY, MAY 12, 1998

HOUSE OF REPRESENTATIVES, SUBCOMMITTEE ON WATER AND POWER RESOURCES, COMMITTEE ON RESOURCES,
Washington, DC.

The Subcommittee met, pursuant to notice, at 2:30 p.m., in room 1334, Longworth House Office Building, Hon. John T. Doolittle (chairman of the Subcommittee) presiding.

STATEMENT OF HON. JOHN T. DOOLITTLE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. DOOLITTLE. The Subcommittee on Water and Power will come to order.

The Subcommittee is meeting today to hear testimony on future water needs of California, CALFED Financing, CALFED public participation, and the monitoring and performance standards of CALFED.

We are gathered here today to have further oversight over the CALFED Program. Last year, we held an oversight hearing concerning this program with emphasis on the fiscal year 1998 Federal Funding Request. Since that hearing, the Subcommittee has been monitoring the program and seeking answers to questions raised at last year's hearing. Even though we are into yet another year of budget requests, the information we have requested has been slowly materializing. We hope this hearing will accelerate the receiving of those answers.

Our questions are focused, today, on four central concepts associated with the CALFED Program: water supply, financing, evaluation of progress, and public participation. Witnesses at the hearing are expected to provide current information regarding these areas. To develop the issues more clearly, witnesses have been selected for our floor panels to address the following basic questions: one, has CALFED expanded or reduced the options available to meet future California water needs? Specifically, how are going to use the CALFED process to meet the future California urban, rural, agricultural, and environmental water needs? Has the CALFED prejudged or eliminated some water planning options? For example, on-stream storage, water reuse, water transfer, et cetera.

These issues must be addressed, immediately, for two reasons, First, the demand for water in California already exceeds water supply during drought years, and second, according to CALFED own documents and the California Department of Water Resources, by the year 2020, California will have a 3-million up to a 7-million-acre-foot-per-year shortage. If the CALFED Program does not immediately begin to address these needs through quantifiable means including on-stream storage, we will lose the valuable time necessary to prepare for this need. I'm interested in each of the members first panel providing the Subcommittee with their level of commitment regarding expanded water supplies.

Two, how does CALFED propose to pay for California's expanding water needs. Interim fundings for the common elements in the CALFED Program is being provided by Federal appropriations and California water bonds. Are the long-term solutions going to be funded by public interest groups, beneficiaries, or government financing? Also, are CALFED costs going to be borne by local communities through unintended program consequences?

In addressing these questions, I would like the second panel to provide its opinion regarding benefit-based financing. Which benefits should be paid for by public money versus user money? Should some groups' contributions be reduced based on their members limited ability to pay? And should contributing stakeholders group be credited for payments they have already made to CALFED or to other ecosystem restoration programs operating within the region.

Three, after spending hundreds of millions of dollars how does CALFED propose to determine if we are any closer to the environmental restoration which it asserts is the reason for asking for the initial funding? How do we evaluate the effectiveness of the funding we are providing? What clear and unambiguous performance standards are being adopted to determine if we are closed to success or have achieved success? Are we going to postpone any major program decision or alternative until we have the results of the early phases or are we going to agree on a basic blueprint and simply adjust it through adaptive management as we move along?

A related issue, the definition of our starting point. It's my understanding that the Early Restoration Program has not defined the baseline for determining the goals and targets for restoration activities. While there maybe a wide spectrum of views on how to create baselines, we nevertheless, must develop both an operating baseline as well as a financial baseline if we are ever to determine if we are making progress for the, literally, billions of dollars we are being asked to spend.

And four, are the affected parties of the public being given an ample opportunity to participate in the process? Have we institutionalized the process to assure that local landowners are fully appraised of potential program impacts? Have we institutionalized a process to assure that local landowners are protected from government manipulation of property values as part of a Habitat Rehabilitation Program.

I do not believe that these concerns that present insurmountable obstacles of the CALFED Program rather they represent reasonable attainable goals which should reflect the way government conducts its business. As mentioned last year, the Federal California Bay-Delta Environmental Enhancement Act coupled with California Proposition 204 advanced a partnership with potential funds of nearly $1.5 billion. It has the potential to be used to expand the water quality, enhance water quality, and restore environmental resources in the Bay-Delta. Yet, how it is administered will be a test of government's stability to transition to a smarter, more efficient, less coercive mode of operation.

I understand that the Governor and the Secretary of the Interior met yesterday and released a statement and will extend a comment period for a month while emphasizing the importance of selecting a preferred alternative. I understand it will, actually, be only a draft preferred alternative which means that it will spillover into next year, into the lapse of the new State administration. And I presume that means that it will drag on for much, if not most, of next year.

I look forward to hearing from the witnesses and will recognize at this time the gentleman from California, Mr. Miller, for his statement.

STATEMENT OF HON. GEORGE MILLER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. MILLER. Thank you, Mr. Chairman, and thank you for convening this hearing. And I appreciate an opportunity to speak today and I welcome the witnesses and others involved in the CALFED process to the hearing. And certainly, in advance of their testimony and others who will not testify, I want to thank all of them for the monumental effort they have put into this effort.

Obviously, this is a critical issue for every Californian. The most important resource to the future of our State is water, and the recommendations, and policies enunciated by CALFED will likely frame how we think about and how we use water in California for a generation or more. For all too long, California and the west, in general, has asked only whether a water development project could be built. Little regard was given to the financing of the project which, generally, was paid through enormous public subsidies. Even less concern was paid to the environmental consequences of the water diversion, massive development, and widespread irrigation that flowed from the water-policy decisions.

Over the pass 15 years, Congress has enacted important reforms to water policy affecting California including the Reclamation Reform Act, the Coordinated Operating Agreements Act, and in 1992, the Central Valley Project Improvement Act. These laws directly address issues that are the official priorities of the CALFED process, environmental restoration, promoting voluntary transfers, reduction of subsidies and other incentives to an efficient use, and promoting the integration of project operations to serve mutual goals.

Implementation of many of these components of laws has been obstructed for years by those who oppose water management, contracting flexibility, and subsidy reduction. There is, however, a growing and justified concern in California that CALFED is perilously close to repeating many of the mistakes of the past. Particularly, the top-heavy reliance and costly and controversial water project construction. CALFED's common program elements do not receive adequate consideration in the EIS and her proposed alternatives to maximize the market-oriented approaches to promote the most efficient use of water. Transfer conservation, waste water reuse, progressive pricing and groundwater management must be more aggressively implemented. With CVPIA and other statutes, we have learned that the implementing reforms on a timely basis is far more complicated than pouring concrete.

CALFED must maximize water conservation, improve management, voluntary transfers to the maximum extent possible, and if costly new construction projects are necessary, then let us be assured that this time those who desire the projects are also the ones bearing the costs of paying for them. Let us remember that a good part of the goal of CALFED is to save the Bay-Delta Ecosystem which is in the state of collapse because of the decades of massive pumping and withdrawals by State and Federal projects.

A CALFED plan that is, primarily, designed to provide even greater withdrawals to fuel the tremendous population growth in other arid regions of the State strikes me, and I have no doubt, most residents of Northern California is simply being unacceptable. More of the responsibility for managing and conserving water and the naturally arid portions of the State will have to come from residents in those areas rather than making more and more costly demands on taxpayers and residents in the northern areas of Oregon, which in themselves are growing and in need of secure water resources. The CALFED process is historic and all of California should be grateful to the extensive and difficult work already completed by the participants.

I am confident that public comments and the draft DEIS will help the CALFED participants to develop a new set of alternatives that address the full range of efficient water management resources. Let's make sure that before anyone obligates Californians to decade of debt, we have implemented, and not just promised, the operational managerial efficiencies that we know are possible with modern-water policy.

Thank you, Mr. Chairman.

Mr. DOOLITTLE. Thank you.

The opening statements of other members will be included in the hearing record, without objection, and I do have, specifically, one from Mr. Herger, who is not a member of this Committee, but who has an opening statement, and that will be included in the record as well unless there be objection. Hearing none, that's so ordered.

[The prepared statement of Mr. Herger follows:]

STATEMENT OF HON. WALLY HERGER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. Chairman, members of the Subcommittee, I appreciate the opportunity to testify about CALFED and its impact on water within the state of California.

According to projections by the Department of Water Resources, California can expect a population increase by the year 2020 equal to the populations of Arizona, Nevada, Oregon, Idaho, Wyoming, Colorado and Utah. As a result, California could experience a water deficit of at least 1.6 million acre feet during *average* water years, with the water shortfall possibly mushrooming to 7 million acre feet during *drought* years. To put this in perspective, Shasta Lake, one of the biggest reservoirs in northern California, holds only 4.6 million acre feet.

The CALFED Bay-Delta Program was created to addresss conflicts over water useage in California's Bay-Delta region. There is no question that this goal is essential and necessary to the future of California. However, a CALFED spokesman recently stated that CALFED was, quote, "Tasked to fix the bottleneck in the Delta, not solve California's water deficit." end quote. While this may be technically true, such a narrow view is dangerously self-defeating. In reality, the problem is that the Delta does not have enough water. You cannot fix the Delta or preserve its unique environment without more water.

Currently, California is home to approximately 33 million people and sustains the world's richest and most diverse agricultural industry. The state is also home to diverse populations of wildlife and native plants. None of this would be possible, however, if it were not for our ability to store water for use in the arid summer months. Of the past twelve years, seven have been droughts and the state suffered serious water shortages.

California does not have unlimited options for producing new water resources. CALFED, however, focuses on proposals by extremists within the environmental community who suggest we take water away from existing uses through additional water conservation efforts. Again, water experts at the California Department of Water Resources have noted we are quickly reaching the limits of water conservation strategies and that we will soon be hard pressed to satisfy the needs of the state's growing population. Another proposal to increase the water supply is to sink deep wells and increase the water drawn from the underground aquifer. As a third generation rancher who grew up in northern California, I can say this is one of the most extreme and impractical proposals I have ever heard. There was a time when we relied principally on groundwater to meet our water needs, but when the aquifer began to dry up and we sank our wells deeper and deeper, we were forced to install above-ground reservoirs to ensure we had enough water for summer use. We still rely on groundwater, but can only do so by supplementing with additional surface water. It would be fruital to return to past practices and further deplete our limited aquifer.

Clearly, the best solution for the Delta, and for California, is to place greater emphasis on upper watershed maintenance, and on off-stream water storage. In the past month CALFED has increased its commitment to improving the health of the upper watershed, and I commend CALFED for this action, however, none of the three potential alternatives included in CALFED's massive, 3,500 page draft environmental impact statement explicitly plans more water storage. Water storage is talked about in general terms, but you will look in vain for a map that points out where new dams and reservoirs will be built. What you will find, however, is a map that shows a peripheral canal. Not a structure to hold more water for usage, but an isolated channel designed to move northern California water south. Something is terribly wrong with this picture. This situation must be corrected and water storage, not the peripheral canal, should take precedence as the key element to fixing the Bay Delta.

In closing Mr. Chairman, until CALFED gives increased water supply the serious attention it deserves, I fear that any of the three current alternatives is destined to fail.

[The prepared statement of Mr. Radanovich follows:]

STATEMENT OF HON. GEORGE P. RADANOVICH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Thank you, Mr. Chairman, for the opportunity to convey my comments on CALFED today. The CALFED agreement, which comprises a unique multi-agency partnership that addresses ecological and water supply problems simultaneously, is of significant value to the state of California.

I, along with many members of the California congressional delegation, have worked diligently to secure Federal funding for this project. Bay-Delta was funded at $85 million in fiscal year 1998, and I fully support the fiscal year 1999 budget request of $143 million.

As a farmer in the Central Valley, and a representative of the two largest agricultural producing counties in the nation, I am extremely concerned with any action that CALFED takes with respect to the agriculture community. It is essential for our state to implement a CALFED package that includes a balanced approach, which meets water supply needs, water quality objectives, and ecosystem restoration in the Delta. As it has always been intended, CALFED must address the importance of a reliable water supply to sustain the agricultural economy in our region. Water-use efficiencies must be applied to all stockholders—agricultural, environmental and urban. Additional conveyance and storage facilities are key elements to the program and must be included in any final package.

As alternatives are discussed, the protection of private property is also a high priority of mine. Private property rights must be secured throughout the process. Furthermore, CALFED representatives or other Federal and state bureaucrats must obtain written permission from landowners when conducting surveys or other biological work on private property. Any actions that violate landowners' rights are unacceptable.

Consideration of the socioeconomic impacts of each of the alternatives is also necessary during this process. Taking agricultural land out of production will not solve California's water problems. Agriculture is a nearly $25 billion industry in California. The livelihoods of farmers and others in local communities who are dependent upon the production of farmland would be devastated in exchange for the minimal gains in environmental protection that this unwise course of action would accomplish.

While I am still evaluating my position on the various alternatives presented in the CALFED Bay-Delta Programmatic EIS/EIR, any final solution that is adopted must be equipped to handle the necessary improvements in the operation of the CVP and the State Water Project for the long-term environmental, water quality, water-use efficiency and flood protection needs for the future of the State of California.

Furthermore any final solution should include the utilization of an open-channel isolated facility. Such a facility would provide the greatest flexibility in terms of future Delta operations, without abandoning the "common pool" concept of providing benefits to municipal and industrial and agricultural users alike.

Also, CALFED decisions must be implemented in a timely manner. Certainly, concerns must be addressed, however, this is not an excuse for delays. I urge all stakeholders and government officials involved to forge ahead this year to accomplish the essential tasks necessary to complete the CALFED process.

California's water needs are best met by maximizing an "adaptive management" strategy for ecosystem restoration and water quality and efficiency improvements. Adaptive management means having the ability to quickly and easily take water to and from different places in the Delta, at different times, using various amounts. The final solution must allow for this type of "need based" management of the resource, improve conveyance capabilities, and provide for the most effective water storage opportunities.

In summary, the solution to California's water needs must include providing a reliable water supply and a healthy environment at the same time. Some in the environmental community think that CALFED is only about improving the environmental condition of the Delta and not addressing the issue of supply. That is simply not true. One cannot—and must not—be achieved without the other.

I appreciate your time Mr. Chairman, and I look forward to continuing the work of providing long-term solutions to California's water needs, through the CALFED process.

Mr. DOOLITTLE. Today's hearing has a different format, somewhat, from the other hearings that we've conducted. We did this trying to look for, perhaps, a more useful format and one that would lend itself, particularly, to the nature of this hearing. The hearing today is organized into four panels with each panel addressing one program component of CALFED. Each panelist prior to the hearing was asked to address a specific question regarding CALFED, and we will ask the entire panel to give their statements, as we normally do, and then members will alternate questioning these witnesses. I'd like to ask the first panel of witnesses, if you'd pleased come forward and remain standing. Take the oath, and then we'll begin.

Mr. Berlin, you are just going to remain where you are, but——

[Witnesses sworn.]

Mr. DOOLITTLE. Thank you. Let the record reflect each answered in the affirmative. We are very happy to have you hear today.

The first panel will address the following question: how are we going to use the CALFED process to meet the future California urban, rural, agriculture, and environmental water needs, and has the CALFED process prejudged or eliminated some water planning options, such as on-stream storage, water reuse, water transfers, et cetera?

I think you're all familiar with those three lights there, but, basically, we urge you to try and keep within the 5 minutes. At the beginning of the fifth minute, the yellow light will go on, and you don't have to stop in mid-sentence, but it's a guide when the red light comes.

Our first witness today will be Mr. Tom Berliner from the City's Attorney's Office, city of San Francisco. Mr. Berliner you are recognized for your testimony.

STATEMENT OF TOM BERLINER, CITY ATTORNEY OFFICE, SAN FRANCISCO, CALIFORNIA

Mr. BERLINER. Good afternoon, Mr. Chairman and members of the Subcommittee. My name is Thomas M. Berliner. I'm general counsel for the San Francisco Public Utilities Commission. Thank you for providing me with the opportunity to appear before you to submit this statement concerning the water supplies benefits which are expected from the CALFED Bay-Delta Program.

The San Francisco Public Utilities Commission is a retail and wholesale water supplier. We provide water to approximately 2.4 million residents of the Bay Area in a service area which extends from San Francisco through the South Bay and Silicon Valley and up the eastern side of San Francisco Bay to the city of Hayward. Service areas which abut ours include the East Bay Municipal Utility District and the Santa Clara Valley Water District, with whom we share various customers in the Silicon Valley.

I'm here today representing the Bay-Delta Urban Coalition, which is an unincorporated association of major urban California water agencies. The Coalition has been extremely active in the CALFED process, and San Francisco has been an active member of that effort as well.

The Urban Coalition has put a great deal into the success of the CALFED process. Individually and collectively, we have been working for many years to achieve a long-term solution to the Bay-Delta problems. In our view, CALFED provides the best opportunity we have seen to achieve this long sought after success. Furthermore, the failure of CALFED leads us to an unacceptable return to the insecurity of years past.

I would now like to respond to the questions you posed to this panel. As to how we are going to use the CALFED process to meet the future water needs of urban, rural, agricultural, and environmental California, four basic elements drive the CALFED process: water supply, water quality, ecosystem restoration; and system integrity. The latter focused mainly on levee stability.

From the Urban Coalition's perspective, improved reliability of water supply is essential to the maintenance of our economy. This reliability will be achieved by improving water quality and quantity, as well as restoring the ecosystem so as to reduce the conflicts between supply and environmental needs. As to water supply, CALFED will provide us with the greatest assistance in terms of improving water quality.

Urban water purveyors have made a strong commitment toward meeting their demands through a variety of sources. We are in the era of integrated resource planning efforts. Every major urban water supplier has invested substantial resources in these integrated resources plans. Components of this plan include improvements to water quality, conservation, reclamation, better use of local storage, including conjunctive use, and water transfers. Improved water quality is necessary if we are to achieve the potential of increased use of reclaimed water. Further, better quality water from the Delta will better enable water supply agencies to fully utilize lower quality water from the Colorado River or local sources.

Finally, improvement of the water transfer market is a major component of the CALFED Program. By improving Delta water quality, and access to transfers, urban supplies can be made substantially more reliable.

As to coordination with other California water planning activities, the urban water suppliers have been planning for their future for several years. As I stated previously, through integrated resource plans, urban agencies are seeking to balance their sources of supply. CALFED provides us with, yet, another opportunity to further augment these supplies. In addition to improving supply by virtue of improved water quality and increased yield, CALFED will also promote improved water management for the environment. For example, we are actively engaged in the effort to develop a sound Ecosystem Restoration Program Plan. An important component of the ERPP is adaptive management of fishery requirements. By improving the efficiency of water management for the environment, it will, hopefully, be less necessary to use water that otherwise could be used to meet consumptive needs.

Water agencies will continue with their own local planning efforts, and not rely exclusively on the CALFED process to meet their long-term needs. CALFED was not designed to meet everybody's needs, and it should not be regarded as the answer to all water-supply problems.

By coordinating local water supply efforts with the improvements expected to result from the CALFED process, we can decrease the tension between consumptive and in-stream storage uses of water. By reducing this tension, each sector will be freer to pursue those activities which are essential to its long-term security. The Urban Coalition is firmly committed to working with all interests to insure long-term supply reliability.

As to whether CALFED has prejudged or eliminated some water planning options, in our view, the CALFED process has been a remarkably inclusive. CALFED has been open to suggestions of alternatives for meeting water supply, environmental and infrastructure needs. CALFED has reviewed over 100 options and narrowed them down to the most preferred elements. It is considered the role of the water conservation, water transfers, reclamation, and potential infrastructure changes including over 40 reservoirs sites and twelve ways to move water around the State. Each idea has received a fair share of comment and scrutiny. In the end, many ideas had to be eliminated and of the three alternatives which remained, ultimately, only one will survive. It may be that the one alternative chosen will comprise a combination of the others, but in the end, we can have only a single vision for the long-term solution to the Bay-Delta.

I conclude my remarks here. Thank you.

[The prepared statement of Tom Berliner may be found at end of hearing.]

Mr. DOOLITTLE. Thank you.

Our next witness will be Mr. Bill Pauli, president of the California Farm Bureau Federation. Welcome, Mr. Pauli.

STATEMENT OF BILL PAULI, CALIFORNIA FARM BUREAU FEDERATION, SACRAMENTO, CALIFORNIA

Mr. PAULI. Thank you, Mr. Chairman, and Members of the Committee.

On behalf of the California Farm Bureau and our 75,000 members, I'm pleased to have the opportunity to appear before you. I'm a farmer over in Mendocino County and grow wine grapes and Bartlett pears.

We are committed to seeking solutions which will insure a reliable, affordable water supply for all of California. California population is projected to grow by 17 million people by the year 2020, and without prudent planning, our current water deficiencies will surely grow.

California farms provide key supplies of food and fiber, $25 billion in revenue, $12 billion in exports, and important jobs, and coveted, open space throughout our great State. The CALFED process provides an unprecedented opportunity to craft a plan to meet our State's water needs for the next 30 years. I can't stress that enough. It's to look ahead for the future and the future growth of our State, and to plan for that. Unfortunately, the CALFED plan to date falls short of this goal. Current CALFED effort is based on redirecting agriculture's two most vital resources, land and water, to satisfy other uses rather than developing reliable, and affordable water supply.

Nonetheless, we are optimistic the CALFED process can succeed. There's three critical issues for agriculture: increasing water storage; minimizing fallowing; and strengthening our water rights.

Current total use of water in California is broken down into about 46 percent for the environment, 42 percent for agriculture, and 11 percent for urban usage. And additionally, millions of acre feet of water flows out to the ocean which is available for good uses year in and year out. Instead of redirecting water from productive agricultural and urban uses, we should concentrate on fully utilizing the water that now flows to the ocean. By conserving overflows, we can increase flood protection while saving water for dry years. We need to increase the capacity of existing reservoirs, such as Lake Shasta, Millerton, Los Vaqueros and, potentially, others as well so that that water can be used for agriculture, for urbanites, for our cities, and yes, for the ecosystem.

CALFED proposes to fallow 250,000 acres of prime agricultural land which holds senior water rights. Overall, fallowing could approach 1 million acres. California agricultural land has significant, global impact. As a matter of good public and social policy, this land should not be converted and we strongly oppose such efforts. We recognize new conveyance system or reservoirs will require the retirement of some acreage, and in those cases the landowners should be compensated. And we clearly recognize the same land will be removed, but the fallowing of agricultural lands for levee setbacks, shallow water habitats and other environmental purposes should not be part of the CALFED process. The combined total, according to the EIR/EIS, could range from 396,000 acres and 914,000 acres removed. Protection of agriculture water rights is a key to the ultimate success of CALFED.

Farmers and ranchers depend on established water rights to maintain their livelihood. CALFED must assure surface and groundwater rights. Areas of origin must be protected and strengthened. Impact in those areas could be monumental. CALFED should abandon the notion that groundwater can be used in areas feeding the Delta as a future source of water for urban and environmental uses under the guise of conjunctive use.

We cannot support the continued investment of public money as long as farmers bear a disproportionate share of the burden in reaching the Delta solution. Farm Bureau supported Proposition 204 and previous Federal appropriations as a down payment to secure major improvements in the Delta water management. Unfortunately, both have been used to fallow agricultural land and set the stage to redirect agricultural water.

We continue to support the need for a long-term Delta plan, but we are losing confidence that the solution will contain meaningful steps, primarily, water storage. Fallowing will seriously hurt California agriculture and the surrounding communities. I cannot stress the amount of impact that it will have in those local communities if that land is fallowed. We tend to forget about the people in the tire shops, the cafes, the newsstands, newspapers. We cannot underestimate the impact on those people. Therefore, it is impossible for us to support continued Federal funding until we see marked improvement in the proposal.

We are discouraged, but we want to remain optimistic that CALFED will turn the corner and work toward meeting the State's long-term needs for the next 30 years, and we are confident that that can occur. The main concern for us at this point is the devil in the details which we do not understand and have not been able to get clear through.

Thank you, Mr. Chairman, and members of the Committee.

[The prepared statement of Mr. Pauli may be found at end of hearing.]

Mr. DOOLITTLE. Thank you.

The next witness will be Ms. Martha Davis, Board Member of the Mono Lake Committee Sierra Nevada Alliance. Ms. Davis, you're recognized.

STATEMENT OF MARTHA DAVIS, BOARD MEMBER, MONO LAKE COMMITTEE SIERRA NEVADA ALLIANCE

Ms. DAVIS. Thank you very much. Good afternoon Chairman Doolittle, and Members of the Subcommittee. Thank you for the invitation to speak before you today.

My name is Martha Davis. I am speaking today on behalf of the Sierra Nevada Alliance and the Mono Lake Committee. Both of these citizen's groups work on water-policy issues in California.

The primary focus of the Sierra Nevada Alliance in on watershed restoration in mountain counties. While the Mono Lake Committee works to promote conservation, recycling, and why-is-water-use programs in Southern California, I also serve as a member of the CALFED Bay-Delta Advisory Council, and on the CALFED Ecosystem Restoration Roundtable.

In summarizing my testimony this afternoon, I want to make sure that I address the two questions posed by the Subcommittee. The first question is how are going to use the CALFED process to meet future-California urban, rural, agricultural, and environmental water needs?

CALFED is addressing the State's future water needs in the context of fixing the San Francisco Bay-Delta. While it's not CALFED's goal to resolve all water issues in California, the water-use policy CALFED, ultimately, proposes to include in the final preferred alternative, especially the programs for increased conservation and water-recycling, will have a profound impact on how much water is available in the future to share between urban, rural, agricultural, and environmental water needs.

The recent developments of conservation and water-recycling programs in Southern California has already made a tremendous contribution to meeting the State's current environmental, rural, and agricultural water needs. Let me give you two examples, the city of Los Angeles. As a primary result of conservation programs implemented since 1990 in Los Angeles, the city is currently using the same amount of water as it did in the mid-1970's only now we are serving almost 1 million more people. The success of these programs have made it possible for the city of Los Angeles to protect Mono Lake, a vital resource to the rural community of Mono County, without taking water away from Northern California or the Colorado River. And that is a clear benefit to the rest of the State. Further, the city of Los Angeles believes that it can meet all of its future water needs even with all the growth projected for the region through additional conservation and recycling projects.

Second success story, the Metropolitan Water District of Southern California. At the peak of the drought of the calendar year 1990, MWD sold 2.6 million acre feet in imported water supplies. Since then, Metropolitan Water District has developed its Integrated Resources Plan, refocused its efforts on developing a more balanced mixture of local and imported water supplies, and helped the region to start to aggressively implement conservation, recycling, and groundwater management projects. The result, MWD has reduced its imported water sales down to about 1.8 million acre feet. Although this year has been wet, and I think they may go lower. Possibly as low as 1.6 million acre feet. This dramatic reduction in MWD imported water needs means there's more water available to meet the State's other environmental, urban, rural, and agricultural needs.

How much of a difference can future water-conservation and recycling make to meeting the State's needs? Let me answer with a question. How many in people in 1990 would have predicted the overwhelming success of conservation programs in Southern California. These programs have fundamentally reshaped our water demand, and there is still much more that we can, and should, be doing in Southern California. And what's been done in Southern California can be done elsewhere.

The second question posed by the Subcommittee is whether the CALFED process has prejudged or eliminated some water-planning options from the discussion? The answer is no. I don't think so. CALFED is not yet completed its planning process nor yet made a decision on the preferred alternative. Addressing the Bay-Delta problem is a huge, if not heroic, undertaking and the work of CALFED is far from finished. But I do, briefly, want to raise concerns I have been hearing about some of the information CALFED is relying upon in its evaluation of the water-planning options. These are the assumptions used in the California Water Plan, known as Bulletin 160. Bluntly, the concern is that this document has greatly overstated the future urban-demand projections and, substantially, understated the potential for conservation and opportunities to recycle water. In other words, it's been making the problem with meeting the State's future needs a bigger problem than, perhaps, it needs to be.

I reviewed Bulletin 160 with an eye toward Southern California, and I agree that the document raises some troubling issues. For example, why does Bulletin 160 assert that water demand in 1995 for the South Coast Region was in the vicinity of 4.3 million acre feet when the actual demand was in the vicinity of 3.5 million acre feet? The 800,000 acre-foot difference is more than the entire water needs of city of Los Angeles.

Why does Bulletin 160 identify over 1 million acre feet and potential conservation and water recycling projects for the South Coast Region for 2020 that only count approximately 300,000 acre feet of this water in the final water projection? And how is this information incorporated into the CALFED environmental analysis? I mean, perfectly honest, I find it troubling when I see charts that show a potential shortage of 6 million acre feet for the year 1995, which was a year that we had ample water supplies. And I understand the need to normalize the data, but my question is what is the data that those projections have been based upon.

I don't yet have the answers, but I am confident that we will find them in the context of the CALFED process.

I'll end my testimony there. Thank you.

[The prepared statement of Martha Davis may be found at end of hearing.]

Mr. DOOLITTLE. Thank you.

Our next witness is Mr. Stephen Hall with the Association of California Water Agencies. Mr. Hall.

STATEMENT OF STEPHEN HALL, ASSOCIATION OF CALIFORNIA WATER AGENCIES, SACRAMENTO, CALIFORNIA

Mr. HALL. Thank you, Mr. Chairman, and members. It's a pleasure to be here. Thanks for inviting us.

The Association represents agricultural and urban water agencies around this State that collectively deliver somewhere between 90 percent and 95 percent of the delivered water in this State. We're the folks who, actually, deliver it to the users, the homes, farms, and businesses. As you said in your opening statement, Mr. Chairman, we're here to discuss the State's water needs and what role CALFED will, and should, play in meeting those needs, and in our minds, the two are inextricably linked.

We need additional water in a growing State. A State that's going to continue to grow by all projections. And CALFED, in our view, is the best way to provide for the water for that growing State.

There's a fair amount of debate still going on. You heard Martha Davis' testimony just now. There was perspective that says the water demands are overstated and the opportunities for the so-called "soft-path methods" are understated. I think that debate will continue, but one thing is clear and that is that no single option is going to get us where we need to go with respect to water supply for the State. We're not going to get it by simply building additional reservoirs, but we're also not going to get it through more conservation. I think it's going to take a mix, and that's why we're supporting CALFED because CALFED provides the sort of mix that we think we're going to need.

At our present rate of growth, the most recent estimate are we're going to be somewhere 3 million and 7 million acre-feet short in the year 2020. Sounds a long way off. It's the planning horizon. By the time you plan it and build it, whatever it is, whether it's a new reclamation plant or new reservoir, you are going to need the water that you started planning now.

There is some question about the estimates that are being proposed by Department of Water Resources Bulletin 160, but frankly, there's no more credible study available. And although there remains debate about how much can be developed through conservation versus additional development, those are all within a reasonable range and if you look at any of them, it clearly shows that no matter whether you take the low end or the high end of the range of estimates, you're still going to need that mix.

Everybody understands in California who studied water that in decades past we met our needs through building additional reservoirs. In the last three decades, the 1970's, 1980's, and 1990's we've met our needs through, what the environmental community calls, the "soft path," conservation, reclamation, land conversion. We've got a remarkable record in that. In the urban setting in Southern California alone they've spent over $160 million, conserved nearly a million acre feet of water, enough to meet the needs of the city of Los Angeles, as Martha pointed out. In fact, I was glad she made my point for me. We've done quite a bit in the urban setting.

In the agricultural setting, the record in some ways is even more impressive. Water use in the agricultural setting through land conversion and conservation has been reduced by 4 million acre feet since 1980. Production in the meantime is increased by 50 percent. Projections are that agricultural-use will go down another 2 million acre feet over the next twenty, twenty-five years. And agricultural has invested over $2 billion—$2 billion with a b, in drip systems alone.

Urban and agricultural-water users have gone a long way in conserving. It's something we should have done and we're glad we did, but clearly, conservation alone is not the answer. It won't fix the system in the Delta which is badly broken. Today, we have conflicts between protecting fish and delivery water. It cannot be fixed with the existing system. We have drinking water quality problems that can't be fix with the existing system, and we're badly in need of additional flood control in this State. That's why we believe as a part of whatever develops, CALFED has to deliver more water for the State. We're glad that CALFED now has up to 6 million acre feet of additional storage in its plan, and we're going to stay engaged and supportive of CALFED and see that as a final plan it contains a significant amount of additional storage.

We will also, though, continue to support the so-called "soft-path methods." CALFED has as much as 4 acre feet of water through conservation for every 1 acre feet of additional yield in its projections. What that agricultural final mix looks like in terms of how much conservation and how much water supply is what CALFED will sort out over the next several months and, I think, everyone of the stakeholders here at this table, and in this room will stay engaged to try to help them get to that right mix. But the bottom line for all us—the thing that I think we all agree on though we disagree on some of the facts, is that CALFED is the best opportunity that we've had in a generation to solve the problems, reduce the conflicts, and meet our present and future water needs in this State.

CALFED must succeed and the Water Community is committed to staying engaged to make sure that it does.

Thank you.

[The prepared statement of Mr. Hall may be found at end of hearing.]

Mr. DOOLITTLE. Thank you.

For the benefit of the members, we'll probably will do a couple of rounds or so of questions here.

Mr. Pauli, are your members of the Farm Bureau, actually, actively opposing the funding in this year for CALFED?

Mr. PAULI. No. Our concern is that if we don't make progress in terms of the issue related to fallowing and make or have assurances related to additional storage, that it simply does not make sense to continue to fund the process because the process needs to include those two to be viable, and that's what we're saying. Not to cut funding, but in order to continue funding, it needs to be a well-rounded and complete program or we would not favor continuing the funding this next year.

Mr. DOOLITTLE. Are you expecting some assurances to be given at some point before final action is taken this year or are you waiting to see what happens next year in order to make that conclusion?

Mr. PAULI. Well, hopefully, as we go forward with the discussions during the summer and fall we'll receive some adequate assurance and, there again, that part is quantified, but adequate assurances that those two issues will be addressed in a way in which we can continue to proceed with the process because we all recognize how important the overall outcome of the process is.

Mr. DOOLITTLE. It's my understanding we presently have, not in this year, but on the average we presently have in an average water year a water shortage right now. Is that—anybody disagree with that?

Ms. DAVIS. I'm sorry. Do we have a shortage this year?

Mr. DOOLITTLE. Not this year, but that in an average year, we have a deficit already at least as I understand the California Department of Water Resources analysis of this. Apparently, they estimate that there's about a 1.6 million acre-foot shortage for an average water year.

Mr. HALL. I will say that we cannot reliably meet the needs of all areas of this State in an average water year today, and that there is groundwater overdraft which is, in part, indicative of water shortages.

Mr. DOOLITTLE. OK. I think we're probably get to the quantification in one of the other panels, but—I mean, if no one—does anyone dispute the assertion that we are short on the average right now?

Ms. DAVIS. I don't know how to answer the question because when I read Bulletin 160 and I try to put all the pieces together and understand how they put together their numbers, I don't know they got to the outcome they got to. I think that part of the point of the testimony I wanted to make today was the need for a good, quality answer to that question. What are the water needs of the State currently? How do we define for urban, for agriculture, for the environment the water needs so that we track through those numbers and then take a what the supplies look, and take a hard look at the match and whether there's a mismatch. I do believe there is a perception that there is a tremendous mismatch between supply and demand, but I don't think we've got the document that gives us the answer to the question.

Mr. DOOLITTLE. Well, we'll ask Mr. Potter when he comes on Panel Number 2.

Mr. HALL. Mr. Chairman, may I just make one additional comment on that.

Mr. DOOLITTLE. Yes.

Mr. HALL. Regardless of what any report says, when you have declining water tables and when you have water users who are chronically receiving 50, 60, 70 percent of what they've contracted for and are paying for, that to me strongly indicates the shortage. And that's in normal and above normal years.

Mr. DOOLITTLE. Well, that would, certainly, be an indicator of that to me as well, and I presume, CALFED believes there's a shortage or they wouldn't be proposing to fallow these hundreds of thousands of acres of prime agricultural land which, I think, is a real concern.

I am interested in seeing our water supplies increase, and Ms. Davis testified she didn't think any of the options had been foreclosed which I guess means that even on-stream storage isn't foreclosed under CALFED. Is that—anybody here disagree? Do you believe it has been foreclosed by CALFED?

OK. No disagreements so far. You all, or some of you alluded to it, but I wonder the discussion of the soft-path land is to increase conservation, and the conservation of the city of L.A. is remarkable. I think it shows what we can do with improving technology and understanding of our water systems.

But it seems to me that it might be dangerous to rely upon conservation as the main solution to our water problems because I look upon that as kind of being the emergency solution, when we run out of water or have a crisis facing us. It seems like we're giving up our response capacity if we use conservation to be the main source for additional water development. I mean, obviously, where we can conserve without impacting significantly our lifestyles, that's one thing, and that apparently has gone on in the city of Los Angeles, and in other areas, and that's very encouraging.

But there's always the option to impact our lifestyles, when necessary, in the event of a major drought or something. I would like to see our policy increase the amount of water available so that we don't have to—so that we no longer have the ability to respond in an emergency without experiencing grave, negative consequences.

Did anybody want to comment on that?

Mr. PAULI. Mr. Chairman, I think we need to focus to the future. You know, we've made tremendous strides in agriculture, tremendous strides in urban use, in terms of conservation, and being much more efficient with the water we have available. And yet, as we look forward over the next 20 to 30 years, I think Mr. Hall said, as you look forward, what are we going to do with the growth with the next 15 or 20 million people?

We agree already that there is a shortage, the magnitude of which maybe we can't quantify, but clearly, a shortage. What are we going to do for the next 15, or 20, or 30 million people who come to our State? Can we provide water for all of their needs, including recreational environmental without additional surplus or additional supplies and storage? Can we continue to take all of the water that they're going to need from conservation? At some point, I think we can only conserve so much.

Mr. DOOLITTLE. Thank you. Mr. Miller is recognized for his questions.

Mr. MILLER. Thank you, Mr. Chairman, and thank you to all of you for your testimony. This panel alone probably has given us a week's worth of questions, but we'll see if we can get it done this afternoon.

Well, let me just go to the point that's been raised here. Ms. Davis, in your testimony what you describe as discrepancies, or questions raised, I guess would be better, we don't know if they're discrepancies or not, but questions raised by Bulletin 160 of State Department Water Resources, I don't know how exhaustive your list is, at one point, the South Coast you refer to a number of times, but they're fairly substantial numbers. It looks to me like somewhere between conservation and overstatement of use. You're very close to 2 million-acre feed of water. Is that correct?

Ms. DAVIS. The first number that I refer to is for 1995, and the second was for the year 2020. So I was trying to cover both current and the future situation——

Mr. MILLER. OK, I see. I see.

Ms. DAVIS. But, when you start, there are a very large number of comments that have been submitted to the State Department of Water Resources that raise similar questions, and a substantial amount water, both looking at 1995 and 2020.

Mr. MILLER. Well, my concern would be that if the fall to 160 is as deeply integrated into the CALFED—others can respond to this later—as you suggest it is, if there are flaws there with respect to assumptions made about usage or about conservation or the future of usage and/or conservation, as you carry those into the CALFED process, it seems to me, we start a multiplier effect here, as we start extrapolating these things out to 2020, we hope that CALFED carries us more than a few years down the road.

The impact on water decisions, the impact on taxpayers can be fairly dramatic. You can take a small area here and it can be rather large out there in the future.

Ms. DAVIS. I agree. I think that everything that CALFED stands for is trying to get the best quality information pulled together so that we can make good decisions about California's water future. These questions need to be answered.

Mr. MILLER. You know, my concern is a couple of things. A little bit of this is déjà vu. I sat in this hearing room for 25 years, and I probably spent the first ten with people sitting at that table telling me that if we didn't build a thousand nuclear power plants, if we didn't bring on line X number of generations, year-after-year-after-year, this economy and this country wouldn't go. Later, we find out, that we should be growing economy and decrease your power consumption rather dramatically in this country, actually.

And now, California taxpayers are looking at $28 billion in stranded costs, because a lot of decisions were made on bad underlying assumptions. It turned out just not to be the case. And here, we're looking at whether you generate a million-acre feet of water in conservation, non-structural ways are two million-acre feet, or whether you generate it behind a large structure is a big difference to the taxpayer—very substantial difference if you're going to ask for general obligation bonds.

So, I don't know if you or Mr. Hall is quite correct here, about how you attribute this, but it seems to me that the test would be if this was the plan to build a motel, and you say, I believe my occupancy rate is 90 percent, loan me the money, but if the figures show that it's really 30 percent, you made a drastic mistake. And so the question is here, if we're going to go to the taxpayer at some point, because I think we're in agreement with what Mr. Doolittle said, that none of these options are off the table, and nobody believes they should be taken off at this point.

But we've got to start in this common-period, and I guess in the next common-period that the Governor and the Secretary have agree to, we've got to harden this information. Because at some point, we're going to go to the market, or we're going to go to the taxpayers, at minimum, if we won't go to the market. It may not fly in the market, but with unfortunately, the taxpayers, it might.

It's analogous to what goes on around here. We're arguing now over cuts, and spending, and tax-cuts. And what they're saying is they want to know you've made every effort to cut the spending, so they know what they have for tax-cuts, or before you raise taxes, you want to know that you've made every effort here.

And so, a good chunk of the questions that the chairman's asked you and other panels to respond to, this discrepancy is absolutely vital. And we're going to go to the people for a big flood control bond. They're either going to double-back on water—they ought to know that we've rung every drop of water out of this system that we can at the lower cost if that's available. Otherwise, we're going to look like the utility industry. Well, we are the utility industry. We just haven't had our turn in the de-regulated atmosphere. But, we shouldn't repeat that history, or be within coming along and asking people in 2020 to keep coughing-up money for a bond issue, and the benefits have disappeared.

That's my opening statement, Mr. Chairman.

[Laughter.]

Let me just say that I think this is absolutely fundamental. No matter how you think the end of this process comes out, if we cannot go to the public with hard figures, I think we're doing a real disservice to ourselves, in the interest of putting some stability into California's water system. But we're going to be doing a real disservice to the taxpayers who were going to be asked, apparently, under a couple of scenarios to foot most of the bill.

Thank you, Mr. Chairman.

Mr. DOOLITTLE. Thank you. Mr. Pombo is recognized.

Mr. POMBO. Thank you, Mr. Chairman.

Ms. Davis, do you believe that water needs for the future of California can be met through conservation?

Ms. DAVIS. I think the experience from Los Angeles is instructive. In 1990, when we were in the midst of litigation with the city over the protection of Mono Lake, the city insisted that it could not afford to share a single drop of water with Mono Lake. That the city's growth, water needs, and concerns about the growth of those water needs were so large, so monumental that it was not possible——

Mr. POMBO. And we—they adopted low-flow toilets, shower heads, I mean, they did it—we did it throughout all of California. We did water rationing during the drought. We did a lot of different things. But the reality is they've done all of these things to this point. They've gone after the easy conservation, and I think that, that's true with all of California; it's true with agriculture. They've done everything they could, in terms of what they could realistically do at an economically viable place.

Now, we're talking about adding 17 million—the projection–17 million people, additional land, it is going to be irrigated, all of these different factors; will conservation alone do that?

Ms. DAVIS. Well again, going back to the Mono Lake example, as a result of the conservation that has been done to-date, the city has saved more water than the entire amount of water that they divert from the Mono Lake ecosystem. And the way this city has been looking at conservation, they've linked it with solving every problem that the city is facing.

We have had problems with sewage. We have had problems with antiquated infrastructure in Watts area, South Central Los Angeles, and by investing in conservation, we're investing in our community. It's a combination of solving problems and drought-proofing our economy. So what's happened is, we've learned that conservation is not just a short-term emergency response to a drought, although there's that component of conservation, what we've learned is that if we don't conserve, if we're not building in water recycling projects, we're making ourselves economically vulnerable during droughts.

And so, what the city-council has said, their plan is to meet future growth through conservation water recycling projects.

Mr. POMBO. So their forays up into the valley to buy farmland, and transfer the water from the farmland in the valley into southern California is not real? They're not really doing that?

Ms. DAVIS. I'm not aware of LADWP with proposals to transfer water from the Central Valley.

Mr. POMBO. Well, we'll go on.

Mr. Hall, do you believe that conservation of our water in California will meet the future needs of California over the next 20 or 30 years?

Mr. HALL. No, I don't. As I said in my statement, I think conservation of water, and frankly, of other precious resources is a strongly indebted ethic in California, and that's a good thing, and that we can make additional progress. But, as I said in my statement, we have made remarkable progress in the area of conservation, and the downside to that is, that it does harden demand. The demand that remains is less flexible. And when—because it's not if, it's when—we have our next drought we will have less capacity to conserve. I think that's a risk worth running, but only if we also put together a mix of additional water supply options.

I think, we're at a point in California water, where the cost of water, both in dollars, and politically, is such that you cannot develop additional supplies, unless they make a lot of sense. I think we're at the point now, where we can go forward with a mix of additional conservation-reclamation if we include additional water supplies, and we can make it work now, and in the year 2020.

Mr. POMBO. Do you believe that any water plan for the future of California that does not realistically look at the development of new surface water resources is being realistic?

Mr. HALL. I frankly don't. I think there are other options that are easier to do, and perhaps, more affordable, conjunctive-ousting—my favorite example. But there are some things conjunctive-use can't do; flood control is one of them. You don't get much flood control benefit out of conjunctive-use as you do out of surface storage, whether it's on-stream or off.

Mr. POMBO. Mr. Pauli, agriculture has done a lot in terms of conservation over the past several years. Do you believe that there is a huge amount that they could do in the future to save water?

Mr. PAULI. Well, we'll currently continue to try to conserve water, and I think we can continue to make progress in a number of areas. But, we will reach a point at which we can no longer conserve additional water. Where that is, I'm not sure because we continue to have technology that does allow us to conserve water, but there will be a limit.

The other thing that's clearly occurring as part of the conservation effort, we're converting from one type of cropland to another type of cropland as though we've gotten some benefits there. But where the limit is, I'm not sure.

Mr. POMBO. Thank you, Mr. Chairman.

Mr. DOOLITTLE. Thank you. Mr. Dooley, you're recognized.

Mr. DOOLEY. Thank you, Mr. Chairman, and I guess first-off, I'd like to express just a little bit of frustration because some of the opening statements, and including that of Mr. Miller in that, we appear to be finding ourselves lapsing into some of the old rhetoric, and some of the old battles that got us into a position where we weren't able to find solutions. I think I, myself, was looking at this cow-fed-process as a best opportunity for us to move forward in a collaborative fashion with all the stakeholders at the table, in order to try to find some solutions.

And while I had took some exceptions to Mr. Miller's remarks, Mr. Pauli, I would say, as a farm bureau member, I also take some exception to the California Farm Bureau basically coming out, and saying that they're not going to support public funding if these two conditions aren't met. Because I think that disrupts the opportunity, or impedes the opportunity, I guess it is, for us really to try to move forward.

We're not all going to get everything we want; it's clear. And, I hope that there will be a little bit of softening of some of the rhetoric here as we move forward. Because I think, in some of the testimony, where Mr. Doolittle asked all of you to testify on whether or not the CALFED-process was prejudging. I mean, we heard in so many opening statements that it appeared that we were already making statements, in terms of prejudging, in terms, that we are looking at favoring concrete solutions over recycling and others, where we are looking over taking greater withdrawals out of the Delta over the others, and I guess, when I look at the various alternatives that you have been offering, that we're still in a process, I have trouble seeing how any of us can say that we are now at the point where we're prejudging anything, because we haven't determined what the drought process is.

I also express a little frustration over this Bulletin–160. I think it's appropriate for us to really ascertain the accuracy of this document. And, I think, that's a legitimate issue that I would hope that during the remainder, and the balance of the CALFED process, that we will continue to look at, and make our determinations of what the final draft proposals should be. But again, I think that we have to be careful that we are going to be trying to justify whatever our personal pre-judged position should be based on whether or not that is valid or not.

I guess one of the other issues that I was most concerned with, there was a statement made that there wasn't enough consideration given to market-oriented approaches, and in that reference, I think we were probably referring to transfers. I guess, Mr. Berliner, you made some reference to that. Has this issue from your perspective, been adequately addressed? Has it been taken off the table, or where are we at as we look at water transfers?

Mr. BERLINER. I don't think that water transfers have been taken off the table at all, in fact, quite the contrary. I think water transfers are one of the major issues in the CALFED process, and an area that the urban community is looking to, very favorably and quite strongly, as being available to meet some of our future needs. So, we intend to rely quite heavily on water transfers. I had ordered to move water in the areas that are water-short.

I might comment about an earlier conversation that had taken place regarding conservation. Certainly, urban areas are not going to be able to meet their future needs strictly from conservation.

Water transfers and additional yield from the system are going to be essential.

We met last week with members of the business community. There was a letter signed by 28 chief executive officers, urging the President and Governor Wilson to proceed toward a preferred alternative by the end of this year, and in their view, water transfers was one of the key components of the CALFED program, and urged that review of water transfers continue. We support that. We believe that we do need to move toward preferred alternatives, and that water transfers are a very important component. We are glad that the business community is becoming engaged in this. After all, the California economy, the business community is what that's all about, and water is a key, in part, to the survival of our economy.

So, water transfers are hugely important, but I would add a caution which is, that water is essential. It is not equivalent to buying a car, a totally free market in water is not possible. You cannot simply move water toward money. Water has to stay, in communities words, essential. And we cannot see wholesale transfer water, simply based on money alone. So, an entirely free market in water is something we would not support.

Mr. DOOLEY. Ms. Davis, I understand you're a member of the Bedock process advisory group, would your statement in terms of questioning the need for water, a need for additional water developments—excuse me, and yield, I would point out, through means other than just conservation and soft-path approaches, then, do you object to, during the CALFED process, the consideration as I think, Mr. Berliner identified that they were looking at potential infrastructure changes, including over 40 reservoir sites, and 12 ways to move water around this State, do you think that it is inappropriate for that to be considered during the CALFED process?

Ms. DAVIS. No, I do not.

Mr. DOOLEY. So, then, when we're looking in terms of the potential way we can move the process forward, and you're certainly not saying that you're not open nor should we be open to looking for additional yield that might be actually new surface or whatever water infrastructure developments are in need to increase yield?

Ms. DAVIS. I think the CALFED process has to look at all the options.

Mr. DOOLEY. All right, thank you.

Mr. DOOLITTLE. I'm going to reserve my time for now, and recognize Mr. Miller for his questions?

Mr. MILLER. Thank you, Mr. Chairman.

It would be a mistake if people suggested that these line of questioning is about whether or not an option will fill the needs of California. The whole CALFED process is to determine the range of options, and what mix of options make the most sense for the future of California. And that continues, I think, to be the mission.

The question we get to now ask, and what I characterize as a mid-term review here, and I'm not sure Lester would be happy with that because that sounds like he's going to be doing this the rest of his life. But, it's at the mid-term review, you've got to start asking and narrowing tougher and tougher questions. And, I think, some of the questions raised about the basis, that Ms. Davis had raised, about the basis for 160, and then the use of 160 in this process are very legitimate questions because they have huge ramifications for how you measure different alternatives, the cost, and the efficacy of those alternatives.

No one here is suggesting that all of our needs are going to be met with conservation. I guess maybe that could be a conclusion, but there's no evidence that that's the case so far. But, when you're picking choices you've got to start at some point, match them-up based upon the need. I have people in the financial community in the San Francisco Bay Area, from our leading banks that tell me if we had a free-market system, there would be a surplus of low-cost water available in our State; they just believe it. I've sat for hours, went through them—they were not exactly ideological travelers with me—and, when we got all done discussing this, and all the ramifications of the politics of water in California, they said, in a real-market system there would be a surplus of water available.

Now, you made a decision, Mr. Berliner, the people you represent, that we have other values in California whether it's supply for San Francisco or whether it's the future of agriculture, or what-have-you, but those decisions also come at a cost. Because if you said you're going to take agricultural water and throw it out on the free-market, it be a dramatic change in the make-up of our State. I don't know if it would be winners or losers. Because I don't know if just trading in a row-crop for a three-bedroom-two-bathroom home necessarily makes it a better State.

But, there are those who suggests, like natural gas, people like myself who fought those market forces all of those years, kept saying, just throw it out in the market, you'll have more natural gas than you know what to do with, and you'll have it at prices that people can afford. Well, for the last 10 or 12 years, they've been proven correct. I don't know if that will be proved in the long-run or not, but these questions must be asked. Because we are now getting into a different process.

We're getting into the process of selection. And so, whether or not there's a million-acre feed in conservation or two-million-acre feed, or the market can generate surpluses, or transfers can generate additional water, these are crucial questions at this stage. And, I just think that it's very important that they be asked.

Let me, on another point, Mr. Pauli, welcome and thank you for your testimony. But, let me ask you a question because—and I only ask this because I'm not clear of the accuracy of it. Somewhere in your statement, on page two, you said that your concern was about Proposition 204, and you say, "that Federal appropriations have been used in large part to follow agricultural land and set the stage to redirect agricultural water to other users." Is that accurate?

Mr. PAULI. Yes, sir, I believe so.

Mr. MILLER. I thought we were using a lot of this for some restoration projects, and a lot of fish screens so irrigation districts could continue to take water, and some other things.

Mr. PAULI. We're clearly using it for a wide range of products. I mean, there's not one simple answer to one thing that we're using it for. It's a wide range of things. Yes.

Mr. MILLER. OK, so, I guess, maybe Lester can clarify that or we can get that information for the Committee. The chairman's raise, and I think it's an important issue.

Let me just say, Mr. Dooley referred to breaking down the comedy here, the suggestion that somehow, 204 was the environmentalist money, and now somebody else is entitled to a pot of money to build structures, there's a lot of that environmental money that is there, and the reason we're here in the CALFED process is to avoid the crash of the system, so that people think that they can get, as Mr. Hall pointed out, additional yields out of this system if we shore-up the environmental structures. So, the benefits flow a number of different ways. Just as when people go to build these dams, they're going to want to tell us what great environmental structure they are, so they won't have to reimburse for the cost. These will become the biggest environmental projects in the western United States by that time.

So, I just want to make sure that we don't, "that was your money, now it's my turn." Because there's an awful lot of money there that is going to benefit a whole lot of different purposes. As I understand, some of these projects that are done in terms of watershed restoration, the fish screens, and others. I don't know that money has actually been spent to fallow land.

Mr. PAULI. Well, we clearly supported 204. Our primary concern is the fact that when you start talking about whether 600,000 or a million acres, we know there's a range there, and we don't know the exact number that's going to come out of production agriculture. We're concerned.

Mr. MILLER. Yes, but we haven't spent money. I guess what I'm trying to clarify, we haven't spent money, to date, to do that.

Mr. PAULI. No, but at some point, you'll get an opportunity to spend money for that. I mean, it says voluntary purchases or acquisitions, so you will get a chance if the program goes forward to spend that money. Somebody's going to have to pay for that land.

Mr. MILLER. All right. I'll live with that. Thank you.

Mr. DOOLITTLE. OK, Mr. Pombo.

Mr. POMBO. Thank you, Mr. Chairman.

Mr. Pauli, in terms of land that's going to be fallowed or retired from use, you stated that it would be somewhere between 400,000 and 900,000 maybe as much as one million acres of land that could possibly be retired under this plan. We know that there is a proposal here to take about 250,000 acres of land, and retire that, mostly in my district.

Just to put that in context. San Joaquin County has 467,000 acres of irrigated land. If this were to be put into place, the 250,000, about half of the irrigated land in San Joaquin County would be taken out of production. What impact would that have on the economy of San Joaquin County?

Mr. PAULI. It would clearly have a major impact, and not just in terms of the land that's removed per production, because clearly, those people in theory, are going to be compensated for the sale of their land to the restoration projects, but the people who are put out of a job, the taxes that aren't paid to the school districts or the water districts for the other community services districts, the cannery and processing facilities are not going to receive that product.

Now, I don't know what the mix would be of that 250,000 acres, but probably, a quarter of it would be tomatoes. I mean, you're talking about an awful lot of tomatoes, and those are going to mean workers who aren't going to be working at those processing facilities. There are going to be banks that aren't going to be getting paid because of the mortgages on those processing facilities. The earthquake effect is going to be felt much broader than just those farmers who receive payments for their land. It's going to have a big impact on the communities across-the-board, in terms of things we haven't even contemplated yet.

Mr. POMBO. Mr. Hall, along the same lines in talking about the retirement of land. One of the things that they go by on this report, and you mentioned six million acre-feet of water in response to a question, one of the basis that this report is going off of, is that, by retiring that land that they're going to create new water. And that water is going to be transferred either to other contractors or to environmental uses. The people that I've talked to will argue that letting those islands flood, creating the wetlands out of it, is going to use as much if not more water than irrigating it. So where is the additional water going to come from?

Mr. HALL. I don't have a ready answer for the last part of your question, though it intuitively makes sense. That, if you keep the area flooded, and divert water to flood it, you're probably not going to save much, if any, water. I will say that my membership is not in support of retiring ag-land to reallocate the water.

It is true that if we were to build a system today, we would probably set back levies, we would develop more riparian habitat in order to protect the fish, that use that system just like we do. Because the fact is today there are fish numbers declining, and because of that, they're becoming endangered, they're listed as endangered, and that, in turn, impacts on every diverter and user out of that system. It does seem clear that we're going to have to develop additional habitat along the Delta corridor, and along the Sacramento/San Joaquin corridors. I don't think we need to retire the amount of land that you all have used in your estimates, and we would not support that.

Mr. POMBO. Unfortunately, it's not my estimate. I got it out of the CALFED. I mean, if it was my estimate it wouldn't be anywhere near that high.

Mr. HALL. I understand. But the numbers that you all have discussed today, which come out of CALFED, I'll let Lester now talk about that, but we are going to need some land to develop habitat, so that, the water supplies for folks in your district, and the folks who use the system up-and-down, and as exporters, can continue to rely on that supply. Obviously, we're not interested in retiring any more land than is absolutely necessary. And, we would not support anything other than a willing seller sort-of basis.

Mr. POMBO. But the land has to be identified.

Mr. HALL. It does have to be identified, and we would, as I said before, would like to see the amount of active agriculture land that's now in production, see the amount of that converted, kept at a minimum.

Mr. POMBO. Let me ask Mr. Pauli a followup question on that. Mr. Pauli, you're a farmer. If you were looking to expand your operation, and you looked at a ranch in San Joaquin County, and it was slated for possible purchase by the State or Federal Government or by someone else to be turned into habitat, would that be a parcel that you would continue to look at or would you look elsewhere?

Mr. PAULI. No, I would not look. And the bigger problem would be is if you were interested in a piece of ground alongside of a farmer. He had two pieces. One, he said, I'm not going to commit to the program. I don't want to sell it. I want to see it stay in production agriculture. And I said, well, I'm interested in buying that. And the next day I learned that the 2,000-acre piece of ground alongside of it has a willing seller, and he's going to convert. I would not then be interested in the first piece of ground because of the impact that it's going to have on me to farm that piece of ground alongside of land that's owned by the state or the Federal Government, and the consequences of doing that.

So, we clearly do value the land, and my ability to sell it.

Mr. POMBO. So, the result would be, even though the Federal or State government has purchased the land, not bought an easement on it, they've not bought it fee-title, all they've done is put it on a map or put it in a book, like this, and said, that we want to buy that land. So the end-result is we have devalued the property.

Mr. PAULI. I believe so, yes.

Mr. POMBO. For agricultural purposes, it has less value today than it did before it was put on a map as being possible habitat for something.

Mr. PAULI. I believe it's already impacting land prices in that area, because everybody can see what's coming.

Mr. POMBO. Mr. Chairman, are we going to have the——

Mr. MILLER. I just answered your question. It's absolutely a point in for me. How would you go about this process. I mean, we know that there's going to be some riparian restoration, there's going to be some landowners that have already indicated some willingness in some of these areas. How do you go about that process? You've got to do some planning. You've got to identify it so that it passes must-do. This is an improvement.

Mr. POMBO. I've been arguing for the past couple years that they have to be very careful about the documents that they put together, because once you identify the lands that are suitable for purchase, you've impacted the value of those lands.

Mr. MILLER. Well, you know, we've had a hearing on that. I don't disagree with you that you don't be a landowner living under this kind of uncertainty. I just wonder, how do you then proceed?

Mr. POMBO. Well, with their proposal, even if you take the lower figure of 250,000-acres, I don't think there's anybody in this room who can honestly stand up and say that they're going to have enough money to buy 250,000-acres of land, and yet, they've clouded the title on that 250,000-acres of land just by saying that we are going to go out and purchase it. And there's nobody in here, George. And you know as well as I do, that they're ever going to have that money.

Mr. MILLER. But you've got to pass environmental must-do, you've got to pass a whole series of riff, they can't put in a blank. Well, you can't say, well we're going to have blank-acres of land.

So, at some point, it's what any city or country goes through with zoning or whatever. You've got to say, look, this is open for consideration, and then the process refines it down or something. Maybe it's in these processes that they decide that they should be talking about 100,000 or 200,000, whatever the figure is. But, I don't know what the option is for them. I appreciate your concern. I think it's real. I mean, in the real world, that's a problem, but I don't know what the better vehicle is.

Mr. POMBO. Mr. Chairman, are we going to have an opportunity to have another round of questions with this panel?

Mr. DOOLITTLE. Well, I would remind our members, there's three more excellent panels to go. I think we ought to try and wrap-up. Well, let's just hurry.

OK, Mr. Dooley. OK, Mr. Dooley is going to pass on his questions. I only have one or two myself. There's a lot we could talk about here, and I think that's obvious, from the way the hearing's been going on.

We have three other hearings, Mr. Pauli. There are conversions going on in agricultural land, but we're moving in some areas, more toward permanent crops, and away from the annual plantings, and it's been pointed out that in the case of going to the permanent crop, you then lose your flexibility. You absolutely have to have the water then. You don't have the option of not planting that year, or something like that. And, of course, the permanent crops use water all year long. Would you care to characterize whether this is a trend? Can we generalize, and indicate that this is going on pretty much throughout the Central Valley, or is it just in isolated areas?

Mr. PAULI. I think, I think, Mr. Chairman, there's a couple of points there. No. 1, generally, we are converting to the higher-value crops, permanent crops, and the trend there is because that's where there's still viable agriculture. It's where you can still make a profit, where some of the other crops, we haven't been able to. Certainly, that doesn't include some of the other major crops. We tended to move away from some of the livestock-type of operations, and more to the tree and vine crops. We haven't necessarily moved out of cotton or rice or some of those crops. So, we have moved to that.

No. 2: clearly, as we look ahead, you don't have the same flexibility. I mean, you can't shut those trees or vines off for a year or for 2 years during the drought. Whereas, if you were in some of the other crops, even tomatoes, as an example, and there wasn't the water available, and you didn't plant for that year, you wouldn't necessarily have the same kind of losses that you would in a permanent crop.

Mr. DOOLITTLE. It's very difficult for farmers to know what amount of water you will have, isn't it?

Mr. PAULI. Well, you know, that's why the question of assurances and reliability become so fundamental in this process. And, that's why we continue to stress that one of the things, I think for all water-users, whether you're an urban water district or whether you're a small, rural agricultural water district, assurances and reliability so that your customers, your members in making their commitments, whether it's to a sub-division in homes, or a school, or a hospital, or whether it's to a processing facility, or 100-acres of almonds, that you're going to have assurance and reliability of that water in order to make that investment. So assurance and reliability are absolutely fundamental in this whole process so that we know where we are, and what kind of commitments we'll have for water.

Mr. DOOLITTLE. Well, do you see CALFED moving in a positive direction with reference to assurance and reliability?

Mr. PAULI. Well, I think that we're all hopeful. And I know that Mr. Dooley said that he was concerned about my comments. I reiterate the fact, that we have stayed at the table. We've continued to participate in the discussions. We're still optimistic that something can work out, but at some point the rubber meets the road, in terms of assurances and reliabilities, and not having the million acres of following. And if the plan ultimately comes out to be extensive volume, we're clearly going to oppose it.

We want it to work. We hope it will work. We need assurances. We need reliability. We need a plan in California that deals not only now, but into the future for all Californians, and all water-users, and for the ecosystems for the fish, and for everything else. And that's what this process is about, a plan that works for everybody, that we all get better together with. We simply don't remove a million-acres of production from California agriculture as the solution. That, we will absolutely oppose.

Mr. DOOLITTLE. Thank you.

Thank you to all the members of the panel for appearing for your testimony. There are further questions. I know Mr. Pombo has some. I'm sure probably all of us have further questions that we will submit in writing, and we'd urge you to respond expeditiously to those questions.

With that, we'll excuse the first panel, and ask the second panel to come forward.

Mr. HALL. Mr. Chairman, with your permission, the issue of water transfers came up earlier in the discussion, we have recently written a rather extensive letter on this subject. I'd like to attach it to my testimony for the record.

Mr. DOOLITTLE. Thank you, without objection, that will be entered in the record as well.

[The information referred to follows:]

ACWA

May 7, 1998

Mr. Gene Voiland, CEO
Aera Energy
5060 California Avenue
Bakersfield, CA 93309

Dear Gene:

ACWA's mission is to assist its members in promoting the development, management and reasonable beneficial use of good quality water at the lowest practical cost in an environmentally balanced manner.

In your leadership role with the California Chamber of Commerce Water Task Force and because of the ongoing interest in water transfers as a central means to shape water policies for California, you have asked me to provide some insight into the water community's perspective on the role transfers can and should play in addressing Bay Delta problems. In responding, I wanted to be reflective of a cross-section of the water community, so the individuals on the attached list have all reviewed this letter.

Those in the water community who are working most directly on CALFED and Bay Delta problems agree that voluntary transfers (with consent by the water rights holder) will play an important role in solving California's water problems, including those in the Delta and on the Colorado River. Toward that end several people in the water community met this week with business leaders to discuss the issue of water transfers and legislation to promote a more active water market.

It should be noted, short term transfers already play an important and useful role in meeting water supply and environmental needs. There have been literally hundreds of little noticed but important transfers and exchanges occurring each year for many years. In higher visibility situations such as the drought years of 1991, 1992 and 1994, the state drought water bank worked effectively to meet critical needs in both the urban and agricultural sectors. We expect these types of transfers to expand in the future and we want to ensure that modifications to water transfer policy do not inhibit that expansion.

There are also longer term transfers such as the deal struck between Imperial Irrigation District and Metropolitan Water District in 1988 which provided conservation dollars for Imperial Valley and additional

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water supplies for Metropolitan Water District's service area. The Monterey agreement on the State Water Project provided a package of benefits for both agricultural and urban contractors including the creation of a market for the permanent transfer of over 138,000 acre/feet of entitlement from agricultural to urban uses. Westlands Water District and Santa Clara Valley Water District recently completed an agreement on a very substantial exchange of water.

There are other transfer arrangements under negotiation that will provide additional benefits. The agreement whereby Imperial Irrigation District will sell water conserved through on-farm improvements to the San Diego County Water Authority will help California meet its commitments to stay within its Colorado River entitlement. That deal will be one of the linchpins in California's so called 4.4 plan and will trigger other beneficial projects such as additional groundwater storage along California's Colorado River Aqueduct. The implementation of the proposed Vernalis Adaptive Management Program on the San Joaquin River will involve agriculture to environmental transfers. This is in addition to the annual transfers of water from agricultural water districts to meet instream flow needs for fish and wildlife refuges authorized by the 1992 Central Valley Project Improvement Act.

Though there are vast differences in the examples I heve given, and they are not without controversy, there is broad conceptual support for these kinds of arrangements within the water community and we are looking for more to support. Water managers and many in agriculture communities have come a long way in a short period of time in accepting and even embracing water transfers as a necessary (and beneficial) aspect of water management in California. The question is how to responsibly promote transfers so that they continue and meet their potential as a water management tool.

There are some who believe that water transfer legislation is needed in order to create a more open market for water that would send prompt and accurate signals as to where water is most needed, and that those same market forces would identify any problems in the water supply system, whether they be in the Delta or elsewhere. They also believe those same market forces would provide the funding necessary to pay for fixing those system problems. Fred Cannon's recent letter to Secretary of State Bill Jones does a good job of explaining that point of view. Others point out that we live in a society that is driven by a free market but which also recognizes market forces cannot solve all problems. By way of example we include a letter written by Alex Hildebrand, a long time Delta farmer and water activist, to Sunne Wright McPeak on that subject.

We believe that the best models for developing solutions to complex resource problems like those we face with water are those that include both a sound planning effort (like CALFED) and mechanisms to provide appropriate incentives and disincentive like market forces can provide. That is why we support water transfers and CALFED. It is why I believe CALFED's solution must include a balanced integrated package with an array of water management tools including water conservation, recycling, ecosystem restoration, watershed management, new storage projects, improved trans-delta conveyance and water transfers.

Toward that end, it is probably timely to have a full discussion of water transfers. However, any such discussion must address the very real constraints on water transfers and the market that would promote them.

One of the most important of these constraints is the real physical limits that exist today in the Delta because of a lack of pumping capacity and facilities to move the water to be transferred. Most of the larger and more active customers for transferred water are those that are dependent upon the State Water Project and the Central Valley Project, both of which divert water from the South Delta. Export capacity has dramatically diminished in recent years as measures to protect endangered species have significantly reduced the windows of time in which export pumps can operate. The net effect of this reduced pumping capacity is the loss of a substantial portion of the water that has been sold under contract, and which is being paid for, even though it is often not delivered.

The closure of pumping windows is directly attributable to actions taken under the federal Endangered Species Act to protect two species of fish that are listed as endangered. There are currently three additional species proposed for listing. Without changing the way water is moved across the Delta and pumped for export, there is little opportunity to improve the existing pumping regime. In fact, the situation is liable to get worse as additional species move from candidate status to endangered.

Under such conditions, it is not only appropriate, it is prescribed by law that transferred water takes a second priority to water being delivered to those purchasing water under contract with the State and Federal projects. Those that are currently purchasing contract water could not reasonably be expected to tolerate transferred water taking a higher priority. So, even if a transfer deal is made, if the water has to be moved across the Delta, the odds against the transfer succeeding are long.

There are other problems that need to be solved before a transfer market can meet its potential. The Delta supplies all or a portion of drinking water to two-thirds of the State's homes and businesses, and it is not currently a reliable source of high quality water. The combination of dissolved organic material from farm and urban runoff and seawater induced bromides creates very poor water quality. The process of disinfecting that water creates byproducts that have been linked to cancer and birth defects. New federal standards are expected to further limit treatment options. This is a serious problem, and in order for urban California to depend on the Delta watershed for suitable quality water there will have to be a sound technical solution.

In summary, there is a very real, clearly identified, physical constraint on transfers from the Delta that we believe must be remedied before transfers can be expanded to any significant degree. The combination of improved Delta conveyance and additional storage would greatly improve if not eliminate this problem altogether. Conversely, if the physical constraints on transfers through the Delta are not solved, no amount of institutional or legal change will fix the problem. In market terms, there is the potential for sales, but today we can not get the goods to the buyers at the quality or with the certainty they need.

Another significant constraint on transfers is the length of time needed to acquire the necessary regulatory approvals in order to execute a transfer. These delays are frustrating to the buyers and sellers and there has been considerable talk about streamlining the regulatory process. However there is a real question about how much streamlining can be done without eliminating the safeguards that now protect a wide variety of third party interests. We would be happy to work with you and others to develop streamlining opportunities, since many in the water community would like to see a more expeditious approval process. For instance, regulatory agencies are required by law to encourage and facilitate transfers but too often their actions serve to obstruct them.

One of the options to expedite transfers that deserves further discussion is the formation of a water exchange which buyers and sellers could use as a market place and as a means to help move transfers along more quickly. We are particularly interested in discussing this possibility.

Finally, we are convinced that any significant effort to promote a water market or other mechanisms promoting transfers should be closely coordinated with CALFED, both because of the need to address the physical and institutional problems described above and because we believe it would be a mistake to view water transfers or a water market as a solution separate and apart from the other elements of a balanced CALFED package. We acknowledge the point made by some that a water market would lead to development of the other CALFED elements; however, CALFED is addressing a system which is largely owned and operated by State and Federal governments, not local or private interests, and it seems unlikely that those governments will relinquish either their regulatory or operational responsibilities in the Delta, or that they would adopt a stand alone market driven approach to solving environmental, regulatory and operational problems.

In conclusion, we support water transfers as part of a balanced package. We are prepared to work with the business community on both short and long term transfer issues.

Based on our discussion with Bay area business leaders on a short term transfers (2 years or less) bill, we are concerned about whether such a bill can be kept simple and non-controversial. Therefore, we are asking that the business community develop a proposal, and that we have a follow-up meeting as soon as that is ready for discussion. I have been asked by a broad cross-section of urban and agricultural representatives to coordinate this meeting with the business community. I will be in touch with you and others to schedule that meeting.

Sincerely,

Stephen K. Hall
Executive Director

Enclosure

cc: Honorable Jim Costa
Honorable Bill Jones
Honorable Mike Machado
Fred Cannon, Bank of America
Sunne McPeak, Bay Area Council
Bill Pauli, California Farm Bureau Federation
Richard M. Rosenberg, Bank of America
Lester Snow, CALFED
Allan Zaremberg, California Chamber of Commerce

Tom Berliner - City and County of San Francisco

Wally Bishop - Contra Costa Water District

Byron Buck - California Urban Water Agencies

Tom Clark - Kern County Water Agency

Jim Fiedler - Santa Clara Valley Water District

Rich Golb - Northern California Water Association

Mike Hardesty - Reclamation District No. 2068

Tom Hurlbutt - Tulare Lake Basin Water Storage District

Randy Kanouse - East Bay Municipal Utilities District

Dan Nelson - San Luis & Delta-Mendota Water Authority

Dave Orth - Westlands Water District

Jason Peltier - Central Valley Project Water Association

Tim Quinn - Metropolitan Water District of Southern California

Allen Short - Modesto Irrigation District

March 24, 1988

How Can a Water Market Best Serve California?
by Alex Hildebrand

__Introduction__

The application of market forces can be a very effective way to achieve a balance between supply and demand, and to stimulate efficient use of limited resources. However, broad social interests often require that market forces operate within boundaries designed to protect interrelations and social interests that are not price responsive. This is particularly true of limited, socially essential resources. Market forces don't typically protect public interests such as the environment, or public health, or the social interest in allocating and segregating land use among parks, residential use, heavy industry, and the production of food. There are also problems when there is a long time lag between the time that a predictable shortage of an essential commodity such as food is reflected in a price rise and the time it takes either to increase supply or adapt to the shortage when it occurs.

The use of water involves an unusually complex mix of these price responsive and non-price responsive social values. The complexities include interrelations among consumptive water use, instream public trust needs, other non-consumptive water uses such as for power generation, water application efficiency which sometimes affects total water supply and sometimes does not, dedicated land use and the water supply associated with that land use, etc. Consequently it is important that great care be taken in deciding where the use of water marketing can appropriately be facilitated and where it can only be done with care, or not at all. This is essential in order to protect third party interests and social interests that can not be protected by market forces at least in a socially acceptable time frame.

The purpose of this memorandum is to discuss the situations (a) in which marketing is most likely to be socially beneficial and can be facilitated without extensive oversight, (b) those situations where substantial analysis and oversight is needed to assure that the buyer and seller don't profit at the expense of other interests, and (c) those situations wherein reallocations of time, place, and purpose of use of water can not occur without significant detriment to other important short or long term social interests. Let us first examine different interrelations and limitations, and then consider what mix of facilitation versus oversight and prohibition will best meet the broad, long term social interests.

<u>Transfers that rarely cause problems</u>

There is a long history of beneficial, short term water exchanges and sales among agricultural water users within a basin or within an export service area. The oversight by local districts, and the sensitivity of the water exchangers to impacts on their own rural interests typically provide adequate oversight. There may be similar opportunities among urban interests.

Transfers of water for any purpose typically cause little disruption if the water derives from an increase in the overall yield of a watershed; i.e., it is water that is not already serving beneficial uses. However, areas of origin may need to be given first call on that water.

Water can be made available for transfer by a quantified, monitored and assured reduction in consumptive use by the seller. In this case the assurance is only realistic if there is oversight by a competent neutral entity. These sales can involve changes in place and purpose of use. However, as discussed later, substantial cumulative reallocations of water from the production of food to environmental and urban uses can have serious long term social consequences as the population grows.

<u>Applied versus consumptive use of water</u>

In some situations increases in water application efficiency increase the overall availability of water, but in other cases it does not. If a toilet is flushed in San Francisco, the water is lost to the ocean. If a toilet is flushed in Sacramento the water is treated and returned to the river system for reuse. Low flush toilets in San Francisco, therefore, save water. Low flush toilets in Sacramento save pumping and treating costs but don't save water.

Similarly, increases in agricultural water application efficiency can save distribution costs but only save water for overall beneficial use when excess applied water drains to the ocean or the Salton Sea. In the Central Valley almost all excess applied water is reused either by direct return to the stream system, or by recharging groundwater basins. Recharged groundwater is then pumped for reuse, and some of it percolates into streams during low river stages. All groundwater is derived from percolated surface water.

It is fairly obvious that if water is pumped and sold from a fully utilized or overdrafted groundwater basin, the sale causes or exacerbates increased costs and decreased water availability for other pumpers overlying the groundwater basin. The same is true of a fully utilized or overcommitted watershed. The entire developed water supply is already being beneficially used most of the time in the San Joaquin watershed and part of the time in the entire Central Valley watershed.

All available water at these times is either consumed in the valley (primarily for the production of food and fiber, and for wildlife refuges, etc.) or it is committed for existing exports, or it is needed to comply with mandated minimum Delta outflow. At these times tributary diverters can still capture and sell water that is beyond their own needs. However, that excess captured water is already being beneficially used downstream for the above purposes in the absence of the sale. If water is captured at these times and is sold for new exports, new outflow, or new in-valley consumptive uses (e.g., new wetlands) existing uses of water are inevitably impacted. This is less obvious but just as real as what happens when water is sold from a fully utilized groundwater basin.

To understand this it is necessary also to understand how crops and other plants use water. A given variety of plant in a given climate must draw up a rather fixed amount of water through its roots and evaporate it through its leaves in order to grow a pound of biomass. Drip irrigation can increase a plant's ability to produce biomass, but it does so by increasing the plant's ability to consume water. If more water is applied than the plant can use for biomass growth it does not consume it. The excess water then percolates or flows to groundwater or surface waters where it can be reused unless it flows to the ocean or another body of surface or groundwater that is too salty for plant use.

Water salinity versus water use efficiency

Plants can not use 100% of the water that is applied to the ground and percolated within reach of their root systems. All natural waters contain varying amounts and kinds of salt. The weathering of soils and streambeds results in substantial releases of salt. Furthermore, waterfowl, wildlife, decaying vegetation, cities and farms all unavoidably add to the salt load. Plants' osmotic root systems draw up water and leave most of this salt behind in the soil. If this residual salt results in a rise in salt concentration in the root zone above a threshold level, the root system can no longer function. Some plants (like cotton, wheat and tumbleweed) can tolerate more salt than most fruit and vegetable crops. However, in all cases excess water beyond what is consumed must be applied to flush salts from the root zone. There is a common notion that 100% efficiency is not achieved if any water is applied beyond what is consumed. This disregards the fact that applied water must over time also provide this flushing water. Expensive water application systems like drip can minimize the applied water that misses the root system and can somewhat reduce surface evaporation but can not avoid the annual flushing requirement which varies with the salinity of the applied water.

Salt must also be flushed from each watershed to the ocean. Historically, civilizations have died because failure to do so destroyed the food supply. In the long term, failure to flush salt from a watershed (such as the San Joaquin Valley) is no more realistic than decreeing that residents of San Francisco must use privies instead of flush toilets.

Water appurtenant to dedicated or existing land use

Lands have been dedicated to agricultural use through county zoning, the Williamson Act, farmland trusts, open space easements, etc. Other farm lands are supporting large populations of wildlife and waterfowl, such as rice lands in the Sacramento Valley and Delta corn lands. If owners of these lands are encouraged to sell their water these dedications and environmental uses will be frustrated.

Reliability

There is a tendency to believe that water supply reliability is important to urban areas but not for the production of food and fiber. Farms and cities that can increase groundwater pumping during a drought can decrease their use of surface water at those times. However, when this results in long term groundwater overdraft, that flexibility is gradually lost. Farming is a business and can not survive intermittent operation any better than other manufacturing industries. Labor, supplies, agricultural service industries, food processors, payments on debt, etc. can not just be turned off and on.

Shifts in time of stream flow

When power dams are authorized it is understood that they will not consume water, but will capture winter flows and release them downstream in the summer when power demands are high. This is also a time of greater downstream need. If the purpose of these dams is changed by purchase, or otherwise, and they are used to increase spring and fall fish flows, the downstream summer flows needed for existing beneficial uses is frustrated. Purchase of power dams for this purpose are being proposed. We also already have time of release shifts wherein power producers are paid to produce power at an uneconomic time in order to shift power releases from the time of downstream summer needs to spring and fall fish flows.

Cumulative long term impacts on the food supply

Bulletin 160-98 postulates that there will only be a modest decrease in future per capita use of urban water and that the future urban supply must then be that per capita demand times the forecasted future population. The Bulletin does not similarly estimate the per capita water supply needed to grow a nutritious food supply and then multiply that by the future population. If there is a loss of sustainable groundwater supply coupled with both the forecasted population growth and transfers of water from agriculture to other uses, the per capita supply of water to grow food will be less than half of its present level in less than three decades. Refer to my attached March 14 letter to Deputy Director Ray Hart of the Department of Water Resources.

<u>Notice and analyses of transfers</u>

Analyses of the potential impacts and consequences of some of the above types of transfers is beyond both the competence and the self interest of most sellers and buyers. In fashioning the boundaries that should be placed on market forces it is necessary that (a) potentially impacted parties are identified and notified with a clear description of the proposal, and (b) a method is provided for a competent, financed, neutral entity to analyze complex and cumulative potential impacts of proposed transfers, and (c) a method is provided for a competent, neutral, financed, oversight entity with the power to enforce compliance with boundary conditions. The degree of oversight required can be less for a one season transfer because of the relatively reliable forecast of current water year supply and conditions as compared to a longer period.

<u>Summary</u>

It is hoped that this memo will assist by first leading to a discussion of issues of doubt or disagreement. Boundary conditions should then be devised that will facilitate utilization of the benefits of market forces without leading to transfers that would not be in the long term social interest.

Attachment: 3/14/98 letter to Ray Hart

Mr. DOOLITTLE. If members of our second panel will remain standing for the oath, the three members, panel No. 2. OK, if you gentlemen will please raise your right hands.

[Witness sworn.]

Let the record reflect that each answered in the affirmative.

Thank you. Thank you for coming, and please take a seat. Let's see. Let's focus on our questions from earlier. The second panel, we've asked to address the following questions: one, how are the future needs of California identified through the CALFED process going to be financed; two, since interim funding for the common elements in the CALFED has been provided by Federal authorization, and the California water bonds, are the long-term solutions going to be funded by public-interest groups, by beneficiaries, or by government financing, and three, are CALFED costs going to be born by local communities through unintended program consequences?

Our first witness, Mr. Robert Potter, chief deputy director of the Department of Water Resources, the State of California. Mr. Potter, you're recognized.

STATEMENT OF ROBERT POTTER, CHIEF DEPUTY DIRECTOR, DEPARTMENT OF WATER RESOURCES, STATE OF CALIFORNIA

Mr. POTTER. Thank you, Chairman Doolittle, and members of the Subcommittee.

My name is Robert Potter. I am the chief deputy director of Department of Water Resources. The department operates and maintains the State water project, and develops and updates the California Water Plan. In addition, I serve as the Department's representative on the CALFED policy group.

It really is too soon to get too specific about how we finance the CALFED program, given that we have not arrived yet at a preferred alternative, nor agreed on a plan for implementation. However, it's an appropriate time to start thinking seriously about some of the things that ought to go into whatever the financing plan is. And there's some things that stand out in my mind.

There is some background that I think we ought to consider when we decide how to fund this program. The CVPIA allocated 800,000-acre feet of water away from the cities and farms in California to the environment. The 1994 Delta Accord allocated an additional million-acre feet of water away from cities and farms into the environment. And thus far, there's been essentially no recovery or compensation for those reallocations.

Within the CALFED program itself, it's not clear yet, what quantity of water will be developed or how it will be allocated. Both issues are still on the table.

In terms of principles for how to arrive at equity, most people involved in the discussions and debates have some support for the concept of user-pays. Most people support the concept that the beneficiary should pay. When you look at California, we basically all use water, and we all benefit from California's healthy economy which in major part, is there because of the strong Federal and State water development programs.

Many, many years ago, the U.S. Senate developed a document that was commonly called the Green Book that presented a set of principles for identifying beneficiaries and allocating water development costs to beneficiaries. All of us spent a lot of time agonizing, maneuvering, discussing, and debating how to apply the Green Book and it served us well. But it was not a silver bullet. The CALFED package itself is certainly too complex for us to arrive at some simple formula as to how to allocate costs. The only real answer is to debate and negotiate and probably arrive at a mix of payment strategies tapping both beneficiaries and users. In the long run in most resource issues in this country, we try to arrive at equity and equity tends to drive the decision—not really economics.

In closing, I'd like to assure the Subcommittee that the Wilson Administration is strongly committed to CALFED. Governor Wilson supported Proposition 204 which provided moneys to jump start some of the environmental content of this program. Yesterday, the Governor met—this was mentioned earlier I realize, but it's worth reminding ourselves—that the Governor met yesterday with Secretary Babbitt. They agreed to a strategy for moving ahead on CALFED this year. The Governor at the same time announced that because of the healthy state of the State's economy, in his May revisions, he was able to dedicate almost another $30 million of the State's budget to the CALFED process. He, at the same time, directed $170 million to the flood control subventions in California—an area where we've fallen behind in meeting the State's obligation.

The Governor has proposed a 1998 water bond which would provide additional seed money to keep the CALFED process rolling. I would assume that eventually a larger bond or additional bonds will be required to implement the full $10 billion program that is evolving in the CALFED process.

In closing, I would like to submit for the record the Governor's letter to Chairman McDade and I'm not going to read the letter—I'd like to read two sentences from the letter. "Dear Mr. Chairman, I would like to take this opportunity to share with you California's priorities among the programs funded through the Energy and Water Development Appropriations bill. My top priority continues to be full funding for the $143.3 million requested in the President's budget as the initial Federal contribution toward the restoration of San Francisco Bay Delta." The letter goes on and identifies other priorities of the Governor's, but I thought it was important that you hear his first priority. Thank you.

[The information referred to may be found at end of hearing.]

[The prepared statement of Mr. Potter may be found at end of hearing.]

Mr. DOOLITTLE. Thank you.

Our next witness is Mr. David Yardas, senior analyst for the Environmental Defense Fund from Oak—from California. Mr. Yardas.

STATEMENT OF DAVID YARDAS, SENIOR ANALYST, ENVIRONMENTAL DEFENSE FUND, CALIFORNIA

Mr. YARDAS. Thank you, Mr. Chairman and members of the Subcommittee. I appreciate the opportunity to testify on the issue of CALFED financing. I did submit a fairly lengthy statement for the record, so I'll attempt to just touch briefly on a couple of points from that now in my oral comments and address specifically a couple of the issues that you identified up front.

Just for perspective, I want to be clear that the Environmental Defense Fund, both on its own part and working through the Bay area-based Environmental Water Caucus is—takes CALFED very seriously and is very much committed to CALFED and the consensus that was—set CALFED in motion through the Bay-Delta Accord to which we were signatory. That doesn't mean that it's easy or that we always see eye-to-eye on some of these matters as you heard on the first panel and no doubt as we'll get into on this one and those that follow. That said, my organization, in particular, views the issue of finance—that is, who is going to pay for what out of CALFED as perhaps one of the most, if not the most, fundamental issues to be addressed.

I have personally spent the—better part of the last 3 years involved in the deliberations of the BDAC Finance Work Group or subcommittee attempting to wrestle with at least two of the issues that you asked: how will future needs be financed, and what about the mix of beneficiaries versus public. How will those issues be addressed? We have struggled in attempting to come up with a consensus on how to proceed on that front. I think it is correct to say that most folks agree that a beneficiaries pays principle-based approach makes a lot of sense. We have expressed some major concerns from the very outset, however, that the fundamental problem with the benefits-based approach taken literally is that it essentially assumes a level playing field from the outset. We are mindful of the criticisms that have been made that looking backward is nothing but divisive and unproductive. On the other hand, we feel that there is a need to take an honest look at how we got to the need for a Bay-Delta Accord and a CALFED process in the first place in order to meaningfully address the important issue of finance and what defines an equitable allocation of costs.

The BDAC Finance Committee, and the CALFED Phase II draft to its credit, identifies an important question with regard to the benefits-based approach, and that is whether or not any adjustment for past impacts is appropriate prior to using the benefits-based approach. This is a matter of ongoing work in the Finance Committee discussions in particular and I know in CALFED's efforts as a whole. The Environmental Defense Fund certainly thinks that the answer is resoundingly yes—that any reasonable accounting for the prior investments and prior impacts of water development will and must acknowledge that the playing field is not level, that the important funds that have been provided or authorized to-date for ecosystem purposes are a good start but are nowhere near to the point where we've reached a quid pro quo kind of situation, as has been argued in the context of the Governor's water bond proposal, at least prior to yesterday's announcement. (I'm still trying to understand exactly what was announced yesterday and what it means for the pending water bond measure.)

But in any case, where we come out at this point, what we would recommend as a way to move forward, and the position that we've taken in the BDAC discussions can roughly be summarized as follows: That partnership funding, public and user-based funding, ought to be available to fund the common programs of CALFED pretty much across the board. We would support that. That seems like a reasonable way to proceed. However, when it comes to the more controversial issues of new dams and conveyance—large conveyance facilities through the Delta—we feel quite strongly that those should be looked at as new water projects and that they should be paid for by the beneficiaries—the direct beneficiaries, the users—who will benefit from those projects which are made necessary by all of the water development primarily that we've done in the past.

We recognize that not only water development—and particularly the State and Federal projects—can be assessed blame for the past. That's why we supported, joined with our urban, agricultural and business sector colleagues in a somewhat controversial—in our community—push for public funds to the exclusion of user mitigation funds under Proposition 204 and the Bay Delta Act. But that said, we will continue to support partnership work and recommend that funding be provided in that way for common programs, but that—I guess what it comes down and what it reflects back on is the prior panel: Somehow price really matters when it comes to how we perceive moving forward in CALFED. CALFED's about a new way of doing business, and we think that making sure that true cost-price signals accompany newly developed water is a fundamental part of the equation. I'd be happy to go into that more in a question and answer, given that my time is up. So, thank you.

[The prepared statement of Mr. Yardas may be found at end of hearing.]

Mr. DOOLITTLE. Thank you.

Our next witness is Dr. Tim Quinn, Deputy General Manager of the Metropolitan Water District of Southern California.

STATEMENT OF TIMOTHY QUINN, DEPUTY GENERAL MANAGER, METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Dr. QUINN. Thank you, Mr. Chairman, members of the Committee. Like everyone else, I very much appreciate the opportunity to present some of my views here this afternoon.

My name is Timothy Quinn. I'm Deputy General Manager of the Metropolitan Water District of Southern California. I would also point out I'm one of five panelists appearing before you today to sit on the Ecosystem Roundtable and have some responsibilities for providing advice about the expenditure of CALFED moneys.

Primarily, I am here, as Tom Berliner was, as a representative of the Bay-Delta Urban Coalition and my testimony has been reviewed by a committee, North-South, so that it would reflect a broader spectrum of interests. I would like to try to be responsive to the questions that you posed to this panel by briefly describing four key principles that the Urban Coalition believes will be important in developing a successful financing plan. They're discussed in more detail in my written submitted testimony.

The first principle is that the finance plan must be founded on a CALFED solution that generates widespread value. The concept is simple. First, create value so that you create willingness to pay amongst the people who are going to be asked to contribute financially. We believe that CALFED, for the first time in a generation, offers the opportunity to create value for the environment and for water users in California. For the environment, we're talking about moving into the 21st century and restoring health to the ecosystem through a historically unprecedented ecosystem restoration investment program. For urban California, substantial improvements are possible in the source quality of our drinking water. We see the possibility of creating a stable infrastructure upon which we will build economic prosperity in the future. For agriculture, we're talking about moving into a new era of natural resource management in the 21st century in a way that sustains and strengthens the largest agricultural economy in the Nation. Those are values that we think people are willing to pay for in California through one means or another. Just as the benefits are widespread, we are firmly convinced that the finance plan must have a diverse source of funds.

The Urban Coalition has long taken a position in favor of user fees as a primary funding source for CALFED solutions, but we also recognize that many of the benefits of a CALFED-preferred alternative are going to be broadly spread and that justifies some participation by State and Federal taxpayers. Exactly how that mix comes together, we're going to have to tackle that question over the next 6 months as we define a preferred alternative consistent with the direction that we're receiving from the Governor and from the Secretary of Interior this week.

I also would emphasize the importance of acting favorably on the appropriations request of the Clinton Administration for keeping the ecosystem restoration elements forward moving.

The second principle is that CALFED must provide benefits at the lowest possible cost. It's not enough to just look at cost allocation. We think this Committee and all others involved in this process have to look hard at the overall price tag. Quite frankly, we believe the $9–$11 billion of estimated costs is too high and the urban community is committed to working with the CALFED agencies and others to find the lowest-cost package that achieves the benefits that can be obtained through the CALFED process.

Principle three: We believe the costs should be shared consistent with the beneficiaries pays principle and that costs should be allocated in a mutually agreeable manner. The beneficiaries pays principle—it comes off the lips easily. We believe there's a lot of devil in the detail here. We are extremely concerned that an arbitrary or academic application of that principle could backfire and upset the whole process. For that reason, we're recommending that the beneficiaries pays principle be implemented to the maximum degree possible by coming up with mutually agreeable allocations of cost. We think that approach will give those who are expected to help pay a voice in defining whose benefiting and by how much. We think it will produce the best alignment of benefits and costs. In the end, it will underscore the importance of assurances to all the parties as we move forward to a preferred alternative.

The final principle—somewhat in counterpoint to the point made by Dave Yardas—is that we believe the finance plan must be based on a prospective assessment of value and not on a retrospective assignment of blame.

To be successful, CALFED has to look forward. We don't think it's possible to agree on who's responsible or who should be blamed for what problems are in the system today. More importantly, we think the debate itself is counterproductive. Blame does, we think, lead back to divisiveness and to the gridlock that CALFED gives us the opportunity to leave behind us. We would urge that financing decisions be made on the basis of prospective assessments of who's going to gain value from the implementation of a solution and who's going to help pay for that solution.

Let me close on an optimistic note. We believe there's an enormous opportunity here for creating value for California, for agricultural and urban water users and for the environment. We think that there's a lot of work to be done, but that by the time we get to the end of this year, we will have an agreeable financial plan that backs up a preferred alternative that's going to benefit California as we move into the 21st century.

[The prepared statement of Mr. Quinn may be found at end of hearing.]

Mr. DOOLITTLE. So, Dr. Quinn, you actually believe you'll have that by the end of this year?

Dr. QUINN. I think we'll have principles that define a financial plan consistent with the direction we're getting from the Governor and the Secretary of Interior. That they would like to come to some agreement on a single preferred alternative by the end of the year. I would point out that I'm known in the water community as quite an optimist.

[Laughter.]

Mr. DOOLITTLE. Thank you.

Dr. QUINN. My optimism has proven justifiable on many occasions in the past, however.

[Laughter.]

Mr. YARDAS. What we sometimes use is a slightly different term—but that amounts to the same thing.

[Laughter.]

Mr. DOOLITTLE. Mr. Potter, what's the average shortage—in an average water year—what's our shortage, according to your department?

Mr. POTTER. I believe you quoted the number earlier—that about—I don't have 160 in front of me and I don't do a very good job with numbers, but I think that number is right.

Mr. DOOLITTLE. OK. I think the figure I quoted was 1.6 approximately and in a drought year, it's 5.2 presently. So anyway——

Mr. POTTER. Those are consistent with my recollections. I don't—I didn't bring the bulletin with me.

Mr. DOOLITTLE. OK, could you check on that and verify it——

Mr. POTTER. Certainly, certainly.

Mr. DOOLITTLE. [continuing] for the Committee?

Mr. POTTER. Could I comment just a little bit on the 160 process itself?

Mr. DOOLITTLE. Yes, that's a good——

Mr. POTTER. You know, the State developed the California water plan in 1957, published it and it was adopted by our legislature. At the time it was agreed that it would be periodically updated. The Bulletin 160 series is the series in which we do those updates.

If memory serves me correctly, the first update was in the 1960's—some 35 years ago or so. I think this is either the sixth or seventh update. It's easy to go back and take a look at whether or not our crystal ball has been any good. Sometimes we're high and sometimes we're low. In the final analysis, we're guessing the future—there's an old Arab proverb to the effect that he who foretells the future lies even if he's proven correct. I mean, it's a real problem to try to look ahead. Well, we did however, have a very comprehensive process. We had a 30-member citizen advisory committee. We had a public hearing process chaired by our California Water Commission. We feel comfortable that we've done the best job we can with the facts in front of us on foretelling the future on California's water.

Mr. DOOLITTLE. I guess this is getting to the third question, but does the Wilson Administration support the fallowing of land as you've heard it described in the CALFED? I mean the estimates were from roughly 400,000 up to nearly a million acres of land?

Mr. POTTER. I'm going to try to give you two different responses to that. First, certainly it's not department policy or State policy to fallow land to make water with some exceptions. I was one of the key administrators of the Governor's 1991, 1992 and 1994 water banks. In 1991, we did fallow extensive land to make water available in the drought emergency. We paid farmers not to farm. For the farmer and the water users, it turned out to be a good experience. For some of those people that experienced third-party impacts, it wasn't such a good experience. In 1992 and 1994, we did no fallowing. I'm not saying that we wouldn't come back and fallow again in a serious drought because we might well do that. But we are still taking a tremendous amount of criticism throughout the Sacramento Valley for some of the impacts of that first water bank. There is no State policy that supports the concept of fallowing to make water available. There is a Federal CVPIA program in which the Federal Government can fallow land to provide water.

Mr. DOOLITTLE. So the State would only support that then—if I understood what you said—is an extraordinary response to an emergency?

Mr. POTTER. In any specific point and time basis—not on a permanent fallowing program.

Mr. DOOLITTLE. Not on a permanent basis?

Mr. POTTER. That's correct.

Mr. DOOLITTLE. OK.

Mr. POTTER. I should say in fairness, I think that the CALFED program has taken a bum rap on the fallowing issue. In reacting and working with their advisory council, they did some exploratory analysis and evaluations of what might happen if you fallowed a bunch of land. But they do not have in the CALFED program fallowing to generate water per se. There's nothing in there to that effect. There's some land conversion to support their environmental restoration program and there's some land—some agricultural land conversion to support some of the levee setbacks in the Sacramento/San Joaquin Delta. But there is not an item in the CALFED package to fallow land to generate water.

Mr. DOOLITTLE. Have you been with the Department for a number of—when—how long have you been with the Water Resources Department?

Mr. POTTER. If you were closer to the pen, you'd see a 40 on it——

Mr. DOOLITTLE. Forty.

Mr. POTTER. It will be 41 years in June.

Mr. DOOLITTLE. Well, do you—are you proud of what has been accomplished in those 40 years or do you feel guilt-ridden over what has happened?

[Laughter.]

Mr. POTTER. I'm certainly proud of what the Department has accomplished over the 40 years. I'd like to avoid my personal record here, if we could.

[Laughter.]

Mr. DOOLITTLE. Do you feel, Mr. Potter, that additional surface storage is going to be necessary in order to meet our present and long-term water needs in the State of California?

Mr. POTTER. Well, one of the things that I think is that the CALFED family—all 15 agencies have come to recognize as they've tried to arrive at resolving the Delta problem. That is their charge. Their charge is not to try to balance all of California's water needs in the foreseeable future, but rather to resolve the Delta problem. Just in that relatively narrow view, they have concluded that there is no escaping some additional storage if we're going to add to the water supply pie.

Mr. DOOLITTLE. OK, well my time is up. Mr. Miller, your turn.

Mr. MILLER. Thank you, Mr. Chairman. Mr. Potter, let me just say I appreciate your comments about the annual—the 5-year reviews under the process by which you—which people—the State arrived at 160. But I think on a previous panel, Ms. Davis raised some fairly concrete arithmetic questions here. That either the water usage in South coast was 4.3 or it was 3.5. There's a world of difference between those two—especially if that's what you're building a base on, you know. As she pointed out, there are reasons we want to normalize some of these figures and the process you go through. And the question of whether in the South coast region, is there really a .5 million acre feet of conservation to be developed there or is it 90,000 acre feet? There's a world of difference between those two when we start apportioning out what this plan should contain, what it should look like and who pays.

It seems to me there has to be some attempt at resolution of some of these issues. Just like, you know, sort of like people ask for good science. If there's a mistake, we ought to seek to correct it, or explain it or disavow it or whatever—however that turns out. Again, I'm not suggesting that this is all right and 160 is all wrong, but as we start to build on these determinations, I think it becomes very important as to where we stand with those.

Mr. POTTER. I certainly agree. I don't really have the information or the skills to get into detail here, but I had a couple of reactions as Martha was talking and will certainly talk more with her. But one of the things in 160 is we do two things. I mean, we do say what's possible and then we arrive at what's probable. It doesn't surprise me that there are situations where we have estimated a large potential water conservation piece and then ground into the program a smaller number because we thought that was what was going to happen.

I believe in the 160 process, we have gotten plenty of criticism in both directions in terms of our water conservation program. Because of the controversy that has been stirred recently by the bulletin, I've talked to the staff about their public hearing process—which I was not personally involved in. But they have been basically criticized in both directions. "You've got more water conservation in here than anyone can ever possibly accomplish, or hey you guys are ignoring water conservation."

If you go back to the Governor's water policy of 1992—when Governor Wilson came in, we were overwhelmed with drought. In terms of water—that's where his attention was focused for the first year. By 1992 he turned to a long-term water policy and if you look at that water policy, it is basically a policy that has a broad menu of both demand management and supply augmentation—concludes that we need to attack both menus. But says in effect that over the next few years, our focus ought to be on fixing the Delta. Fixing the Delta isn't just about meeting the State's future demands, it's also about protecting the estuary.

Mr. MILLER. Well, thank you and I just want to raise that because I think it's a point that has to be brought to some resolution—you know, in the next coming months.

Mr. Yardas, let me go back to your testimony. On page eight you describe what this combination as a public end use base relationships between ecosystem restoration, new surface, storage, conveyance facilities and so forth. Where are we—I mean—I guess—you know, earlier last month, this Committee heard from some people who were beneficiaries who said they are paying about all they can pay for water in the agricultural community. I guess, in my district, they might think that too after they built Los Vacaros. City of San Francisco can say well we're not—we're supportive of all this, but we have our stream of supply for the time being. I mean, the description of beneficiaries is going to be as difficult as apportioning the cost—it seems to me. Because some people are going to say—gee, you know that doesn't impact us. In San Diego, we're paying all we can pay down here. This recharge up there—how do you get through this thicket. I mean, that's why some people say you just turn to general obligation bonds and everything is on the calm here.

Mr. YARDAS. Well, on this point, in some ways, Dr. Quinn and I may not be so far apart in that kind of what's come out of the deliberations of the Finance Work Group is that we're going to need to figure out some way to move forward recognizing that the question of bright lines between beneficiaries will be difficult. That you have some financial and a lot of nonmarket benefits that are difficult to compare. That looking backward can be problematic whether you stop at 1992 or whether you go back a few years before that. So part of what we're trying to put forward in our recommendations and the ongoing discussions of the CALFED Work Group on finance is a forward-looking alternative. I described a current draft document at the bottom of page five and top of page six on my written statement that's currently in progress and will be the subject of review at the BDAC meeting—or at least discussion and briefing—on Thursday of this week.

From our point of view, the bottom line is that in order to move forward, the cleanest way to do it is in a sense to view the common programs as a kind of mitigation and restoration program for the existing system. Then to the degree that new projects come on-line—OK, but those ought to be user-financed. They ought to include all of the environmental and nonmarket mitigations that have not been part of our conventional water development system, that have helped to understate prices, inflating demands, over building a system relative to what would be affordable if those who—if we were really pricing the next acre foot of water at what it costs broadly defined to develop it and provide it. So did that make sense? [Laughter.]

Mr. MILLER. Yes, in this room it probably makes sense.

[Laughter.]

I'll go back around when Mr. Doolittle's done.

Mr. DOOLITTLE. I'm going to recognize Mr. Pombo who I think is right outside the door there.

Mr. MILLER. OK. Well in the interlude I would just say that, you know, it's amazing when we started putting cost-sharing on efforts here. All of a sudden the local demand for some of these projects when the Federal Government was providing 100 percent of financing, they just somehow weren't as worthwhile the next year as they were when, you know, when they had 100 percent financing. I mean, there is some market test to some of this in terms of when you're windowing out—what's in and what's out.

Mr. YARDAS. Well, I think the point you made about the comments that were made at the hearing in Fresno relating to flood waters currently being too expensive because of the environmental fees that are attached to it— I mean, that's water that's going to be available at a fraction of the cost of newly developed water that would presumably have to capture that same flood water. So, it kind of—those who are major proponents of those alternatives are inherently saying I think they're expecting someone else to pay for it—if in fact that's a viable alternative for them. In the north valley, already we have payment capacity waivers provided by the Bureau of Reclamation on the environmental fees because they're not affordable by the Bureau's calculations and policy. How do those—where does the beneficiary-based payment come into play there?

Mr. MILLER. Thank you.

Mr. DOOLITTLE. Pending Mr. Pombo's arrival. Mr. Yardas, do you recognize—it seems like we're almost talking about this system as if it never changes. But, I mean, it is an ecological system and those do change over time—don't they?

Mr. YARDAS. I think all healthy systems are dynamic. Yes.

Mr. DOOLITTLE. Well, if it is dynamic, can you tell us how could one mitigate impact caused by a dynamic system?

Mr. YARDAS. Mitigate impacts caused by a dynamic system?

Mr. DOOLITTLE. Well, or happening to a dynamic system.

Mr. YARDAS. I think that what we're trying to get at is some effort to ensure that—I mean, there are clearly costs associated with the use and development of water. There is habitat that's no longer accessible. There is water quality degradation due to pollutant runoff. There is depletion of the system itself and its implications for the mixing zone, and so on. I mean, there are lots of identifiable impacts associated with water development and use that have impacts and costs on the ecosystem.

Mr. DOOLITTLE. But those are positive, as well as negative, aren't they?

Mr. YARDAS. Which are the positives?

Mr. DOOLITTLE. Well, you'd have water available flowing down the stream that wouldn't ordinarily be there if it were just left up to nature.

Mr. YARDAS. Like the cold water releases at Shasta?

Mr. DOOLITTLE. Well, like having water available at say—to name an example close to our home in the lower American River.

Mr. YARDAS. Yes. I think any honest look at the indicators of the health of the ecosystem—whether it be the extent of habitat that remains, the amount of unfragmented habitat, the status of the populations of fish or waterfowl species—Waterfowl have improved substantially in recent years—thanks to the CVPIA, in particular—but any honest assessment would conclude that we've spiraled down pretty far, pretty quickly in the last 20 to 50 years or so. For—in large part because of the water development that's taken place. To say that the system would be exactly as it was 50 years ago—no, I wouldn't say that. But I think it would, absent water development, be substantially similar.

Mr. DOOLITTLE. But is there no positive benefit you recognize from the projects that have been built?

Mr. YARDAS. Oh, I think Central Valley agriculture is incredible. I think the California economy is amazing. There's absolutely—there are benefits associated with water development.

Mr. DOOLITTLE. So at least you'll acknowledge the human species is part of the environment.

Mr. YARDAS. Absolutely. I'm one of them and I enjoy those benefits. I don't condemn them. [Laughter.] I'm merely saying I think we ought to include the costs of our actions in the price that we pay so that we know that we're fully accounting for the impacts of our being here.

Mr. DOOLITTLE. I'm going to recognize Mr. Pombo.

Mr. POMBO. Thank you, Mr. Chairman. Mr. Potter, I want to give you an opportunity to clarify the statement you made on land conversions or land retirements. You said that there were no water benefits associated with that. That it was the position of CALFED that you weren't retiring land to create water. Just clarify your answer.

Mr. POTTER. Well, let me clarify my position for a minute if I can. I represent one agency—15 of whom run CALFED and you really ought to put this question to Lester when you get him up here. But what happened—my understanding of what happened sitting on the policy group now and not necessarily grinding the mechanics of the process—but my understanding of what happened is that the BDAC forum, the CALFED staff was asked to generate how much water could be saved by retiring some agricultural land. They threw out some big numbers—500,000 to 900,000 acres. There was sufficient reaction both within the committee itself and in the general public that that concept of retiring the land to make the water was withdrawn and is not a part of the CALFED program. There are land conversions in the program—in the environmental restoration program, and in the physical works—some of the delta levees are proposed to be straightening, some of it straightened, some of the channels widened. That sort of thing does have an adverse impact on agricultural land. Retire some agricultural land but not for the purpose of generating the water, but rather for the purpose of ecosystem restoration or having a more reliable levee.

Mr. POMBO. The low number I've heard is 250,000 acres. The high number, as you've mentioned and has been testified to, was close to a million acres. According to the CALFED document, the land necessary for facilities ecosystem restoration and water quality could range from approximately 75,000 to 140,000 acres. So the difference—even if you take the low numbers—there's an additional 100,000 acres that would be taken out of production.

Mr. POTTER. This is a copout, but I'm going to ask you to either drag Lester up here now or save this for Lester.

Mr. POMBO. Well, I'm going to ask him, too. I just—I mean, you testified——

Mr. POTTER. I'm not sufficiently informed—I'm not sufficiently familiar with the specific numbers to have this conversation. I'm not ducking. If I knew the answer, I'd provide it. I simply don't know the answer.

Mr. POMBO. I appreciate that answer and I believe that that's an honest answer. It was just in response to the Chairman's question—you said that no land was being retired to generate water and I believe that is an inaccurate statement—even if you just read CALFED's documents only.

Mr. POTTER. Just a comment. I attended a public hearing for the CALFED program in Walnut Grove the other night. There is a tremendous amount of upset and concern in the farming community in the Delta. Because they feel that the ecosystem restoration program and the levee work to some degree has them paying a much larger portion of the hit on land conversion. It's something that we're all going to have to better understand if we're going to make it through the process. I don't think that we gave—well I know that we did not give them good answers that night because we simply didn't have them, but sooner or later those questions have got to be answered.

Mr. POMBO. Well, that is a point that I will bring up with Mr. Snow later is the answers to the questions at Walnut Grove. I'm glad you had the opportunity to visit my district because all of those people make a habit of calling my office and visiting my office with their concerns about this process. To go back—and since we started on that point—I would like to go back just briefly and ask you about a development of new water sources. Just asking you simply would—do you believe that any plan that's looking at 20 or 30 years out in the future that does not realistically identify new water sources, new surface water availability is going to accurately deal with the water problems that we have in California currently and where we're going to be 20 to 30 years from now.

Mr. POTTER. I guess the short answer is no, I don't believe that. I do think though it is important to draw a distinction between meeting the overall statewide water balance. The charge—my understanding of the charge that Lester Snow has been given which is basically to arrive at sufficient knowledge and understanding to develop a program that will protect the Delta estuary. We didn't ask Lester to solve all of California's water problems. We asked him to see if he could lead us through the Delta dilemma.

Mr. POMBO. Well, I understand that Mr. Potter. But I think any plan that does not look at developing new water—surface water resources for the future—is totally inadequate in protecting the Delta. Because every time someone needs water, they stick another straw in the Delta and they suck more water out of it. I grew up out in the Delta. I can tell you——

Mr. POTTER. Me, too.

Mr. POMBO. [continuing] just as well as anybody here about the water quality problems that we have in the Delta today versus what we had 20 years ago. There's a big difference. A big part of that is that we keep sucking more and more and more water out of there and we're not developing any new water. One of my major concerns with this process is I believe that the development of new surface water resources has been given the short script in this development. We talk about all these wonderful things of retiring 1 million acres of land and creating these wetlands and doing all these things, but that's not going to be enough to deal with the future. That's not going to be enough to deal with the water quality problems that we have.

Mr. POTTER. I think CALFED has come to the same conclusion that you have. There is storage in all three of our major alternatives.

Mr. DOOLITTLE. Mr. Miller has an additional question, I understand. You're recognized for that purpose.

Mr. MILLER. Mr. Yardas, let me again—as I understand taking into account what the Governor and the Secretary—correct me, Mr. Potter, if I—they announced to extend the comment period and then come up with a draft proposal—a second draft, obviously windowing out a lot of things that you've heard here back and forth from across the State. Then there would be an additional comment period—is that correct?

Mr. POTTER. That's correct. That's correct. I wasn't there yesterday. I was on an airplane trying to get here.

Mr. MILLER. Yes. Apparently, none of us were, so we're trying to figure out what that was. But if that's correct, Mr. Yardas, let me ask you this. At some point, you decide some approach to one of these three alternatives or probably a hybrid of one of them given the comments and everything that's learned in this process. But is there a point where we start to attach when you think about the financing and the preliminary discussions—I'm going to ask all three of you actually. Is there a point where we start to attach beneficiaries to particular projects in this thing? Or are they seen as, you know, as part of the whole? If you look at the enlargement, Millerton or Montgomery, possible expansion of Los Vacaros, and what happens with the islands in the Delta, for what purposes—is that drinking water or is that agricultural water or what have you? Do we start to lock onto who the beneficiaries are here at some point? If you choose, beneficiaries pay or in combination with the public financing and then decide whether there's a go or no go—or do we just sort of attribute characteristics to these? Where's the apportionment? What's the financing committee thinking about this?

Mr. YARDAS. Well, again, it is difficult to draw bright lines between these various beneficiary groups. I mean, in some cases it's clear. If there's additional yield—I would say there is no new water to be had in the system but there may be additional yield to be developed—carried over from wet periods into dry periods. That will go someplace. That's pretty easy to track. On the other hand, water quality—a much more nebulous concept and much harder to figure out exactly what's going on. As you heard earlier, the ecosystem restoration program, there are water supply benefits very much involved in what's going on in implementation of that program right now. So, it's very difficult in most cases to define very clear lines.

I think the focus of the Finance Work Group in recent months has been to try and get beyond both the assignment of blame and the strict definition or quantification of benefits into a kind of more proactive or forward-looking approach. The gist of that is that the common programs would receive partnership funding, but that storage and conveyance would be paid for by the users of those facilities. Now that would be the recommendation that we would have. I don't think the Finance Work Group is there yet, but that's the proposal that's kind of——

Mr. MILLER. But that's the process you sort of envision—is that close to the process that you envision how to——

Dr. QUINN. Yes, that's why I'm pleased at how close it is to the process I'm envisioning. Some cost elements will be identifiable to a beneficiary. I don't think a lot of them will, but some of them will. Metropolitan recently financed an integrated resources plan where we're spending billions of dollars on a combination of investments, including reclamation, conservation, water marketing, and transportation and storage projects. What we found to be a successful approach—in some cases, there were clearly identifiable benefits which we just put right into our regular rate structure. You paid for it if you got the water delivered. In other cases, the way we approached it was to focus on what kind of a package will maximize the value for the region.

In this case, we were thinking only of southern California. Here you're thinking of a much broader geographic area. Then we started going to our member agencies as constituents—pointing out the value that they would receive from increased reclamation in Central and West Basin. Part of the value is we could downsize our capital program. Everybody saved money if we could reduce expenditures on the capital program, and we eventually came up with the Local Resources Program where all the member agencies pay $250 an acre foot to those member agencies who are able to invest in local resources. In general, for much of the financing of the IPR, we did not attempt to draw lines from one specific piece to somebody that's going to benefit. Instead, we focused people on a package that would generate value, and then worked with them to make them understand they're getting value. And eventually, people would not want to argue so much over the pennies. They were willing to stand back and look at the broader picture, and we were able to get to a successful conclusion.

I think something very much like that needs to happen here—to stand back and start focusing on a package that can create value for each of the interests throughout California. Where can you generate value and then start to generate interest and willingness to pay, which, of course, was the theme I tried to put in the Urban Coalition testimony I presented today.

Mr. MILLER. My time has run out, but there is a little bit of a difference in your answers there.

Mr. YARDAS. Well, I guess I would just say, though, where this will get difficult is in the notion that the environment needs new dams to get healthy, and we just don't agree with that. I don't know if that's part of what Tim was saying in code, or not. It's certainly part of the analysis that CALFED is doing, and we just don't believe that that's properly—that the environment needs it. Or, if there are so-called benefits ascribed to the environment, that those ought be financed by the public. Those are very much tied to water use and water development and ought to be properly financed by those who benefit directly from those facilities.

Mr. MILLER But under Tim's answer, you could have—you could ascribe those as benefits that the broader community leaves, it gets, and lay them off in that fashion.

Dr. QUINN. Let me emphasize. I'm not trying to be opaque here. We believe, not only Metropolitan, but pretty broadly in the urban community, that the future lies in a combination of investments and new infrastructure, new system capacity, including both surface storage as well as ground water storage, as well as better allocation mechanisms through more effective water markets.

We don't think the answer lies at either polar extreme. At one extreme, relying on zero percent storage and one hundred percent reallocation through the market. Or the other extreme, relying solely on new storage with no increased reliance on market forces. The urban coalition believes we need to start talking about what is the proper combination. Some of the storage that's on the table is off-stream storage that we believe could be very valuable to the environment as well as to the water users. It's not as cheap as the storage we were building 30 or 40 years ago, but it is relatively affordable. I mean, if somebody walked in my door and said I've got a deal for you—here's a block of several hundred thousand acre feet that's going to cost you $200 an acre foot for protection in dry years—I'm interested. And the fact is some of the storage that's on the table in the CALFED process meets those economic criteria. So, I stand back and I say, if you were designing the whole system yourself, what makes the most sense as an economic package? And I've changed my own views about storage. At one point, I was not interested in storage. I thought it would cost too much. The facts have changed my mind. It's very clear that storage has a legitimate place in this debate, and we think it's likely, in proper combination with the other elements, to make sense in an overall package.

Mr. MILLER. Thank you.

Mr. DOOLITTLE. So, Dr. Quinn, you would go for storage that produced water at $200 an acre foot?

Dr. QUINN. I would certainly not throw somebody out who proposed a water supply at that cost.

Mr. DOOLITTLE. Well, there. That's what you just said. What are you hedging for?

Dr. QUINN. Let me—let me—the answer——

Mr. DOOLITTLE. You just said you would go for storage. Are you standing by that statement or not?

Dr. QUINN. The answer is yes.

Mr. MILLER. If you do, it's something he wants to sell you.

[Laughter.]

Mr. DOOLITTLE. The problem is we don't have any to sell. We got to have it all for ourselves. But was it your testimony that you would go for a deal that offered you water at $200 an acre foot?

Dr. QUINN. I believe that storage—environmentally sound storage that can make water available during dry times for $200 an acre foot——

Mr. DOOLITTLE. Oh, no. I didn't hear all of that in that first statement. What do you mean environmentally sound storage?

Dr. QUINN. Well, I mean storage——

Mr. DOOLITTLE. What's an example of environmentally unsound storage?

Dr. QUINN. Well, can I turn that question around? An example of environmentally sound storage is storage that can survive the permitting process.

Mr. MILLER. Ah, you want to go through the dance?

[Laughter.]

Mr. DOOLITTLE. Well, let's just leave it at that.

[Laughter.]

The figure of $200 an acre foot, you find, as did the Metropolitan Water District of Southern California, to be an attractive price. Is that right?

Dr. QUINN. It's competitive.

Mr. MILLER. We ought not to—let's not make this a policy statement of the Met at this stage. But I think, if I might, Mr. Chairman, he was saying that if this—you say, yeah, you might be interested. There are people who would be interested in water at that rate if that could be done. You know. You show me that it's equal to——

Dr. QUINN. Just for clarification, you can't throw storage out on purely economic grounds, because it costs too much. It does not. There may be other grounds for this project or that project, but it clearly can earn its way into a lease cost program from our perspective.

Mr. DOOLITTLE. OK.

Mr. Pombo, would you like to ask some more questions. By the way, the first vote is at 5:30 p.m., and all votes are finished at 6 p.m. And we've got two more panels to go through. I'm just telling me that as well everybody else.

Mr. POMBO. No further questions, Mr. Chairman.

[Laughter.]

Mr. DOOLITTLE. You can ask one or two. That's all right.

Mr. MILLER. It's not that they weren't important.

Mr. DOOLITTLE. OK. Well, we will have those supplementary questions submit. I would like to thank the gentlemen on this panel, and we'll hold the record open for what we hope will be your prompt responses. And with that, we'll excuse you.

I'm going to propose an ad hoc change here. We're going to ask panels two—three and four to come up together to form one panel of five people.

OK, it's six people. In other words, all the members of panels three and four. Have we got them all there? OK, when you have got seats for everybody. All right. Sorry for that, but that will expedite your planes, for those who have them, and our needs here. Let me ask you. If you—let's see. We got everybody there? If you six gentlemen, there we go thank you. If you will raise right hands, please.

[Witnesses sworn.]

Thank you. Let the record reflect that each answered yes.

We appreciate your coming, and for these two panels, I'll just review the questions and you can just answer the questions you are asked to answer. OK, here's for the third panel. How do you evaluate the effectiveness of the funding we are providing? One. Two, what clear and unambiguous performance standards are being adopted to determine if we are close to success or have achieved success? And three, are we going to postpone any major program decisions or alternatives until we have the results of the early phases, or are we going to agree on a basic blueprint and simply adjust it through adaptive management, as we move along? And then, the fourth panel had one question: Is the public given ample opportunity to participate in the CAL—excuse me, two questions—CALFED process? And two, how have we institutionalized a process to ensure that local landowners are fully appraised of potential program impacts? Have we institutionalized a process to assure that local landowners are protected from government manipulation of property values as part of the habitat rehabilitation program?

With that, let's begin with Mr. Lester Snow, executive director of the CALFED Bay-Delta Program.

STATEMENT OF LESTER SNOW, EXECUTIVE DIRECTOR, CALFED BAY-DELTA PROGRAM

Mr. SNOW. Thank you, Mr. Chairman, members of the Committee.

My name is Lester Snow, executive director of the CALFED Bay-Delta Program, and my excitement to testify has grown considerably over the last couple panels, so——

[Laughter.]

I actually would like to start off with a couple clarifying points before I get to answering the specific questions because I think they're important issues.

One, I want to make it very clear that none of the proposals contained in the CALFED draft that is on the street contains ag land fallowing for the purposes of demand management or generating water supply. We have identified a number of actions that have, as a consequence, ag land conversion for the purposes of habitat restoration, water quality improvement, levy improvement, and certain water supply related facilities, but not as a demand management tool.

As a means of disclosure in our environmental document, we have estimated a maximum footprint, or a maximum impact associated with these activities; and that is approximately 380,000 acres. I do not know where a number of 1,000,000 acres of ag land impact in the CALFED Program has originated. It is not in our documentation.

Even with that maximum footprint, we are working with the communities and affected parties to avoid impact, reduce impact where it's unavoidable, and develop mitigation measures where you must proceed with some impact. But I must make it clear: We do not have ag land retirement as a water supply development strategy or a demand management strategy.

The second issue that I think is important to clarify is if we define the mission of CALFED as getting everyone to agree on 20- and 30-year projections, we will fail for two main reasons: all projections are wrong. Some are just worse than others. Getting all the parties to agree on 30-year calculations about California water issues is a lifelong career. It will not get us where we need to go. And where we need to go is developing a strategy that will allow us to manage a complex natural resource system in the face of uncertainty. If the issue was one of selecting the perfect computer model to project where we are going, we would not be here today.

Rather, the challenge is developing a package of actions that address the diverse issues and that are tied together so that you can't build a subsidized reservoir and abandon conservation and reclamation. Or you can't restore ecosystem and levies, and let water supply reliability continue to deteriorate.

The challenge is in tying the package together and not focusing on the single issues that have torn us apart in the past.

In terms of beginning that effort, we are now proceeding with ecosystem restoration, which is the critical issue before us. The issue has been raised, how you monitor and how you proceed to judge whether you are making progress, and how if—if you are making the right choices.

The approach that we are taking in the CALFED Program is twofold, and I will make reference to the briefing document that we have provided you: the tab marked "monitoring and performance standards" and the last page which is a figure one, and shows the five levels of performance measures that we've identified in the program. We've divided those into project monitoring and ecosystem monitoring.

In project monitoring, which is at the bottom of the page, there's basically two parts: implementation monitoring and effectiveness monitoring. As we begin spending money, we have implemented this stage of our monitoring program.

Implementation monitoring is straightforward. Has the project done what it was supposed to do? If they were putting in a fish screen, did they actually do it on time and on budget?

The second component of project monitoring is effectiveness monitoring? Did the fish screen allow the fish to pass? And in the example that we use move up Butte Creek to spawning in the number and at the time that's appropriate for salmon recovery?

And then we move to the issue of ecosystem monitoring. How do each of these projects, whether it's coral dam or any habitat restoration project or other screening projects in the Sacramento system, how do they cumulatively affect the overall ecosystem? We are developing indicators of ecological health, and have developed some. They provide us perspective on performance standards for overall ecosystem which lead up to an overall goal. We have developed some specific indicators that tie into the specific projects, such as counting the number of returning spawning salmon, counting the number of out migrants that go back out to the ocean, and seeing how they relate to overall salmon population levels.

Again, we have developed the project monitoring level that is being implemented on every single project that is awarded and moves out. We are developing the longer term program that will be able to provide us the assessment of the cumulative impact of each of these individuals projects in improving the overall health of the ecosystem.

Thank you.

[The prepared statement of Mr. Snow may be found at end of hearing.]

Mr. DOOLITTLE. Thank you.

The next witness is Mr. Richard Golb, the executive director of the Northern California Water Association.

Mr. Golb.

STATEMENT OF RICHARD GOLB, NORTHERN CALIFORNIA WATER ASSOCIATION

Mr. GOLB. Mr. Chairman, thank you. Members of the Subcommittee, I appreciate the opportunity to testify this afternoon.

I am Richard Golb, the executive director of the Northern California Water Association. In the interest of time, I'll summarize my remarks as briefly as a I can. I would appreciate the inclusion of my written testimony into the hearing record today.

Mr. DOOLITTLE. This is a full statement. It will be included.

Mr. GOLB. Thank you, Mr. Chairman.

At the outset, I think the simplest way to assess the question of how can we determine whether CALFED has been effective or not in allocating funds to the ecosystem is to just look at CALFED's statement of goals, objectives and principles. In terms of the definition of the program itself, the goal is to improve the environment and, at the same time, decrease regulatory mandates on water supply operations and the water projects. And from a broad level, I think if we accomplish those two goals, we have achieved a measure of success.

Now, on a more specific level, as Lester indicated, I think we can look at specific projects. For example, we can identify clearly established problems in the system, such as water diversions that harm threatened and endangered fish. If we identify those diversions that are harming fish species and we install a fish screen on that diversion, we've solved a problem in the system. And we've basically been effective in at least resolving one clearly identified problem.

At this point, there are nearly a dozen water suppliers, agricultural water districts in the Sacramento Valley, that are engaged in the study, design, or construction stages of developing a fish screen or fish passage project. Several of these projects are now complete.

For example, as Lester indicated, on Butte Creek, there's the Gary N. Brown Butte Creek Siphon Project, which Western Canal Water District just recently completed—an amazing project. The district completed the construction of a siphon to carry water supplies underneath Butte Creek, which allows spring-run salmon, now listed by the State of California and proposed for Federal listing, unimpeded access of Butte Creek. Just stop for a second and think about it. You have farmers that voluntarily participated in a cost share to remove several small dams. That's not happening in a lot of areas of the country, and I think that case clearly illustrates the benefits of these restoration projects and the effectiveness, in that we did we achieve restoration at the same time local farmers and the local community benefited through a more dependable, reliable water supply, which is a really a mutually compatible goal.

Now, in response to the performance standards that Lester is now developing, we haven't had a chance to fully assess them. When we do, we'll probably have additional comment. But I think, as you indicated Mr. Chairman, developing performance and monitoring criteria is extraordinarily difficult on a complex and dynamic ecosystem like the California's Bay Delta. It's continually changing. And, at the same time, because it's not a static process, because it's dynamic, there are factors in the entire watershed that create difficulties for us to assess. For example, wildfires in the Sierra or the Shasta watershed, drought, such as the 1986 to 1992 drought, or the 1997 floods, which was the worst flood in California history; and a flood that swept millions of juvenile salmon prematurely out to the Pacific Ocean.

Those kinds of natural effects make it extraordinarily difficult for us to determine the type of standards we should apply on whether or not the program itself has been successful.

An additional difficulty is that CALFED has ambitiously defined some of its projects as an attempt to replicate natural processes. The river meander is one. This project although, from a theoretical perspective, has great value, there are number of questions that arise from allowing the river to meander. You know, rivers are beautiful until they meander through your living room. And one of the things that we have to be very careful about is that the river meander projects are constructed in such a way that they're consistent with flood control protection.

In conclusion, I would say that I think we can accomplish some of these projects—ecosystem restoration projects—but they have to be done carefully. We've recently encouraged CALFED to focus its efforts on solving known environmental problems, like fish screens. And, at the same time, when it come to dealing with projects like the river meander to be very careful and to consider the implementation of pilot projects so that we deal with them in the right way. We complete NEPA and CEQA certification process. We have representative processes for landowners to participate, because this thing necessarily will require land acquisition along the river. And finally, I would say that the best way to look at this is, if CALFED focuses on known problems and moves the unknown solutions to a longer process of evaluation, what we'll implement ultimately is more dollars up front for restoration projects that will produce more quantifiable benefits, which I think is our goal.

So, in conclusion, we support the appropriation and would urge you to continue your focus on CALFED. It's been helpful throughout the process for all the stakeholders, ourselves included.

[The prepared statement of Mr. Golb may be found at end of hearing.]

Mr. DOOLITTLE. Thank you. Our next witness is Mr. Gary Bobker, senior analyst with the Bay Institute, San Rafael, California.

STATEMENT OF GARY BOBKER, THE BAY INSTITUTE

Mr. BOBKER. Thank you, Mr. Chairman, members of the Committee.

Like Rich, I'll try to summarize my statement and ask that the written statement be incorporated in the record.

Although I'm representing the Bay Institute here today. I also want to mention that I'm the co-chair of the Ecosystem Roundtable, and the perspective that I want to cover reflects work that I've been doing over the last few years in the Roundtable and other stakeholder processes to try and build greater consensus around ecosystem restoration and the broader water management planning process. And I think that what's amazing is the amount of success we've had in the extremely difficult and often adversarial process. We have to look at the relative amount of success, and I think it's impressive.

I think it's important to remember that in looking at the Bay Delta and California's water-related environmental problems that we have changed, altered, and assaulted the California Bay Delta and the water environment to a scale that has really has been seen in very few places in the world. And, as a result, the program that we are now contemplating through the CALFED process to correct those problems—restore the estuary, reduce the conflicts—is on a scale never before attempted. And there is no connect the dots, Cliff notes approach here. There is no easy answer to this, which is one of the reasons why it's a technically challenging, complex task. And we're going to learn as we go along. We are going to make mistakes as we implement this program. And what we have to make sure is that we learn from those mistakes, which is why elevating the issue of having monitoring—adequate monitoring regimes and performance standards is an extremely important issue. The only way we're going to learn from our mistakes is if we have a sense of where we're going. And in adaptive management, which is the sort of learning as you go approach, I think there are four key elements there. One is you've got to have sense of where you're going, define success in a measurable way with goals and objectives and indicators.

Secondly, have an implementation plan. Design a blueprint that you think, based on what you know now, will get you there.

Third, monitor how you do.

And then fourth, go back and revise your blueprint to get you back on course toward your objectives.

What I want to touch on is how is the CALFED process dealing with that kind of mid-course correction approach, both in the near-term spending that's going on with the money that Congress has provided, as well as in the longer-term planning process.

In the near-term spending process, the Roundtable—the stakeholders and the agencies involved in that process—identified what we considered to be the most urgent priorities for near-term spending, and that was to protect those endangered species that are on the brink of extinction; to reduce the most volatile conflicts in the system; and to start learning from on the ground habitat restoration. And so we identified a list of high priority endangered species. We identified a list of those kinds of habitats that we think we want to start doing demonstration projects on, so we can learn from that on the ground implementation. And then we made sure that for each of the projects that we considered funding, there was a required monitoring process. And those monitoring regimes focus on the obvious things related to the priorities we set. How are endangered species populations fairing as a result of the projects that are being funded? How is on the ground restoration working? For instance, one of the projects that is to be funded this year is gravel replenishment on the Tuolumne and Stanislaus Rivers. The priority there was the need to increase spawning habitat for fall run Chinook salmon, which are in big trouble in the San Joaquin system. There's limited spawning opportunities, so we're going to put more gravel into the system. We're going to look at how it's spread out through the stream. We're going to look at how fish use those new gravel areas. We're going to have biologists splashing around in the streams, checking all this. And then we're going to go back and figure out how to improve the gravel replenishment program so that's more effective next year and the year after and the year after.

We've also dramatically increased the funding available for a more comprehensive monitoring program, which is a cooperative effort of the Federal Government and the Interagency Ecological Program and the non-profit Estuary Institute.

In the longer-term, an independent scientific review panel took a look at the CALFED process and said, "you know, you could really stand to sharpen up some of these goals and objectives and indicators." As a result, most of the major stakeholders who are involved in the CALFED process have been working together over the last 6 to 8 months to try and identify a work plan for revising the ecosystem element, sharpening up these goals and objectives. And, in fact, I think we've made a lot of progress. We've also sponsored a number of technical workshops and conferences with the University of California to identify a comprehensive suite of ecological indicators—in other words, measures of success. I think there has been a lot of progress on that. There's a lot of work to be done, but I think we can say that we're well on the way toward a good set of indicators.

Finally—the final point I want to make addresses the last question that you posed, Mr. Chairman, and that is about this sort of either or of—do you have a blueprint or you defer decisionmaking. What I want to say is I think that might be a false dichotomy—is that if you have a good blueprint, you make appropriate decisions now and you postpone inappropriate decisions. The example that I would give is that when it comes to restoring habitat, there's pretty much widespread scientific consensus that if you restore large blocks of habitat, that is going to really work better to conserve species than most other things. And so we need to go out and start doing it. We also know that exotic species really, really can damage the ecosystem, but we really don't have a very good idea of what to do about it. And so we're going to have to defer making decisions about how to deal with exotic species until we've done more research and monitoring.

The one last point I want to make on that is that it's also important to defer making site-specific decisions about restoration. It's one thing to have a blueprint that sort of connects our plan from one county to another, from one watershed to another, but that plan is not the place to make decisions about your specific land acquisitions or fish management measures. That is something that is going to come in the more detailed planning process that's going to have to followup on CALFED.

In conclusion, the opportunity that's represented here is an enormous one. It's an exciting one, and I think that we're all committed to trying to carry through the very complex task of rising to the occasion and fleshing out where we want to go. But we cannot defer implementing it until we have it all figured out. The only way we will figure it out is by learning as we go.

Thank you.

[The prepared statement of Mr. Bobker may be found at end of hearing.]

Mr. DOOLITTLE. Thank you.

Our next witness is Dr. A. Alan Moghissi, president of the Institute for Regulatory Science, Columbia, Maryland.

Dr. Moghissi.

STATEMENT OF A. ALAN MOGHISSI, PRESIDENT, INSTITUTE FOR REGULATORY SCIENCE, COLUMBIA, MARYLAND

Dr. MOGHISSI. Thank you, Mr. Chairman.

Thank you very much for inviting me to testify before this Committee.

We in the scientific community are not used to be asked to express our voices. Normally, it's the politician or advocacy groups that appear before you. I certainly appreciate to give us a chance to speak on this very important subject.

I'm Alan Moghissi, and I'm president, as you mentioned, of the Institute for Regulatory Science. We are dedicated to the idea that societal decisions must be based on best available scientific information. I was a little confused during this couple of hours about the word environment. I had been with the Environmental Protection Agency for 20 odd years and I have been a professor for some years. I was confused how the word environment is being used. The word environment, as we defined it, consist of people—humans—and other living things supported by the atmosphere, hydrosphere, and geosphere. So when somebody says this is for the environment, I wondered which part of the environment were they talking about.

I've include my biographical summary to this statement, and I would appreciate if the entire statement would be made a part of the record.

Mr. DOOLITTLE. Yes, it will be.

Dr. MOGHISSI. I am not an ecologist. My perspective is that of a research director who had to seek funds for ecological research; a funder who had to provide money for ecological research; and a scientific journal editor who has to accept or reject papers dealing with ecological activities.

One of my most proudest time has been the sport of ecological risk assessment. The method that was developed as a result of funding that I provided at the time has become the standard method for ecological risk assessment.

The CALFED program, and I'm going to use that word describing the entire project, can be separated into two parts: its goal—the societal objective; and the scientific part that supports that objective. So, there are three questions that need to be answered: How one knows the science is acceptable? What is ecological health and how is it defined? And what—how can ecological health be measured?

The acceptability of scientific information is based on peer review. The information that was provided to me indicates that CALFED did not have a peer review program as its defined within the scientific community. Rather, it had a technical advise. Peer review implies that the person that in groups that are involved in the peer review that are having a stake in the project have no hand in the selection of reviewers and must formally respond to the recommendations of the reviewers.

My statement includes a classification of the scientific information with decreasing level of acceptability, starting from confirmed science—the laws—all the way to pseudo-science. Some people call it junk science.

Now there is a consensus within the scientific community, and I believe CALFED agrees with that too, that there is new metrics for measuring the health of the ecosystem. You cannot go and make some measurements, say this ecosystem is healthy, the other one isn't. Therefore, one has to use ecological indicators, and I guess they are using that too.

I'm surprised that one of the most powerful tools in the ecology, namely ecological risk assessment, does not appear to be a part of this program. This would be one method by which one could identify benefits of action one takes. And this is normally expressed by probabilities. How good is the chance that this species will survive? How good is that the quality of water can be improved?

Instead of answering the question that was raised, and I would be—my statement includes answers to those, let me make several recommendations.

First, CALFED should provide clear and objective measures to demonstrate the status of its success. The success of the program should be measured in terms of quantitative goals achieved as compared to the funds expended. It's very important to relate the goals to amount of money that you all are providing and that in the name of taxpayers.

The entire program should separate science from societal objectives. The scientific aspects of the project should clearly and unambiguously avoid advocacy or the participation of advocacy groups. If scientists from advocacy group participate in that effort, they should do so as scientists and not as representatives of advocacy organization. They must follow the rules of the science, particularly the peer review.

CALFED should try to use science described as—in my classification—should use higher class sciences. And if they use lower class sciences, they should understand the ramifications.

Finally, they should set up a project to independently peer review the program, which I believe would benefit.

Thank you.

[The prepared statement of Dr. Moghissi may be found at end of hearing.]

Mr. DOOLITTLE. Thank you.

Our next witness will be Mr. Dick Dickerson, president of the Regional Council of Rural Counties in Redding, California.

STATEMENT OF DICK DICKERSON, PRESIDENT, REGIONAL COUNCIL OF RURAL COUNTIES, REDDING, CALIFORNIA

Mr. DICKERSON. Yes, thank you, Mr. Chairman. And thank you for the opportunity to testify before the Committee.

I am the president of RCRC. That's an organization of 27 rural California counties. Our membership encompasses a broad geographic area, stretching from the shores of Mono Lake to the shores of Clear Lake, from the valley floor of Yosemite to the top Mount Shasta, and from the farmlands of Sacramento to the San Joaquin Valley and to the Sierra forests.

Our members are located within the San Joaquin, Sacramento, and Trinity watersheds. Collectively, our members are the source areas for the San Francisco Bay Delta. It is from our membership that over 80 percent of the water for the Delta comes.

The forests from within our membership area include the most significant snow pack areas in California. The water storage in these snow packs dwarfs the capacity of all of the reservoirs in the State. Snow melt during the spring and summer months is what keeps the Delta ecosystem alive. The health of the watersheds in our membership areas are, to a great extent, the early indicators of the health of the Deco's ecosystem—or the Delta ecosystem, not by any law of man or a map in a Federal office, but by the laws of Nature. Any successful Bay-Delta solution will depend upon actions in our membership area to implement ecosystem restoration, watershed management, water transfers, new water storage, facilities, and existing storage re-operation.

RCRC is represented in the CALFED process at three levels. Our water committee chairman, Mr. Meacher, from Plumas County, serves on the Bay-Delta Advisory Committee. Our water natural resource consultant, Mr. John Mills, serves on the Ecosystem Restoration Roundtable. Mr. Meachum, Mr. Mills and other RCRC elected officials and staff also participate in numerous BDAC work groups, such as ecosystem restoration, water transfers, assurances, and finance.

The expectation of adequate public participation within CALFED is predicated on the ability of the public to understand the subject matter. To have the opportunity to meaningful their interests and concerns to those making decisions. And for those making the decisions to evaluate and to respond to public input. This is, when effective, an interactive and ongoing process.

Mr. Chairman, the CALFED Bay-Delta Program, if completed, will be the most complex ecosystem restoration program ever carried out within the United States. It will affect the laws of tens of millions of Californians and the millions yet to come. It will cost billions of dollars and involve the use of significant portions of California land use area to achieve this success. This process should not only involve water managers and Federal State agency personnel, but also the general public, whose lives will be affected by the CALFED solution. The solution will be complex and should not—and should involve, to the greatest extent possible, as much public input as is practical. Notwithstanding the participation of RCRC that I have referenced, we believe that there are very—two very serious problems with the CALFED public participation program.

Mr. Chairman, it is our experience that the CALFED schedule is too short. It fails to allow for most the affected parties to even become acquainted with the information being presented, let alone provided meaningful input. While it is true that the process has been underway for over two years, it is only the past 6 months that clear projected features and components of a solution have been assembled in any understandable manner. It is only in the last two months that a draft environmental impact statement has been released for public review and comment. Unfortunately, during this time period—or this same time period, the California Department of Water Resources released their water plan update with an April 15 deadline for comment. The Bureau of Reclamation set April 17 deadline for comments on its own 5,000-page programmatic environmental impact statement. Most local governments were simply overwhelmed with the paper load. For the general public faced with earning a living, the invitation to participate in this process on that schedule was quite impossible.

In addition, providing meaningful comments was further frustrated by the significant portions of CALFED solution packages being incomplete at this time. For while we know now what various alternatives are for the conveyance, there are missing pieces to the puzzle. For example, there is no assurance package. For our members, the issues of protections and guarantees of performance is of paramount importance. There is no water transfers package. Water transfers, while an important component of any CALFED solution, pose the most direct threat to our economies if not properly designed and implemented. There is no complete watershed strategy. At best, CALFED has put together a strategy on how to do a watershed strategy. The watershed restoration and management component of CALFED's solution is critically important to our members. There is no clear direction on any new surface storage. Without new storage of surface water, the chance of producing a CALFED solution that could be—not be—not negatively affect our members—is very slim. Therefore, we feel that we are being forced to comment on a an incomplete CALFED package in an unrealistic timeframe. We are not optimistic that our comments would have any influence on the process, given the lack of time for CALFED staff to evaluate and incorporate changes. We must underscore that we do not feel meaningful public input can be accommodated in the CALFED process given it is to be completed in the next 7 months. That is a schedule that sets up confrontation, not consensus.

I'll skip through some of the testimony to get to some specifics in getting the participation of the public.

The CALFED ecosystem restoration plan, for example, was a multi-volume plan to restore the environment of the Delta and it was mailed out to only 550 recipients. And that's according to CALFED's own mailing list. CALFED's choice of who the documents went to was also of concern. In one of our State senate districts in the Sacramento Valley, only two farm bureaus one of those 250-550 copies. No copies were received by the Women in Agriculture, or by any Chamber of Commerce. However, more than 25 copies went out to environment groups, such as the Sierra Club, the Nature Conservancy, and Restoring the Earth. Also on the A list of recipients were universities, which received 20 copies, in places as far away as Riverside. Federal and State agencies obtained over 40 copies. Those who stood to be most affected by the plan, those whose lands might have been retired or whose water rights might be acquired, or those whose land might be converted to habitat were left in the dark.

Public frustration expressed to us, the local elected officials, was significant. They have asked us, and were are asking you, to help expand and improve the public participation process in a meaningful way.

The CALFED program has seemingly expected rural California to supply the land, the water, job sacrifices to fix the Delta, without question in the manner of traditional top-down agency mandates. We believe that this much change. CALFED has scheduled its own document releases and review periods in apparent ignorance or oblivion to the actions being taken by other CALFED agencies. We believe that this must change.

CALFED expects all California to step forward to help fix the DELTA when it is convenient for CALFED, in a location convenient for CALFED, in a manner convenient for CALFED, and we believe that this much change.

Mr. Chairman, one of CALFED's own brochures read, "ultimately, it is the active participation of the entire public that will help fix the Bay Delta." And we believe that that should not change.

Thank you.

[The prepared statement of Mr. Dickerson may be found at end of hearing.]

Mr. DOOLITTLE. Thank you.

Our final witness is Mr. Bill Gaines, director of governmental affairs for the California Waterfowl Association in Sacramento, California.

Mr. Gaines.

STATEMENT OF BILL GAINES, CALIFORNIA WATERFOWL ASSOCIATION

Mr. GAINES. Good afternoon, Mr. Chairman and members of the Subcommittee. My name is Bill Gaines, and I am the Director of Government Affairs for the California Waterfowl Association.

Thank you for the opportunity to come before you today to discuss the private sector's role in the CALFED Bay-Delta program.

California has lost over 90 percent of its historical waterfowl habitat. Due to significant changes in our natural hydrology and the lack of true seasonal flows, the ability to provide high-quality wetland habitat today largely must be done through managed wetlands. In other words, wetlands which are artificially irrigated and intensely managed to create positive wetlands values and functions.

The CALFED Bay-Delta program is a long-term effort to address ecosystem health, water quality, water supply reliability and levee system integrity in the Bay-Delta watershed. Because the restoration, enhancement, and maintenance of waterfowl habitat throughout much of this watershed also depends upon these areas of concern, properly implemented, the CALFED Bay-Delta Program represents a tremendous opportunity to address the needs of wintering and nesting waterfowl and other wetland dependent species.

Today, I've been asked to provide our association's view regarding public participation in the CALFED Bay-Delta Program. As a 501(c)3 non-profit organization, representing nearly 13,000 Bay-Delta stakeholders, the California Waterfowl Association also has a significant interest in the private sector's ability to contribute to the CALFED process.

Let me begin to address this question with a statement that, although California's "water wars" and deteriorating ecosystem health are well chronicled, the CALFED Bay-Delta Program is far and away the most significant and positive multi-interest effort ever undertaken to address water and environmental concerns in California—or perhaps throughout the Nation.

The sheer magnitude of this landscape effort results in unintended barriers and natural disincentives to public participation. At times, even those individuals or the representatives of agencies and organizations who are fortunate enough to be able to dedicate full-time to this sweeping effort, struggle to obtain a comprehensive grip on the program and its dynamic process. Clearly, providing for a program which offers ample public participation and opportunities, as well as real-time public awareness of its continual progress and potential impacts is, in itself, a tremendous challenge for the Bay-Delta program team. Irregardless of the stumbling blocks associated with assuring full stakeholder participation in such a mammoth program, the California Waterfowl Association believes the CALFED team has made every effort to design a process which facilitates and encourages important public input, as well as return real time information flow.

Yes, our association, even as a member of the program's Ecosystem Restoration Roundtable and BDAC, has experienced times of serious frustration due to our inability to positively influence CALFED program decisions. But we don't contribute this frustration to a CALFED agency team set on implementing the program "their way," but rather, to the tremendous difficulty associated with trying to address a myriad of Bay-Delta concerns in a fashion which is palatable to each of the many stakeholder interests which must be served.

The ability of the private sector to be heard in this process ranges from high profile role of formal committees established to provide direct advisory input to CALFED agencies, to hands-on workshops in small rural towns throughout the watershed, to other public outreach efforts which are enough to choke even the hardiest of mailboxes.

As each of you is probably aware, CALFED agencies have tried to facilitate formal public input and interaction by establishing the Bay-Delta Advisory Council, or BDAC, a committee which is chartered under the Federal Advisory Committee Act and comprised of a variety of stakeholder interests, including California Waterfowl Association.

In addition to BDAC, formal stakeholder interaction is also provided by the CALFED Ecosystem Roundtable, which is a roughly 20 member BDAC subcommittee. In addition to the BDAC, and BDAC subcommittee, there's also 13 technical panels. And, in addition, an umbrella integration panel, which provides an opportunity for specialists, if you will, in various areas of stressed species, stressed habitats or regions, to help design program priorities, as well as rank, if you will, and evaluate the program projects which are offered for funding.

One of the main concerns that the California Waterfowl Association has, however, is that, regardless of our ability to dedicate a fair amount of time to the program and our seat on the Bay-Delta Advisory Council as well as on the Ecosystem Roundtable, we have been relatively limited in our ability to fully address each of our concerns.

Our association fully appreciates and supports the goal of the CALFED program to address water supply reliability and the importance of addressing the habitat needs of listed fish species in achieving this objective. Our "managed wetlands" will also benefit greatly from achieving this goal. Yet, if the program is to make a sincere effort to restore the integrity of the Bay-Delta ecosystem, it must also more fully consider the serious habitat needs of native wildlife. Most notably, wintering and nesting waterfowl, and other species which share their habitats.

California's Central Valley, largely the same geographical area which is being addressed by the CALFED Ecosystem Restoration Program, is widely recognized as one of the most important waterfowl regions in North America. It provides wintering and nesting habitat for nearly a full ¼ of our continental waterfowl population. Yet, this area has suffered the significant loss of nearly 95 percent of its historical waterfowl habitat.

In the mid 1980's, in response to serious reductions in North America waterfowl populations, the North American Waterfowl Management Plan was signed by the Federal Governments of Canada, the United States, and Mexico. This plan established broad waterfowl population goals and identified seven priorities areas on the North American continent in need of habitat restoration and enhancement. California's Central Valley was one of those initial seven priority areas.

Two years later, in 1988, a habitat restoration program, in many ways like CALFED, was initiated to address North American Waterfowl Management Plan objectives in our Central Valley. This public-private conservation effort, known as the Central Valley Habitat Joint Venture, carefully established biologically based acreage objectives for the preservation, enhancement, restoration, and maintenance of waterfowl habitat throughout much of the CALFED project area. And, in your packet, I have provided you with a matrix of exactly what those habitat goals are.

Recognizing the importance of private landowner support to the success of the joint venture to be able to obtain those goals, a serious effort was made to minimize the changes to existing land use necessary to meet waterfowl needs. As such, the quantity of acreage targeted for wetland restoration was somewhat limited, and heavy emphasis was placed upon leaving land in agricultural production and simply working with the landowner to increase it's wildlife values.

The tremendous loss of Central Valley wetland habitat, as well as the critical importance of the region to migratory waterfowl, is well documented. Clearly, the CALFED program ecosystem restoration effort could, and should, play a significant role in this critical conservation effort. Yet, thus far, the best efforts of our association to elevate waterfowl and their habitats to a high priority of the CALFED program have been relatively unsuccessful.

Congress has already recognized the importance of the migratory waterfowl resource through it's support of the North American Waterfowl Management Plan, and it's authorization and annual funding of the North American Wetlands Conservation Act—the North American Waterfowl Management's Plan Federal funding source.

Today, I ask for your assistance in creating a CALFED program which not only helps to meet these waterfowl needs, but also facilitates greater landowner support by providing full Federal funding to the CALFED Ecosystem Restoration effort, and earmarking a reasonable portion of these dollars for projects which are entirely consistent with the accepted habitat objectives of the Central Valley Habitat Joint Venture.

In conclusion, the California Waterfowl Association would like to state that it is highly committed to the CALFED program and it's process, and would like to applaud the CALFED team for what we believe is a more than reasonable effort to design a program which maximizes the role of the private sector in the decisionmaking process. We ask those who may disagree to consider the tremendous difficulty associated with obtaining complete public satisfaction with a program of this size and scope. We also ask Congress to help us fully realize the potential of the CALFED program to appropriately address the needs of our North American waterfowl population and other native plant and animal species who share their habitats.

On behalf of the members of the California Waterfowl Association and waterfowl enthusiasts throughout the North American continent, I thank you for the opportunity to come before you today. Thank you.

[The prepared statement of Mr. Gaines may be found at end of hearing.]

Mr. DOOLITTLE. Thank you. There's so much material here, it's hard to know where to begin. Mr. Snow, do you file your documents electronically?

Mr. SNOW. We have a web page, where I think we have most of our documents. I'm not familiar exactly which ones are on that web page, but a lot of our material can be downloaded from the web page.

Mr. DOOLITTLE. So would this—we happen to have this up here, and I was listening to Mr. Dickerson's testimony about coping with—reacting to all these multi-thousand page documents. And this is the—I guess—the one that's out right now for comment by CALFED. Would this be on a web site, do you think?

Mr. SNOW. That's what I don't know. There may be somebody here who knows for sure. I know we have the phase 2 report, which is a summary of everything that happened and is contained in that—that is definitely on our web site. It can be downloaded. I know we intended to get this on a web site. I can't verify without checking.

Mr. DOOLITTLE. OK. I just—we did that 2 or 3 years ago in the Congress. I think every document that is generated is generated electronically and it just seems like it would be so much easier, because as Mr. Dickerson observed, I'm sure you didn't want to print too many copies of these because of the volume of it. And yet, for the public to be able to participate, the Internet would offer a remarkable opportunity for people to gain access to it. And I guess—I think—you could have all your maps and everything included within that. Just a thought.

Mr. Dickerson indicated that there's no clear direction on new surface storage, which is a criticism I share. And he indicates that without new storage of surface water, the chances of producing a CALFED solution that would not negatively affect our members is very slim. Could you comment on the surface storage component of CALFED.

Mr. SNOW. Certainly. As you know, we have developed three alternatives and we have evaluated each of the three alternatives with no additional storage and an additional 6 million acre feet of storage. And, so we've evaluated each approach.

It's no surprise that, in order to get additional yield water supply in the system, you must have additional storage. Modification and conveyance, making the ecosystem more resilient, while adding some certainty to operations, do not in fact generate additional water supply. So the only way you get additional water supply or additional yield in the system is by adding storage.

And we have evaluated storage both north of the Delta, as well as south of the Delta. We believe from our analysis that an additional 6 million acre feet is just about the end of the spectrum in terms of reasonable investment, because of the yield curves, which are actually contained in the briefing document if you want to followup on this.

Mr. DOOLITTLE. So, you've done analyses of yields of different proposed projects?

Mr. SNOW. We've done it in a broad evaluation of adding storage within the system and how much water you can move into storage.

Mr. DOOLITTLE. How did the proposed Auburn Dam fare on your yield curve? Is it one that you considered?

Mr. SNOW. We evaluated Auburn Dam. I do not recall, off-hand, how it did on the yield curve. New additional on-stream reservoirs do not fare well at all in our analysis. And, you will see in our planning document much more emphasis on off-stream, groundwater banking, and consideration of expanding existing on-stream.

Mr. DOOLITTLE. Why don't they fare well?

Mr. SNOW. Well, it's because of the—we have identified four coequal objectives in terms of the CALFED purpose. We have actually a fairly unusual purpose and needs statement. We've developed where we hold water supply reliability, water quality, levy stability, and ecosystem, as coequal objectives. And when we look at the sites that you have available for new on-stream, it does not pencil out as well as the opportunities that you create with on-stream—or, excuse me—with off-stream reservoir, groundwater storage, and raising existing reservoirs.

Mr. DOOLITTLE. So it's sort of by definition then, you adopt that on-stream storage is less desirable than other alternatives, because of the impact you feel it has on the ecosystem?

Mr. SNOW. It's not just ecosystem. It's also the issue of how you tie it into the system. What are the benefits you can get out of it, in terms of supplementing flows for fisheries purposes. I think it's important to draw a distinction here. From a technical standpoint, all potential reservoir sites, on-stream or off-stream, are still on the table, because we have not finished 404 analysis to exclude them.

However, I think it's important for me to stress that from our planning purposes, the examples that we included in here are a much more realistic expectation of what may be buildable out there in the system that meets the four objectives of the program.

Mr. DOOLITTLE. Well, I just can't imagine that a facility such as Auburn wouldn't pass your test. You heard Dr. Quinn say they'd be interested in water at $200 an acre foot and this would produce water at a $100 an acre foot. Not that we're willing to sell any of it to Southern California, but in case we were, it would be there.

Mr. SNOW. Yes, certainly cost would not be a lone consideration for us in evaluating whether it fits into the CALFED mix or not. I think the difference from the way Auburn has been discussed more historically, in terms of some specific water supply benefits and certainly flood control benefits, is different than the way CALFED is looking at storage modifications to fit into the broader program. And it's in that context that that reservoir, in particular, and new on-stream reservoirs, in general, do not hold up well in our analysis.

Mr. DOOLITTLE. You may not be able to do it today, but could you refer me to that part of your analysis where that's described.

Mr. SNOW. Sure, I'll try to develop or send you information.

Mr. DOOLITTLE. OK, and then probably, based on that, I'll have some further questions.

They have now called a series of votes, it looks like. In the mean time, let's go to Mr. Miller.

Mr. MILLER. Thank you. I'll just have one question, and it may that this question has to be resolved in writing. But, Gary, I just wanted—is there a big inconsistency between your statement of sort of how your proceeding in CALFED and Professor Moghissi—between your two testimonies here?

Mr. BOBKER. No, actually, I think they're quite consistent. Some of the things that Dr. Moghissi referred to, the need for independent scientific review or the need for quantitative objectives—and these are things that not only the environmental community, but agricultural and urban stakeholders—involved in the process have been calling for. It took a little while to get, I think, an adequate response from the CALFED program, but the good news has been that they have moved in the direction of bringing in scientific review and the initial stages of developing quantitative objectives.

Mr. MILLER. Let me ask you this. But the screen that you sort of describe about how you—when you look—at some of these ecosystem restoration programs—do we apply the same screen to facilities? Can we talk about—you talked about environmental risk assessment—it's kind of peer review?

Mr. BOBKER. Well, yes, I think it's fair to say that the level of quantitative analysis, of definition of success, and of independent scientific review, to which we've been holding the environmental restoration program accountable, has not been applied as rigorously to the other parts of the program.

The Environmental Water Caucus has, in some of our communications with Mr. Snow and the program, identified that as a need. We really haven't—we're waiting to hear a little bit more about how it's going to be dealt with. But, there's clearly a need, I think, for independent scientific review of the water quality component, independent scientific review of some of the water efficiency elements. I could go on and on. I will provide the Committee with a longer list that we have supplied to them of some of those needs.

Mr. MILLER. Thank you. Our apologies that we're now coming up against these votes. But, Mr. Gaines, I want to thank you. You're description of being involved in this process probably should be mandated reading for all of us. But we hope that, as we move into this next phase, that we narrow some—so people aren't wearing so many hats and we can start to harden some of these consideration. But, it's great reading. Thank you.

[Laughter.]

I'm not sure it's a great experience.

[Laughter.]

Mr. DOOLITTLE. I think at this point we're going to have to recess and come back after the vote. There are four votes. It will be half an hour before we make it back. I wish I had better news.

Do any of you have to leave to make a plane?

Mr. BOBKER. Too late now.

[Laughter.]

Mr. DOOLITTLE. All right. We'll get back as soon as we can.

[Recess.]

Mr. DOOLITTLE. OK, thank you for your indulgence. I see it took even longer than I was expecting. Mr. Pombo is recognized for his questions.

Mr. POMBO. Thank you, Mr. Chairman. I guess I'll start with Mr. Snow. Two different areas that I'd like to go in with you. We've discussed a lot of different things and you've heard all of the testimony so far.

The first area I'd like to question you on is in terms of process. The concern has been raised about public participation in the process. The concern that I'm hearing from constituents and from others is that you have done an admirable job of pulling together what you consider the stakeholders and pulling those people in and trying to make them part of the process.

I think that—and I understand you didn't attend the hearing in Walnut Grove—but, I think what that hearing represented was the general frustration, the lack of information that was available, the lack of information that has been distributed to those that are being impacted. I think it's fairly obvious that none of those people that attended that hearing, who live and work in the Delta, who's land and water will be directly impacted by whatever final decisions are made, are considered stakeholders in this process. At least, they feel that they have been excluded from this process.

I think that's an old pattern that we have fallen into with CALFED, and, as I've told you before, I don't oppose the CALFED process. I think it's very important. But I think that one of the things that we've fallen into with this process is, that you look at the people who are on the panel that are considered stakeholders, and you don't have a lot of people who own property in the Delta or have water rights to the water that flows through the Delta that are included in the process.

Would you like to respond to that?

Mr. SNOW. Sure. I think there's two points that everybody would agree with. And that is—and they seem contradictory, but I don't believe that they are—that the CALFED process has done more in terms of outreach than any other process has attempted. The number of meetings, the number of workshops, our outreach, has gone beyond that which has done for most projects like this.

But at the same token though, I think there's agreement that we need to do more. Because of the magnitude of the potential impacts, we need to continue and even expand beyond the traditional stakeholders. And I think the Delta, in fact, is a good example of that, where we have, let's say, relied on the easier representatives—the traditional folks, an Alex Hildebrand or Pat McCarty, Jim and Sally Shanks, and Tom Zuckerman, and Dante Nomalini—those people that have provided us advice. We tried to reach out through the Delta Protection Commission and attend some of those meetings, and some of the rec board meetings.

But, I think the point that you're making—as we move forward in this and start making clear decisions, we need to get down to the community level. To the level where people are actually impacted by land acquisition strategies. And I agree with that. And I think we're trying to, at this stage of a draft programmatic, to get clearer on where we're headed and what the issues are. We have to do more outreach, particularly in the communities that are to be impacted by these actions and the Delta is the best example of that.

We've tried to listen to the different issues. I think they've been very articulate at a lot of meetings, including the Walnut Grove public hearing. There's a whole host of issues that they're concerned about. Land retirement is only one of them. They're concerned about isolated facilities. They're concerned about commitment to maintaining levies. They're concerned about getting ESA restrictions off their back, so they can maintain the levies. We're listening to those points and I think we need to do a better job of communicating that.

Mr. POMBO. In terms of the Walnut Grove hearing, one of the most often shortcomings that I heard was that each person was allowed to make a statement for 3 minutes. Many of them were cutoff mid-sentence, when their 3 minutes were up. No questions were answered. Many people came there with questions and walked away with the same questions.

I get the feeling that you're going through this process so that, at the end, we can say we had 17 hearings throughout California with the general public. And if all of the hearings are the same as this particular one was, you may end up with 17 hearings with the general public, but you will end up with everyone who went to those 17 hearings walking away without one question being answered that they walked in with. And I think that something needs to change in the way you are conducting these hearings, so that people at least feel like they got some answers.

Mr. SNOW. There's two different—there's many different kinds of meetings, but there's basically two types that we're pursuing in CALFED. The one is the legal hearing process, which has very specific legal requirements on how we conduct ourselves. And the other is the open meeting with full exchange and dialog between the parties.

We have even modified our hearings, so that we start a public meeting an hour before the formal hearing, that allows people who wish to come to actually meet with individuals in the program and discuss different issues and get answers to those questions. We also have been conducting—you know, in the past 2 years, over 350 community meetings and outreach efforts, whether it's a formal CALFED public meeting or a meeting cosponsored with a local reclamation district, where we have the full exchange.

But we are conducting very formal public hearings to comply with law and case law to make sure that everybody has equal access and equal opportunity to provide comments into the official record.

What I would propose in this case, is that if we need to hold a public meeting for the purpose of the dialogue, not the official hearing record, we'd be glad to do that. And we've done that.

Mr. POMBO. I know, in my area, there's definitely a need for that. I don't know if in Riverside or some of the other areas where hearing's are proposed there is a need for that kind of hearing. But I do know that the people that I represent probably will be more impacted by whatever decision than anybody in the State in California, and they feel like they've been cut out of the process.

Mr. Chairman, my time's expired. I have a number of other questions I would like to ask. But, I don't know exactly how you're going to handle the time.

Mr. DOOLITTLE. Well——

Mr. POMBO. Mr. Miller said he would give me his time.

[Laughter.]

Mr. DOOLITTLE. Go ahead. Proceed.

Mr. POMBO. Second, in terms of process, and this takes off of something that Dr. Moghissi was talking about. I have a real concern about how we end up with a final product. I feel that there is definitely a lack of peer reviewed science that is being done at this point.

And you may debate me on that, but from my perspective, there's a lack of honest science being done at this point in the process. I don't feel like you have gone to outside people who don't have a stake in this end product and said, is what we are doing accurate, scientifically. Does it hold up? I don't think that that's happening, one.

Two, I have a list of proposed projects that I believe came from your office. These are not the projects that we are approving as part of the appropriations process. We're being asked for $143 million, and no congressional committee is having oversight hearings into approving these projects. To my knowledge, no committee and the State assembly or State senate is holding hearings into whether or not we should spend taxpayer money on these projects.

What we are being asked to do is to approve a bulk amount of money to go to CALFED. Who is ultimately responsible if you waste money? Who is ultimately responsible if you put together something that is full of fraud and abuse, that benefits the people that are sitting on the board, who are participating in the process? Where is the taxpayer accountability for the end result? Who—and don't take this personally—but, who voted for you? Who put you in to make you king to decide where we spend taxpayer dollars?

Mr. SNOW. Let me start by saying that being king is grossly overrated, if that's what I am in this process.

[Laughter.]

Mr. POMBO. And I don't want your job. I'm just asking.

Mr. SNOW. Do you have any positions open?

[Laughter.]

That's an excellent question and let me start by saying we think we have put a process in place that guards against those types of abuses. We subject people on panels to conflict requirements, disclosure statements. We work our way through that, and certainly Gary Bobker and Rich can attest to what we require of even the advisory panel in terms of disclosure of interest and remote interest associated with any projects that may be coming forward.

The answer your question—actually, in terms of where the responsibility lies—actually is in the same place as how did I get this job. And basically that is, I'm accountable to the secretary of Interior and to Governor Wilson through the secretary for resources for the State of California. And in terms of the two funding sources—two primary funding sources we are utilizing now in funding these projects—Proposition 204 specifically puts the secretary for resources for the State of California as the fiduciary agent for those moneys. He must be responsible that they are expended in compliance with State law and all the provisions of conflict of interest, contract law, et cetera.

On the Federal side, it is, of course, the secretary of Interior responsible for making sure that those moneys are expended in an efficient and effective fashion under Federal law. Now we have a very elaborate process set up to move projects forward through many levels of screening and review and peer review, before those lists move forward for their recommendations. But in terms of——

Mr. POMBO. You say peer review, but you don't mean outside peer review.

Mr. SNOW. Well, I do mean——

Mr. POMBO. It's within the group.

Mr. SNOW. [continuing] outside peer review in the sense it's not just agency folks reviewing it. When we have technical teams, for example, where they're evaluating the merits of screening projects to achieve the objectives on screening and fish passage problems, that includes technical experts from the agency, as well as stakeholder community. And so that is a broader based science review and it's not simply an agency deciding this is what we would like to do next year.

Mr. POMBO. Dr. Moghissi, would you like to respond to that?

Dr. MOGHISSI. I don't believe that qualifies for peer review. That is technical advise they are receiving. Peer review would imply that Mr. Snow or anybody else who is involved in it would have no hand in selection of the reviewers and he would have to respond formally to the recommendation of those.

No—this problem has been around, particularly with the Federal Government, for a number of years and there is numerous reports from the General Accounting Office, from the National Research Council, which as you know, is the research arm of the National Academy of Sciences and National Academy of Engineering, and so on—there is a fairly broad—from American Association of Engineering Society, American Medical Association—there's a broad consensus of what constitutes peer review.

That is a very worthy thing he's doing in which he basically determines the relevancy of the project, but this is not peer review.

Mr. POMBO. Mr. Gaines, you and I have talked on innumerable occasions about waterfowl habitat protection throughout the Central Valley of California. One of the issues that you have brought up to me, in the past, was the value of farm land in providing waterfowl habitat. Would you like to share with the Committee the impact of the retirement of vast number of acreages in this particular area?

Mr. GAINES. Sure. Let me reiterate a little bit of what was in my testimony earlier. The Central Valley Habitat Joint Venture, which, of course, is the public-private effort under the North American Waterfowl Management Plan, is implementing waterfowl conservation efforts in California—the Joint Venture is one of many, but that's one of the main bodies that's moving forward.

When we pulled together our waterfowl population goals for California and the Pacific flyway, we started out with bird numbers, and we worked that down into what their energetic requirements would be, and then ultimately, what type of habitat changes we had to make on the ground. We knew that the best we could probably do would be to get possibly 300,000 to 400,000 acres of true managed wetlands, or good wetlands, in the Central Valley. And somehow, some way, we were going to have to do something else, because even if that block of habitat—400,000-450,000—acres was managed to be the absolute best it could possibly be for waterfowl, it wasn't going to be enough.

And so, what we did is we also established a goal that we call our agricultural enhancement goal, which is actually 443,000 acres of ag land, Central Valley wide, that we want to see farmed, but farmed in a wildlife friendly manner.

In the Delta, which is one of the areas where, of course, because of flood control projects and other changes in our natural hydrology, we've lost a whole bunch of naturally occurring wetland habitat, the corn fields, wheat fields, and other agricultural production that takes place in the Delta now, provides a real critical component, if you will, of that 443,000 acre agricultural enhancement objective. Specifically in the Delta basin itself, the Central Valley Habitat Joint Venture has established a goal of annually enhancing about 68,000 acres of farm land. And without that block of 68,000 acres, whether it be winter corn or what have you, we'd be really in deep, deep trouble.

One of the things that you hear about when you talk to folks about the CALFED Bay-Delta program is all these wonderful wetlands that are going to come about as a result of the program. Well, there's wetlands and there's wetlands. Tidal wetlands, for example, are what we would consider very marginal waterfowl habitat—great for fish, great for a lot of other species, not real good for ducks—but it depends upon the species of ducks, some species like them. But, by and large, the ones that are the most popular game bird, so to speak, in California, the mallard, pintail, teal, and so forth, tidal wetlands don't give them much, if anything.

Seasonal flood plain, because we don't have the seasonal flows that we used to have anymore, we basically have seasonal flows only when we have no more carrying capacity in the dams and we've got to let some water go—provides very minimal waterfowl habitat as well.

So, if we're going to get there—and we're going to get there in the Central Valley, and specifically in the Delta, because that really is ground zero for our waterfowl effort—we really need to maintain a serious block of agricultural land and we need to do the best we can to keep it as duck friendly and wildlife friendly as we can.

Mr. POMBO. Mr. Snow, on the land that would be necessary to be retired under your plan, the amount—whatever that amount ends up being—do you intend on paying for it, or do you intend on just putting it on a map and leaving the restrictions on the use of that property?

Mr. SNOW. It's our intent that any land that's necessary is acquired in the marketplace.

Mr. POMBO. Using your figures, it's somewhere between $1.5 and $2 billion for the purchase of the land that you said was necessary. Do you—have you included that in the budget in the financing of this?

Mr. SNOW. I'm not sure how you're arriving at that number, but we would have those numbers accounted for in some fashion in our total cost estimates.

Mr. POMBO. Do you think that the elected representatives that have a responsibility to the taxpayers should know that they are committing to a $1.5 to $2 billion land acquisition cost as part of this program?

Mr. SNOW. But I don't think that's the way to characterize this. When we show the cost——

Mr. POMBO. You said you were going to pay for it.

Mr. SNOW. That's correct. But I guess the point I'm making—if you look at the numbers, you'll notice that we show as much as 35,000 acres of ag land conversion, primarily in the Delta region, as a product of stabilizing the levies. And we show those kinds of costs as part of the levy process.

Mr. POMBO. But you would have to pay for that land.

Mr. SNOW. But it's part of the levy project. I guess that's my point. Some of the strategies of stabilizing levies is that you build-up on the interior side of the levy, and also to try to arrest subsidence. That strip of land around the levies that you're now having to manage in a different way to stabilize the levy has taken up some of the ag land, and——

Mr. POMBO. You still have to pay for it.

Mr. SNOW. That's correct.

Mr. POMBO. My point is—whether you take it for seasonal wetlands, or tidal wetlands, or you just leave it fallow, or whatever you decide to do with it—you still have to pay for it.

Mr. SNOW. Correct.

Mr. POMBO. And, if it takes the 250,000 to 400,000 acres—and I believe your figure was 380,000, that you testified to here today—it's between $1.5 and $2 billion in current market value. And that's considering that it's all farm land; and that there's no speculative value on that land as well; and that you're not taking out permanent crops; that you're not taking out home sites; that's just on straight farm land.

That is a considerable amount of money that I don't believe is going to be in the budget in the very near future. And, once you adopt this plan, and you've set aside that land, at least on the map, you've impacted the value of somewhere between 250,000 and 400,000 acres, depending upon what the final plan is.

And I don't—I've got to tell you that I don't believe there's anyone in Congress that's going to stand up and tell you, honestly, that you're going to get that money. I have a real problem with doing that. I have a real problem with us going into this knowing that we're going to devalue several hundred thousand acres of land, and knowing that we can't pay for it, at least not in the near term.

The final issue that I would like to go over with you deals with the water storage component of this. I do not believe that the documents—the draft documents—that we have sitting in front of us right now, adequately address the need for surface water in the future. I don't believe that it addresses the need for surface water for California. I don't believe it addresses the need for surface water to take care of water quality issues in the Delta.

I believe that, with what you've included in here, you are guaranteeing that we will have that train wreck. And that train wreck will be these guys that are demanding water quality as part of this, and those that are demanding reliability on their water sources. And you're going to have to take water away from someone, because you're not going to provide the amount of water that's necessary to provide the water quality goals and the reliability goals that you've outlined for yourself—with the surface water provisions that you have included in this.

I believe they are wholly inadequate to take care of your stated goals. It may avoid a fight on your committee—it may avoid a fight within the so-called stakeholders that are participating in the process right now, but when reality hits, and you've told these people that we're guaranteeing certain water quality and you've told these people we're guaranteeing certain reliability, in exchange for getting them to sign off on the whole program, the reality is, you don't have enough water to do it.

And you're going to be back looking at trying to develop surface water in order to meet those goals. And going into this process, I think you have completely short shirted that part of the document. There may be a reason for doing it, but I think that, in the long run, you're going to be sorry that we did—or that we all will be sorry that we did.

Thank you, Mr. Chairman.

Mr. DOOLITTLE. Well, thank you. I must say, I join in Mr. Pombo's sentiments. And I got to tell you, I'm not happy about a process that this favors surface water, and especially on-stream surface water, especially like we've got—there's a possibility at Auburn. And I would be very interested in your material that you are going to send me on that point.

You talked about levy stabilization, Mr. Snow. Is there any possibility that somehow the city and county of Sacramento or their flood control agency is going to qualify for CALFED moneys or prop 204 moneys to do it's levy enlarging project?

Mr. SNOW. The way we have defined the problem area and the way we have approached the levy program, or the component of CALFED, the levy program is focused on the legal Delta, continued out to Carcinas Straight. And that would not include the American River Levy.

Mr. DOOLITTLE. OK. Thank you. Ecological risk assessment was mentioned by Dr. Moghissi. Is that—and he indicated in his testimony that wasn't part of your analysis—do you concur in that?

Mr. SNOW. We have developed—well, maybe I should caveat this—maybe I'm not familiar with the precise definition of peer review as presented by the doctor here. However, we have initiated a process to bring in outsiders not associated with CALFED or it's members. We started it first with a science panel review of our program and one of their recommendations was to set up ongoing science review, which we have started working on with the stakeholders—to set up a long term process to ensure a science review.

So, maybe I should use that term—that we have brought in independent science review, whether that fits the precise definition of peer review, as presented by Dr. Moghissi—I'm not familiar with that definition.

Mr. DOOLITTLE. But, I think the—and I was interested in the peer review too, but the ecological risk assessment, as I understood it, would enable you to, I guess, quantify what it's going to cost to achieve certain objectives and measure the biggest bang for the buck. Am I mis-characterizing it, Dr. Moghissi?

Dr. MOGHISSI. Right.

Mr. DOOLITTLE. OK.

Mr. SNOW. So, I answered the wrong question, is that——

Mr. DOOLITTLE. Well, that's OK, because I was going to ask you that—that was my next one. So——

Mr. SNOW. That was the next one.

Mr. DOOLITTLE. That's all right.

Mr. SNOW. We have not done that type of analysis at this point in our programmatic evaluation. That type of risk assessment comes up in specific applications. The place where we are doing it now, is trying to get a risk assessment on the fish entrainment issue, which is a major issue in the Delta. The effect of the two large diversions in south Delta, and when you modify the pumping pattern and you modify the location of pumps, whether you add screens, we are attempting to get a handle on the percent benefit or probability of improving specifically, the endangered species in the Delta. And given different configurations and different patterns, what are the probability you can recover the species, which is the objective.

So we're now introducing it on a specific issue like that. And I think the concept of being able to address the probabilities that actions will achieve the designed result, is something that comes along with our program as we get focused on a preferred alternative at a programmatic level and start moving to specific actions.

Mr. DOOLITTLE. I guess what I don't understand—I really don't mean to harp on this—but, it seems—I don't know how you could rank like you said, using your criteria, on-stream storage would not fare well. But I don't know—that seems odd to me—that ecological risk assessment wouldn't be part of that first tier. Because otherwise, things are going to fall off that may never get subjected to ecological risk assessment. And yet, that to me, is so fundamental, in terms of allocating scarce resources.

Mr. SNOW. Well, I can't answer that precise question in terms of risk assessment and how it applies to that. I mean, I think the issue that we've looked at with respect to storage is trying to overlap as many issues as we can.

And so, for example, looking at the difference between on-stream storage on the American River and a popular off-stream site that's often discussed, Seitz Reservoir in the Sacramento Valley. When you look at a Seitz Reservoir, you can do a lot of things with that, including make a joint investment to clean up the red bluff diversion structure, which is a problem with fisheries and a problem for ag users in the Sac Valley. And in doing that, you fix current problems with the Tahama Calusa Canal Diversion.

At the same time, you prepare a diversion structure for an off-stream reservoir. Also, it gives you flexibility to provide water to the backside of some of the irrigation districts, thereby reducing their take off the river and further reducing fish entrainment problems.

So, we'd look at those types of linkages and start building and compounding the joint benefits that we can get. And that's why I make the comment, in a general sense, that off-stream reservoirs, particularly, moved away from the system and the other problems—on-stream reservoirs don't provide the benefits that we've seen with some of these classic off-stream reservoirs.

Mr. DOOLITTLE. I guess the thing that I find strange is that you're one governmental entity—you're made up of a consortium of governmental entities—and yet, members of that consortium, like the Corps of Engineers, in the State of California, Department of Water Resources, have clearly stated in testimony, the only solution for the grave flood threat to the city and county of Sacramento that protects them, is an Auburn Dam. I mean, the Corps of Engineers has spent millions of dollars recently, coming up with that conclusion, and they're a member of your CALFED—are they not?

Mr. SNOW. Yes, they are.

Mr. DOOLITTLE. And the State of California Department of Water Resources is another entity involved with that. They've both come to that conclusion, and yet, CALFED, which is getting hundreds of millions of dollars in funding—State and Federal—has developed criteria that puts blinders on itself. I mean, this just seems very, very strange to me—that something where we already have the need for flood control—I mean, why shouldn't that be, because of that other reality, shouldn't that be reflected in your consideration with reference to a project like Auburn?

Mr. SNOW. Well, I think it is a consideration and I can only surmise that if the CALFED objective was flood control, and was our No. 1 objective, and then we had incidental benefits from it, we might look at Auburn differently. I might also expect that if the Corps had the four coequal objectives that CALFED does, that they might look at Auburn differently. I do not know.

Mr. DOOLITTLE. But my point is—I understand that flood control isn't one of your objectives, but nevertheless, it's a key governmental purpose and yet you don't seem to add in that as part of your mix in the analysis. It's like it's just ruled out. And that seems—because since there is the flood control component, which moves toward an Auburn Dam, if you added to it your consideration of adding more high quality water to the system, those two could work synergistically. Instead, they're forced to remain in isolation from one another. That's the part that seems very strange to me.

Mr. SNOW. Well, we're not attempting to have them in isolation. And to make sure that I'm not misleading—we have not ruled out those options. I'm sure you're familiar with section 404 and the requirements you must go through and we must demonstrate that we have evaluated sites and screened sites properly, and they are all, as we speak, still on the table.

Now, the point I'm making, so that I'm not misleading you or this Committee, is that in our planning efforts, as we try to put these pieces together, on-stream storage—new on-stream storage—does not stack up as well as putting this comprehensive package together, as some of the opportunities with off-stream storage does.

Mr. DOOLITTLE. OK. In the abstract, I can understand that. I may not agree with it, but I can understand it. But, I mean, this isn't the abstract. I guess that's my point. This is something that's a very real thing. There are efforts right now to figure out what to do about the problem in Sacramento. Could I at least ask of you that you will take a look at this and let me know what you think?

Mr. SNOW. Yes, I will.

Mr. DOOLITTLE. I can see it's different than if I were just asking you to build a dam in the American River, where flood control was not a great concern. But it is a great concern. It's a driving concern.

Do you have further questions? Go ahead.

Mr. POMBO. Just quickly, Mr. Chairman. Mr. Snow, are you coordinating the activity between the proposal under CALFED to buy land for retirement, the proposal under the Delta wetlands project, the proposal that BLM and Nature Conservancy have—have you, at any point, sat down and looked at a map and started putting all of those different things together and looked at the impact that would have?

Mr. SNOW. We have attempted to make sure that our numbers are the total accumulative numbers of these activities, to make sure that, when we are expressing what we believe may be necessary to restore Delta smelt and salmon species and the kinds of habitats that are necessary, that those numbers are not additive to another HCP effort or BLM effort. So we believe that we have put the marker down for the totals. And, I believe that we've included in that the Delta wetlands project.

Mr. POMBO. So your number includes the Delta wetlands?

Mr. SNOW. That's my recollection. I will have to check on that and get back to you.

Mr. POMBO. If you could answer that for the record for me, I would appreciate that.

Mr. GOLB. Mr. Pombo, if I might add one point. One thing that we've encountered with the land acquisition and the conservation program CALFED has undertaken is as you know, the State of California and the Federal Government owns nearly half the State. And State agencies, such Caltrans and others, own a tremendous amount of acreage, some of it in small tracks, some of it in large tracks. One thing that we've only briefly talked with Lester about is the concept of trying to utilize public lands first, before we acquire private land. It just seems to make sense from a cost perspective.

Mr. POMBO. Forty-nine percent is owned by the Federal Government; if you include State and local governments, you're up to about 56 percent.

Mr. GOLB. Well, it's a lot of land. Now some of it may not have the same ecological characteristics.

Mr. POMBO. Five hundred sixty million acres.

Mr. GOLB. OK. They may not have the same characteristics that CALFED is considering. But from an efficiency standpoint, it may be worth looking at.

Mr. POMBO. I would agree with you and that's something that this Committee has looked at in great detail—is the impact of the lands that are already owned by the public and this effort to take what—you know, less than half of California that's privately owned and make that public land as well. It has an impact on our cities, our counties, a huge impact on the economy of California. And I think everybody should realize just what an impact that would have.

Mr. DOOLITTLE. I did send you a letter, Mr. Snow, on the 26th of March, asking for certain information. And you wrote back and indicated that CALFED anticipates that significant changes will occur to the hydraulic capacity, physical features, water quality, and ecosystems at Bay-Delta.

What I was trying to get at—I mean, you recognize that you have some anticipation—I would like to know what are those significant changes and how will they be monitored? I mean, do you know what those are now, or is this something you simply believe there will be changes, but you don't know what they are?

Mr. SNOW. I don't recall the specific context that the sentence is in, but I think perhaps the context is simply in terms of the proposals—the three basic alternatives that we have—that would change the way the system functions. In terms of monitoring, there's two things.

One, there is a fairly extensive monitoring system that has been in place for nearly 20 years, collecting data. And it's the data base that has served to indicate that there are endangered species and water quality trends. We are building on that data base with the work that has been referenced here today, in terms of developing additional indicators so that we have a better yardstick to measure the changes and the progress on overall ecosystem restoration.

Mr. DOOLITTLE. Well, let me do this. Let me just send you and give you a chance to clarify this in writing, if I may. I'll give you the background, the letter, and everything. But I'd like to get a more specific answer, if I can.

Mr. SNOW. OK.

Mr. DOOLITTLE. I'd like to thank all of you for appearing today. It's been a long day for you and you've been patient for us to vote here at the end. I think we've developed a lot of very interesting information at this hearing. We will, I'm sure, have further questions—we'll tender in writing and ask you to please respond expeditiously.

With that, the hearing will be adjourned.

[Whereupon, at 7:27 p.m., the Subcommittee adjourned subject to the call of the Chair.]

[Additional material submitted for the record follows.]

RESPONSE OF THOMAS M. BERLINER, GENERAL COUNSEL, SAN FRANCISCO PUBLIC UTILITIES COMMISSION TO THE "DISCLOSURE REQUIREMENTS" REQUIRED BY HOUSE RULE XI, CLAUSE 2(G)

1. Name: Thomas M. Berliner
2. Business Address: City Attorney's Office, 1390 Market Street, Suite 250, San Francisco, CA 94102
3. Business Phone: (415) 554-295
4. Organization you are representing:

The "Bay-Delta Urban Coalition" and the San Francisco Public Utilities Commission.

5. Any training or educational certificates, diplomas or degrees which add to your qualifications to testify on our knowledge of the subject matter of the hearing:

Doctor of Jurisprudence

6. Any professional licenses or certification held which add to your qualification to testify on our knowledge of the subject matter of the hearing:

Member, State Bar of California, District of Columbia Circuit, Ninth Circuit, United States Supreme Court.

7. Any employment, occupation, ownership in a firm or business, or work related experience which relates to your qualifications to testify on or knowledge of the subject matter of the hearing:

- Nineteen years of legal practice on behalf of the City and County of San Francisco, most of which has focused on water, energy, natural resources.
- Represented the San Francisco Public Utilities Commission before the State Water Resources Control Board, Federal Energy Regulatory Commission, Department of the Interior, and other regulatory agencies and legislative bodies concerning water and energy matter.
- Active member of the Bay-Delta Urban Coalition, the California Urban Water Agencies, and other industry organizations.

8. N/A
9. N/A
10. N/A
11. N/A

STATEMENT OF BILL PAULI, PRESIDENT, THE CALIFORNIA FARM BUREAU FEDERATION

The California Farm Bureau Federation appreciates the opportunity to provide comments on the future water needs of California and the Cal-Fed process for a long-term Delta solution. On behalf of its more than 75,000 member families throughout California, Farm Bureau is committed to solutions that will assure a reliable and affordable water supply for all Californians.

The California Department of Finance has projected that California's population will increase from the present 33 million people to nearly 50 million people by the year 2020. These additional 17 million people will not only need new water supplies, but they will also need a safe and reliable food and fiber supply. And, with more people, California will increasingly appreciate the open space provided by the farms and ranches that grace California which account for more than $25 billion in direct revenues and generate $12 billion in exports.

The Cal-Fed process provides an important opportunity for California to craft a collaborative plan that will satisfy a significant portion of the state's expected water demands for the next 30 years. Unfortunately, the Cal-Fed plan to date has fallen short of this goal. Most notably, Cal-Fed has been based largely on redirecting agriculture's two most fundamental resources—water and land—to satisfy other uses, rather than efforts to assure reliable and affordable supplies for farms, cities and fish. Even so, we remain cautiously optimistic that Cal-Fed can turn the corner and forge a plan that will benefit all of California, including its farmers and ranchers. To do this, we believe additional attention must be given to several key issues that will be critical to California in the 21st century, including increased surface water storage, minimizing the fallowing of agricultural land, and strengthening water rights.

Surface Water Storage

The California Department of Water Resources estimates that of California's total water use in 1995, 46 percent was dedicated to the environment, 42 percent to agriculture, and 11 percent to urban use. Additionally, millions of acre-feet of water flow out to the ocean above and beyond this water dedicated to the environment, farms and cities. Rather than redirect water from productive urban and agricultural uses, California must fully utilize and conserve water that now flows through streams to the ocean. By focusing on conserving outflow, California can minimize the risk of flooding, and save this water for other times, particularly for dry year use when cities, farms and fish need the water. The most effective way to conserve outflow is to to increase surface water storage in an environmentally sensitive manner. Increasing the capacity of existing reservoirs, such as Lake Shasta, Millerton Lakes, and Los Vaqueros are good examples of programs that can be used for the benefit of farms, cities and fish.

Agricultural Land Fallowing

Cal-Fed and other governmental programs have proposed to fallow more than 250,000 acres of prime agricultural land holding senior water rights. The overall fallowed acreage could easily approach one million acres. Agricultural land in California is a resource of global significance that, as a matter of good public and social policy, should not be converted to any other use. We recognize that new conveyance systems and reservoirs will require a certain amount of agricultural land to be taken out of production. In these cases, landowners must be justly paid and given adequate notice and opportunity to assure that their property rights are fully protected. The fallowing of agricultural lands for levee setbacks, shallow water habitats and other environmental purposes should be a limited part of the Cal-Fed solution, due to the effects on local communities and government revenue. Instead, non-agricultural lands should be used for this purpose.

Water Rights

Assurances and particularly the protection of agricultural water rights are the key to the ultimate Cal-Fed solution. In many cases, old promises must be fulfilled before new promises to protect rural areas will have any credence. California's farmers and ranchers depend upon well-established water rights to maintain their livelihoods and way of life. Cal-Fed must assure farmers and ranchers that both their surface and groundwater rights will not only be protected, but will in fact be enhanced and strengthened by the Cal-Fed process. Most notably, Cal-Fed and the individual agencies should abandon plans to use groundwater in areas feeding the Delta as the future source of urban and environmental supplies under the guise of a conjunctive use program. Area of origin rights must also be fully recognized and strengthened by Cal-Fed.

Federal Appropriations

We cannot support the continued investment of public money in the Cal-Fed process as long as California's farmers and ranchers bear a disproportionate burden of a long-term Delta solution. Farm Bureau supported Proposition 204 as a down payment to secure major improvements in water management in the Sacramento-San Joaquin Delta. Unfortunately, to date, both Proposition 204 and Federal appropriations have been used in large part to fallow agricultural land and set the stage to redirect agricultural water to other uses. This means that California agriculture is moving backward, not forward, as we have all been promised in the Cal-Fed process.

We continue to support the need for a long term Delta plan, but we are losing confidence that the ultimate Cal-Fed solution will contain meaningful components, such as water storage, that will benefit farmers and ranchers in all parts of the state. We are also very concerned about Cal-Fed's proposal for large-scale fallowing of our state's valuable farmland and the associated effects on rural communities. It is therefore impossible for us at this time to support a continuing Federal appropriation for Cal-Fed until we see marked improvements in the program to benefit California's farmers and ranchers.

In closing, the California Farm Bureau Federation will submit detailed and constructive comments to the Programmatic EIS/EIR for the Cal-Fed program as well as the associated documents. We are optimistic that the Cal-Fed process will turn the corner and begin to focus on efforts that will benefit California's farmers and ranchers and will make significant strides toward satisfying California's water demand for the next 30 years. We look forward to working with you in this process.

STATEMENT OF MARTHA DAVIS, BOARD MEMBER, MONO LAKE COMMITTEE AND THE SIERRA NEVADA ALLIANCE

Good afternoon, Chairman Doolittle, and Subcommittee on Water and Power Resources. Thank you for your invitation to speak before you today.

My name is Martha Davis. I have worked for over fourteen years on California water issues. For thirteen of those years, I was the executive director of the Mono Lake Committee, a 17,000 member citizen's group dedicated to the protection of Mono Lake in the eastern Sierra. A major component of the Committee's work focused on helping the City of Los Angeles to develop local conservation and water recycling programs so that saving Mono Lake would not impact the San Francisco Bay Delta or the Colorado River. As a result of this experience, I have a working familiarity with the urban water needs of California and, in particular, those of Southern California.

I stepped down from this position last year, but have continued to work on California water issues in various capacities. I currently serve as a member of the CALFED program's Bay Delta Advisory Committee (also known as BDAC) at the recommendation of Governor Wilson. In addition, I serve on the board of directors for the Mono Lake Committee, the Sierra Nevada Alliance and the Bay Institute of San Francisco.

I strongly support the CALFED process for seeking a solution to California's complex water issues. It is a process that is profoundly reshaping the way in which the State is thinking about its water future.

CALFED's task of laying out a blueprint for that future is far from complete. The draft CALFED program elements and environmental assessment documents have just recently been released for public comment. We are all sifting through thousands of pages of text and charts, trying to decipher if the assumptions and technical evaluations performed by CALFED are valid and whether the program elements contained in each alternative are adequate to ensure the best water future for California.

My State is not the only potential beneficiary of the CALFED program. States from the Pacific Coast to the rocky mountains, along with Canada, Alaska and Mexico, will benefit from improved fisheries, enhancement of the habitats within the Pacific Flyway, and increased water availability which will come from better management of the California's water supplies.

One of the major and potentially most troubling technical "gaps" in the CALFED analysis is the assumptions it uses about "how much" water California used in 1995 and "how much more" California will need by the year 2020 to meet the State's future urban and agricultural water needs. CALFED embeds these core assumptions into the "no action" scenario. And it is this scenario which serves as the baseline in the environmental analysis against which both the impacts and the benefits of the proposed Bay-Delta programs and alternatives are measured.

To estimate the 1995 and 2020 water needs, CALFED relied heavily upon the urban and agricultural water demand projections presented in the draft California Water Plan. Usually referred to as Bulletin 160-98, this document is prepared and updated by the State Department of Water Resources every five years.

The most recent version of Bulletin 160 was only released for public review four months ago, and now the accuracy of the DWR projections are being questioned by many people in California. Pages upon pages of comments and concerns have been sent to DWR seeking clarification and correction of Bulletin 160-98. Some have even called for an independent evaluation by outside experts. I have attached to my testimony examples of comments provided by several organizations.

Bluntly, the concern is that DWR has greatly overstated the State's urban and agricultural demand projections and substantially underestimated the potential for urban and agricultural water conservation and opportunities to recycle water. If this is true and the assumptions are not corrected in the CALFED analysis, then facilities may be proposed for construction that may not be needed in the next two to three decades—if ever. Further, if the proposals proceed as drafted, taxpayers could be facing costs as high as $8 to $14 billion dollars—and it is assumed that the CALFED program can not go forward without significant new Federal funding.

I have reviewed DWR's Bulletin 160-98 urban water demand projections and they do raise some troubling issues. Let me focus on the South Coast region as an example:

- B160-98 estimates that urban water usage in the South Coast region was approximately 4.3 million acre-feet in 1995. Yet the actual urban water usage for this region in 1995 was about 3.5 million acre-feet. This means that for 1995—the baseline year for the CALFED analysis—DWR *overestimates* urban demand by almost one million acre feet—and this is for just one of ten regions included in Bulletin 160-98. Inexplicably, DWR chose to use estimates of water demand for 1995 rather than the real data from 1995 that should have been readily available at the time of the analysis.
- B160-98 assumes that few *additional* urban conservation measures, above what is being done now, will be implemented in the South Coast region by 2020. DWR's explanation for is that the South Coast region has already "achieved" the goals set by DWR for conservation and so more does not need to be done. This assumption flatly contradicts the positions of the Los Angeles Department of Water and Power and other water agencies in the South Coast who are com-

mitted to continued implementation of urban demand management programs. As a result, B160-98 effectively overstates future water needs in the South Coast region.

• B160-98 drops from the final water accounting a substantial amount of water from its own estimates of the potential savings that could be achieved through through these measures. For example, DWR identifies over 500,000 acre-feet of potential conservation for the South Coast region, but only includes 90,000 acre-feet of this water in its final 2020 demand projections. Similarly, DWR identifies the potential to develop over 800,000 acre-feet of new water supplies from recycling and desalinization projects, but only "counts" 200,000 acre-feet in the final water balance. As a result, demand management programs for the South Coast region appear to be *underestimated* by at least one million acre feet for the year 2020.

• B160-98 includes the assumption that the CALFED program will be fully implemented by the year 2020, but then uses this assumption to limit the potential contribution of conservation and recycling measures in meeting California's 2020 water needs. Inexplicably, DWR incorporates into the analysis its own idea of what the CALFED Bay Delta preferred alternative is likely to be, (even though one has yet to be selected) but fails to provide a description of what this alternative is. Further, DWR assumes that the CALFED program, along with other options, will provide more water to the South Coast at less cost than many conservation and recycling projects.

• Finally, B160-98 assumes that there will be no technological improvements in water efficiency programs in the South Coast region over the next twenty years. This is assumption is inconsistent with our experience over just the last five years where major improvements in urban conservation technology have been coming on line every year. To underscore the point, it is hard to believe that just ten years ago, the Las Virgenes Municipal Water District in the South Coast region had to import low flow toilets from Sweden for its conservation program because none were produced in the United States. Today, low flow toilets are federally required and manufactured by all major plumbing suppliers in the country.

These are examples of some of the problems with B160-98. But the concerns that have been expressed by others go far beyond these points, and include criticism of the economic assumptions incorporated in B160-98, its planning methodology, and DWR's use of outdated technical assumptions in evaluating water efficiency programs.

The bottom line is that B160-98 appears to present in part a distorted and inaccurate picture of both current and future California urbanwater needs. It does this by artificially inflating urban demand figures for 1995 and 2020 and, paradoxically, minimizing the water efficiency measures that could help to meet projected State water needs.

Prior to 1990, many people were not familiar with water efficiency programs and were understandably skeptical about how reliably these programs could meet growing population needs. But the world has changed substantially since 1990, and most regions of the State have gone beyond talking about water efficiency programs and started implementing them.

The results are impressive. Let me give you three quick examples of success stories:

1. The City of Los Angeles. In the 1970's, Los Angeles used approximately the same amount of water as it is using today—only we are now serving almost 1 million more people. How did we do it? As recently as 1990, LA declared that it needed every drop of water from Mono Lake to meet the city's growing water needs. Since then, with support from title 16 Federal funds and AB 444 State monies, Los Angeles has invested millions of dollars in the distribution of hundreds of thousands of ultra low flow toilets and the development of other water efficiency programs. In addition, Los Angeles agreed to dramatically reduce its diversions from the eastern Sierra, and plans to meet its future growth through local conservation and recycling programs.

2. The Metropolitan Water District of Southern California. MWD and its member agencies have experienced similar success with their conservation programs. At the peak of the drought, MWD sold 2.6 million acre feet in imported water supplies (calendar year 1990). Since then, MWD developed its integrated resources plan, refocused its efforts on developing a more balanced mixture of local and imported water supplies, and helped the region to start to aggressively implement conservation, recycling and groundwater management projects. The result: MWD has reduced its imported water sales down—somewhat to its dismay—to 1.8 million acre-feet. This year is wet and MWD's imported water sales

are likely to be even lower—possibly below 1.6 million acre feet. This dramatic reduction in MWD imported water sales means that Southern California using currently using only about 25 percent of its 2 million acre-feet contractural State Water Project supplies.

The South Coast region, through MWD and its member agencies, has taken a leadership role in the State on urban conservation. It is a model for other parts of California to follow. Now, the primary challenge facing MWD is to stay on this successful path. There are already signs that MWD is beginning to pull back on its current conservation commitments, paradoxically because the water is not seen as now being needed.

3. Panoche Water District. Urban water agencies are not only ones that are making substantial investments in improved water management. I recently visited Panoche Water District, which is located on the west side of the San Joaquin Valley and is part of the San Luis Unit of the Central Valley Project, to see the fine work they are doing in their drainage reduction program. In less than two years, the district has eliminated tail water flows, installed water efficiency irrigation systems and substantially modified its water management practices. The result: the district has reduced its drainage by 50 percent from dry year flows and is saving applied water. The program is impressive, demonstrating how valuable water efficiency measures can be to the agricultural community.

In closing, I want to underscore the obvious point: we all need to have good quality information about California's current and future water needs if we are to make the right decisions for California's water future. B160-98 does not appear to meet this test.

Too much is at stake, here in California and throughout the West, to accept less than an accurate, well documented presentation of the State's water demands. We, in California, need this quality information in order to assess and identify the right combination of measures to include in the proposed CALFED program. The mountain counties need it, Southern California needs it, Northern California needs it, the farmers in the Sacramento River Valley need it, the commercial and sport fisherman need it, the farmers on the east and west side of the San Joaquin Valley need it, the environmental community needs it, the business community needs it, the delta farmers need it, and the affected land owners need it.

Congress, too, needs this information in order to decide what level of Federal funding for future CALFED programs may be appropriate.

The potential implications for the CALFED program are profound. The assumptions of B160-98 are embedded in the analytical framework of the environmental documents. B160-98 must be critically evaluated so that, if needed, the CALFED technical evaluations can be redone. Only then will we be able to draw a conclusion about what is the best water alternative for California's future.

Statement of Stephen K. Hall, Executive Director, Association of California Water Agencies (ACWA)

Mr. Chairman and Members of the Subcommittee, thank you for providing me an opportunity to appear before you today and submit this statement regarding CalFed's progress. I am the Executive Director of the Association of California Water Agencies (ACWA). As you likely know, ACWA is a statewide, non-profit association which represents more than 440 public water agencies who collectively manage and deliver 90 percent of California's urban and agricultural water.

California's water resources are finite, while its population and economy continue to grow. At last week's ACWA Spring Conference, Governor Pete Wilson announced that California grew by an additional 580,000 people last year; putting our population at 33,250,000. The State is projected to continue this growth spurt, which is why the Department of Water Resources recently projected a 3 to 7 million acre-foot annual shortfall in water supply by 2020.

No single demand side management or water supply development option can be implemented to address that pending shortfall and the attendant reliability concerns facing all stakeholders. Water conservation alone cannot address the shortfall, water reuse alone cannot, new dams and reservoirs cannot, water transfers cannot. Parties can quibble about the details, but the bottom line is that in the very near future we are going to have too many demands on a system already stretched to the limit, and it will take a package of measures to fix the problem. That is why ACWA is participating in and strongly supports CalFed and its approach, which calls for a balanced package of additional storage, improved Delta conveyance, water conservation, reclamation transfers, environmental restoration and other measures.

Clearly though, additional storage has to be among the elements that has high priority.

Our current system includes key projects like the Federal Central Valley Project (CVP) and California's State Water Project (SWP). The CVP has a storage capacity of 11 million acre-feet and delivers about 7 million acre-feet of water to agricultural and urban uses. The SWP delivers about 2 million acre-feet annually to farms and cities. The single most important aspect of California's complicated water system is the Sacramento-San Joaquin River Delta. Its channels through the state and Federal projects provide drinking water for two-thirds of the state, in addition to irrigation water for more than 4.5 million acres of the nation's most productive farmland.

This is an impressive system, but it is far less than what we see on other river systems. According to the California Department of Water Resources, total storage on the Sacramento River system with average annual runoff of 22 million acre-feet is less than one-year, or 16 million acre-feet. In comparison, the Colorado River system, with an average annual runoff of only 15 million acre feet, boasts a storage capacity of 60 million acre-feet, or enough for a four-year supply.

The lack of storage capacity has led to the tension between operating the system for flood control, the protection of life and property, and operating the system for water supply to meet the needs of the nation's largest economy. And the problem is growing worse. Since the last major element of our water management system was added in the early 1970s, the state's population has essentially doubled. Local water managers have done a good job in balancing this tension. Urban water managers have managed to meet the needs of the rapidly growing population through conservation, reclamation, and innovative water transfers and exchanges. Meanwhile, California agriculture is today producing 50 percent more in food and fiber with the same amount of water that it was using 20 years ago. We are also doing a better job of protecting lives and property. The floods that have occurred in recent years could have been far more devastating had it not been for strong efforts to coordinate the local, state, and Federal flood control operations. This remarkable record is testimony to the strides California's water professionals have made in managing the state's most important resource.

We can do more in the way of water management, and we will; however, the experience of 1997 has shown the deficiencies in our system that not even innovative management can overcome. The devastating floods of January 1997, followed by water delivery cutbacks later in the year, point out that our existing system must be improved and expanded in order to protect California from floods while maintaining a healthy environment and a strong economy.

That is why the California water community is strongly supporting a major water bond issue supported by Governor Wilson and carried by the two chairmen of the water committees in the state legislature. The bond issue will provide badly needed funds to study specific storage proposals, focusing on conjunctive use and off-stream storage. It will also provide funds that are way overdue for additional flood control. It will provide funds for investments in safer drinking water, source water protection, and water conservation. In summary, this bond issue promises to give us a running start on some of the most important elements of the CalFed program.

Some may say it is premature to discuss storage at this point in the process because specific storage projects have not yet been selected by CalFed. However, those same people argued strongly two years ago that ecosystem improvements needed immediate funding, even though there were no specific ecosystem proposals at the time. Nevertheless, that funding was made available through a statewide bond issue and matching federally authorized funds. Now, it is time to move forward on water supply and water quality measures, which are equal in importance to ecosystem restoration.

Another issue raised by critics of this bond measure is that a general bond measure that pays even for studying storage constitutes a subsidy to water users. The argument has already been addressed, since the bond issue provides that the beneficiaries will pay the full cost of any water supply that is ultimately generated. It should be noted that storage has public benefits and therefore should be—in part—paid with public funds.

The conclusion we have drawn is that we must move forward soon on improvements in water supply and water quality, and that this bond measure provides an excellent opportunity to begin that forward movement. If we fail to act now, it will be two years before we can bring another bond measure before the voters, and that will put us two years farther behind in meeting our needs. We believe Californians should have the opportunity now to tell water managers and policy makers whether they support public investment in promoting improved water supply and quality.

Virtually all parties agree that CalFed is an historic opportunity to address critical water problems in the state, both for the environment and our quality of life.

In order for CalFed to deliver on that promise, it has to produce a balanced plan that truly provides for California's present and future needs. That will mean the plan has to contain all of the elements listed in the opening paragraphs of this testimony. Every credible projection of California's water demands and supply show this to be the case.

In decades past, California met its water needs by simply adding more storage or conveyance. For the past three decades, we have focused on managing demand to stretch existing supplies. Now, maybe we can strike a balance between the two, and address them in tandem rather than to the exclusion of one or the other. CalFed is the vehicle to strike this balance. The current water bond issue is an excellent way to fuel that vehicle. We support both and we are urging others to do the same.

STATEMENT OF ROBERT G. POTTER, CHIEF DEPUTY DIRECTOR, DEPARTMENT OF WATER RESOURCES

INTRODUCTION

Mr. Chairman and members of the Subcommittee, thank you for providing me an opportunity to submit this statement regarding financing the CALFED Bay-Delta Program. My name is Bob Potter. I am the Chief Deputy Director for the California Department of Water Resources. The Department of Water Resources operates and maintains the State Water Project and prepares and updates the California Water Plan. I represent the Department on the CALFED Policy Group.

It's too soon to get too specific about financing the CALFED program given that we haven't yet identified a preferred alternative, much less gained agreement to proceed on implementation. Nevertheless, there are a number of factors and principles that should be considered as we prepare for implementation.

BACKGROUND FACTORS

- The Central Valley Improvement Act of 1992 took 800,000 af of CVP yield away from CVP farms and cities and allocated it to the environment.
- The Delta Accord of 1994 took 1,000,000 af of combined CVP/SWP yield away from California cities and farms and farmers and allocated it to the environment.
- Thus far, there has been no compensation provided to ag and urban water users for these reallocations.
- At this point in time there is no clear picture of how much water supply will be provided by the CALFED program or how those supplies will be allocated.

SOME PRINCIPLES

- There is support for the concept of user pays. There is also support for the concept of beneficiary pays. Generally in California we all use water and we all benefit from our states healthy economy which is supported in no small part by reliable water supplies provided by State and Federal water development programs.
- Many years ago when I was just beginning my career in water the U.S. Senate published its famous "greenbook" which provided detailed procedures for allocating costs in recognition of beneficiaries gains. Water planners struggled mightily over the years to implement these procedures. Given the complexity of the CALFED package sorting out the beneficiaries will prove to be a real challenge.
- Generally speaking on public policy we return to equity not economics in arriving at who pays.

CLOSING

The State of California has been and remains committed to the CALFED process. The Governor supported Proposition 204 which provided nearly $400 million for CALFED environmental programs. The Governor has proposed an additional water Bond measure for this fall. This Bond measure would provide additional "seed money" to finance the first phase interim CALFED programs. It would appear that there will eventually need to be a larger Bond measure to finance some or all of the roughly $10 billion CALFED package.

LETTER FROM HON. PETE WILSON, GOVERNOR, CALIFORNIA

May 4, 1998

The Honorable JOSEPH M. MCDADE,
Chairman, Subcommittee on Energy and Water Development,
Committee on Appropriations,
U.S. House of Representatives,
Washington, DC 20515

Dear Mr. Chairman:

I would like to take this opportunity to share with you California's priorities among the programs funded through the energy and water development appropriations bill.

My top priority continues to be full funding of the $143.3 million requested in the President's budget as the initial Federal contribution toward the restoration of the San Francisco Bay-Delta I appreciate the $85 million provided for this program by Congress in fiscal year 1998. We will spend that money wisely and expeditiously. The watershed feeding the Bay-Delta is the source of nearly half the nation's fruits and vegetables, as well as drinking water for 22 million Californians. Environmentalists, farmers, and urban water users have all banded together with numerous state and Federal agencies in an unprecedented coalition to find a non-litigious solution to the water disagreements that have long plagued our state.

I have a number of other priorities funded through your bill that I encourage you to support:

Corps of Engineers

- a $49 million increase to the $11 million budget request for the Los Angeles County Drainage Area Project. This authorized project is exceedingly well justified from an economic perspective, and is vital to protect lives in this burgeoning area of the country. The small amount requested in the budget would significantly delay completion of the project and pose unacceptable risks to public safety. Non-Federal sources will contribute 25 percent of the cost of the project.
- a $56 million increase to the $20 million requested for the Santa Ana River Mainstem project, for continued construction at Seven Oaks dam, work on the Santa Ana River, and beginning construction of Prado Dam. Three million people live in the area that will be protected by this project, where a major flood could cause $15 billion in damages and threaten countless lives. Non-Federal sources will contribute 35 percent of the cost of the project.
- a $4 million increase to the budget request for the Corps of Engineers, under section 206 of the Water Resources Development Act of 1996, as the Federal half of the costs of completing the environmental restoration at the abandoned Penn Mine in Calaveras County, California.
- a $500,000 increase to the budget request for the Corps of Engineers as a Federal contribution to cooperative efforts with California local governments to control the invasive non-native plant arundo. Arundo is a giant reed that is established in the San Gabriel River watershed and is rapidly invading the Santa Ana River watershed. It destroys native fish and wildlife habitat, consumes great quantities of water, and clogs water channels to the point where flood damage is greatly increased. Arundo is among the increasing number of invasive species posing significant economic and ecological problems in California and around the country. The increase would be divided between the intergovernmental Team Arundo that operates in the Santa Ana watershed ($100,000), and its counterpart Team Arundo Angeles that would use $400,000 to eradicate arundo from the Whittier Narrows area of the San Gabriel River watershed.

Bureau of Reclamation

- an increase of $5.2 million in Bureau of Reclamation construction funding for continuing work on a permanent pumping plant to increase water supply reliability for the Placer County Water Agency and reduce Federal costs over the long term. This funding would be in lieu of the up to $1 million that has been annually spent for more than thirty years by the Bureau to install a temporary pump to fulfill its contractual obligation.
- an increase of $5.2 million above the Bureau of Reclamation's $12.3 million budget request for the Colorado River Salinity Control Program, funded through the Water and Related Resources account. This increase, coupled with the non-Federal cost share, would begin to work down the backlog of worthy proposals needing funding.

- a $3.1 million increase to the $1 million request for environmental and engineering studies, and flood easements in the area of Arroyo Pasajero. This work is necessary to protect the vitally important California Aqueduct against flood damage, and to protect lives in the communities in the immediate vicinity of Arroyo Pasajero.
- an increase of $600,000 to the budget request for the Bureau of Reclamation's Regional Wetland Development Program, to be highly leveraged by state and local matching funds, for wetland restoration and floodplain management at Trout Creek near South Lake Tahoe, California. Although the Clinton Administration generated much press activity with respect to Lake Tahoe last summer, the budget request for programs to actually restore the lake is disappointing. My state budget for the coming fiscal year contains $11.5 million in new funding, contingent on new matching Federal funding.
- an increase of $3.7 million to the disappointing and token $250,000 budget request to continue work on fish screens at Rock Slough for the Contra Costa Canal. These screens are required by the Central Valley Project Restoration Act, and will address endangered species issues facing Contra Costa County. Interior has never requested the necessary funds for the project, although non-Federal funds are available to cover the 25 percent match. Thank you for providing $1.5 million for this project in fiscal year 1998. I urge you to provide $4 million in fiscal year 1999 so the project can stay on schedule.
- a $400,000 increase to continue the Sacramento River Winter-Run Chinook salmon captive broodstock program, which is in its seventh year and has demonstrated biological and technological successes that will contribute to salmon conservation in other regions.

I also urge you to support the $49.5 million requested in the Bureau of Reclamation's budget for the Central Valley Project Restoration Fund. These monies are for environmental restoration in the area affected by the Federal Central Valley Project, and are actually funded by payments from water and energy users.

Finally, I urge you to significantly increase funding for the Corps of Engineers for navigation, port, and harbor projects, including navigation studies, engineering and design work, construction, and operations and maintenance. The large cut in the President's budget for the Corps of Engineers is economically unjustifiable, and if enacted, would severely hamper America's competitiveness in international trade.

Thank you very much for your consideration of California's priorities.

Sincerely,

PETE WILSON,
Governor.

STATEMENT OF DR. TIMOTHY H. QUINN, DEPUTY GENERAL MANAGER, METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA ON BEHALF OF THE BAY-DELTA URBAN COALITION

Introduction

Mr. Chairman and members of the Subcommittee, thank you for providing me an opportunity to submit this statement regarding financing the CALFED Bay-Delta Program. My name is Timothy Quinn. I am a Deputy General Manager for the Metropolitan Water District of Southern California, although I am appearing today on behalf of the Bay-Delta Urban Coalition. The Bay-Delta Urban Coalition (Urban Coalition) represents urban water agencies from northern and southern California that supply drinking water to over 20 million Californians.[1]

The members of the Urban Coalition have been active participants in the CALFED Bay Delta process since its inception and are committed to working though CALFED to hammer out the best solution package. The next six months will be a critical decision-making period for the CALFED agencies and all the interested stakeholder groups. The challenge will be to craft a solution that provides broad benefits throughout California—for the environment and for urban and agricultural water users.

This brief statement is intended to answer the questions raised in the letter of invitation to this panel by enunciating several key principles which the urban com-

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[1] Representatives of the Bay-Delta Urban Coalition include the Alameda County Water District, Coachella Valley Water District, Central & West Basin Waters, Central Coast Water Authority, East Bay Municipal Utility District, Metropolitan Water District of Southern California, Municipal Water District of Orange County, San Diego County Water Authority, San Francisco Public Utilities Commission, Santa Clara Valley Water District, and Solano County Water Agency.

munity believes will be central to the development of a viable financing package for a preferred CALFED alternative.

1. The finance plan must be founded on a CALFED solution that produces widespread value.

With California expected to grow in population to nearly 49 million people by the year 2020, one of the major challenges we face is how to provide a sufficient, safe, reliable water supply to meet the needs of households, industries, farms, and the environment. Although still a work in progress, the CALFED process has made more progress and has a greater chance of ultimate success than any of the previous efforts to tackle this problem during the last three decades. After years of conflict and a shrinking water resources pie, for the first time in a generation, California has the opportunity this year to make major decisions that will create value for a wide range of interests. Any successful financial plan must, first and foremost, have the foundation of a preferred alternative that generates value for those who will be asked to pay a portion of the costs, whether through increased water rates or higher taxes.

For the environment, the CALFED ecosystem restoration program will be historically unprecedented anywhere in the nation. Already underway with state and Federal funds provided by California Proposition 204 and the 1996 California Bay-Delta Environmental Enhancement Act, the habitat improvements of the CALFED ecosystem restoration program will fortify our efforts to achieve the restoration goals of the Central Valley Project Improvement Act. For urban California, an effective CALFED solution has the potential to substantially improve source drinking water quality and provide a stable transportation and storage infrastructure that will be required to meet the needs of a growing economy. (In a 1996 public opinion poll, 9 out of 10 Californians stated we need a sufficient, reliable and affordable water supply to maintain a strong economy. For agricultural interests, the CALFED program can provide assurances that we will sustain the largest agricultural economy in the nation while transitioning to a new regime of natural resources management that will meet the environmental and economic needs of the twenty-first century.

Beyond California, improvements in the Bay-Delta estuary will favorably impact aquatic and avian ecosystems in other western states. The Bay-Delta system provides the largest wetland habitat and estuary in the West. It supports 750 plant and animal species, some found nowhere else in the nation. It is a critical part of the Pacific Flyway over which hundreds of migrating birds travel each year from Mexico to the Canadian border.

Just as the CALFED program must generate widespread benefits, funding must be made available from diverse sources. Members of the Urban Coalition have long supported user fees paid by those in urban and agricultural areas who use water as a primary source of funds to pay for a CALFED solution. The benefits to water users from improved water quality and reliability will be substantial and, accordingly, they should be willing to pay an appropriate share of program costs. Similarly, many of the benefits of a CALFED solution will be broadly enjoyed by the public at large, and state and Federal financial resources should be available to pay a portion of program costs. Of course, no specific allocation of costs can be identified until the CALFED preferred alternative is selected later this year.

2. CALFED Must Aggressively Pursue Cost Containment While Maintaining Benefits.

A second fundamental principle is that the CALFED program must provide benefits at the lowest possible cost. Current estimates of the overall costs of the CALFED program range from approximately $9 to $11 billion. Quite frankly, we believe these cost estimates are considerably inflated and the potential value of a CALFED solution can be obtained at a substantially lower cost. The Urban Coalition is committed to work with the CALFED agencies and other stakeholder interests to aggressively pursue cost containment strategies which will assure any preferred alternative is implemented at the lowest possible overall costs.

3. Costs Should Be Shared Consistent With the Beneficiaries Pays Principle and Allocated in a Mutually Agreeable Manner.

The Urban Coalition is committed to the principle that beneficiaries must pay for the value received from a CALFED solution. At the same time, we are concerned if this principle is implemented in an arbitrary manner it could result in imposed costs on some water users which are not matched in their view by commensurate benefits. For this reason, we believe that as part of the broad negotiations required to define and implement the CALFED Bay-Delta program, costs should be allocated on a mutually agreeable basis. This approach would provide all parties who have a significant financial stake with a voice in the determination of who benefits and how they are expected to pay. This principle should be applied equally to water agencies and to taxpayers, and be implemented through appropriate regulatory and legislative procedures and/or a vote of the citizens.

The purpose of this third fundamental principle is to assure all interests which provide major financial support can determine for themselves that they expect to receive benefits which justify their costs. This principle also creates a strong linkage between cost allocation and the CALFED assurances package. No interest group will be inclined to pay a portion of the costs of the CALFED program unless they believe the assurance package guarantees a flow of benefits commensurate with their cost allocation.

4. The Financial Plan Should be Based on a Prospective Assessment of Value and Not a Retrospective Assignment of Blame.

The goal of the CALFED program is to realize both early-start and long-term benefits to the environment and economy of California. To be successful, the CALFED process must be forward looking. For this reason, the Urban Coalition believes that basing financial decisions on perceptions of past responsibilities for mitigation or damage payments is counter productive. Human activities and social policies have affected the Delta ecosystem for over 100 years, beginning with hydraulic mining processes and reclamation in the 1800's, as well as many other natural processes. While water diversions from the watershed have undoubtedly affected the ecosystem, many other human activities have also affected the Delta. We believe that it is impossible to prove the level of damage attributable to individual factors to the satisfaction of all parties. Focusing on blame for past acts will not lead to solutions; it will only lead us back into divisiveness and the regulatory and political gridlock that CALFED has allowed us to escape.

Conclusion

Ultimately, CALFED financing decisions must be based on a prospective assessment of anticipated value from the proposed solution and a willingness to pay as expressed by all the financial participants. Although program costs will be substantial, so too will be the value for California and the nation of a successful CALFED program. We in the urban community are dedicated to working with you, Mr. Chairman, members of the Subcommittee, and all others in the process to identify a feasible financial plan which will allow us to implement an affordable CALFED plan that generates enduring value for the environment and for the urban and agricultural economies of California.

STATEMENT OF RICHARD K. GOLB, EXECUTIVE DIRECTOR, NORTHERN CALIFORNIA WATER ASSOCIATION (NCWA)

Mr. Chairman, members of the Subcommittee, my name is Richard Golb, I am the Executive Director of the Northern California Water Association (NCWA). NCWA is a non-profit association representing sixty-six private and public agricultural water suppliers and farmers that rely upon the waters of the Sacramento, Feather and Yuba rivers, smaller tributaries, and groundwater to irrigate over 850,000 acres of farmland in California's Sacramento Valley. Many of our members also provide water supplies to state and Federal wildlife refuges, and much of this land serves as important seasonal wetlands for migrating waterfowl, shorebirds and other wildlife. I would appreciate the Subcommittee's inclusion of my written testimony in today's hearing record.

The Subcommittee's interest in the CALFED Bay-Delta Program (CALFED) and specifically the allocation of Federal funds for ecosystem restoration is appropriate given the importance of a successful resolution to the environmental and water supply problems in the Sacramento–San Joaquin River Delta and San Francisco Bay (Bay-Delta). The Bay-Delta is a tremendous economic and environmental resource to California and the Nation, and there is much at stake in how CALFED implements its ecosystem restoration actions. CALFED's response to the Subcommittee's questions will also be useful for private interests participating in this process.

I appreciate the opportunity to provide NCWA's perspective on CALFED. NCWA has actively participated in the CALFED process, as a signatory to the 1994 Bay-Delta Accord and a participant in the development of California's Proposition 204 and the Federal Bay-Delta Security Act (Public Law 104-333). Two representatives of NCWA's Board of Directors, Chairman Tib Belza and Director Don Bransford, serve on CALFED's Bay-Delta Advisory Council, and I am a member of the Ecosystem Roundtable—the entity chartered to allocate state and Federal ecosystem restoration funds.

The specific questions the Subcommittee has posed focus directly upon evaluating the effectiveness of Federal funds appropriated to partially finance CALFED's ecosystem restoration programs and projects, some of which are years away, and some of which are now underway. The Subcommittee has also requested our perspective on whether CALFED should implement its plan as designed or amend it based upon the principle of adaptive management. Similar questions have been raised by California's Legislature, local governments, by CALFED's Ecosystem Roundtable and by public and private interests with an immediate stake in efficiently achieving environmental restoration with limited resources.

1. How do we evaluate the effectiveness of the funding we are providing?

CALFED's draft Ecosystem Restoration Program establishes specific objectives, targets and programmatic actions designed to accomplish CALFED's overall mission ". . . to develop a long term comprehensive plan that will restore the ecosystem health and improve water management for beneficial uses of the Bay-Delta ecosystem." If successful, the plan should rehabilitate native fish and wildlife species and their habitat in the Bay-Delta system, and increase water supplies and reliability for California's cities, businesses and farms. One measure of success of the overall program is an improving environment, achieved in part by implementation of restoration projects that resolve known problems. For example, the installation of fish screens on agricultural diversions to prevent the entrainment of fish species. Program success will also be indicated by decreasing regulatory disruption of water project operations, and reduced regulations on individual agricultural water suppliers and farmers.

Many of the private interests following CALFED, such as Sacramento Valley agricultural water suppliers and farmers, are financially participating in cost-share arrangements with CALFED agencies on specific restoration projects. Nearly a dozen water suppliers throughout the Sacramento Valley are engaged in the study, design or construction a fish screen or passage project to protect candidate, threatened and endangered fish. Some of these projects are now complete, such as Western Canal Water District's Gary N. Brown Butte Creek Siphon Project. This unique project resulted in the installation of a concrete siphon to convey agricultural water supplies under Butte Creek, allowing the removal of several small dams that historically hindered spring-run salmon migration to spawning habitat. Completion of this project illustrates the effectiveness of restoration actions in providing immediate benefits to the environment—in this case for spring-run salmon, presently listed as a threatened species under California law and proposed for Federal listing—and for the local community and area farmers who benefit through development of a more reliable water supply.

As with Western Canal's farmers, other agricultural water users in the Sacramento Valley have a vested interest in ensuring state and Federal funds are effectively managed to ultimately improve the fishery, and alleviate regulatory mandates. Their participation is based on the belief the projects will succeed, and are an effective way to restore salmon species and protect landowners from burdensome regulations. Their financial stake in these projects means they will actively oversee the government agencies carrying out the projects.

2. What clear and unambiguous performance standards are being adopted to determine if we are close to success or have achieved success?

As this Subcommittee is well aware, it is difficult to establish performance and monitoring standards on complex and dynamic ecosystems, such as California's Bay-Delta. State and Federal resource agencies, and private interests, have encountered similar difficulties in assessing the effectiveness of restoration in the Pacific Northwest and the Florida Everglades. Moreover, CALFED will attempt to apply its yet to be developed standards on specific projects, and the entire program, in an ecosystem that has sustained natural and human damage; which continues to change. Complicating this task is task is a lack of full biological information of the effects these continuing natural and artificial processes have on fish and wildlife, and their habitat. Additionally, natural events can overwhelm our best efforts and mask success. Wildfires in the Shasta or Sierra watersheds, drought, or damaging winter storms—such as the 1997 storms that produced the worst flood in California history which swept millions of young salmon prematurely to the Pacific Ocean—can devastate fish and wildlife and their habitat.

An additional difficulty in assessing this program's success, and its individual actions, is CALFED's plan to implement projects that will replicate natural processes associated with instream flows, stream channels, watersheds and floodplains. CALFED proposes to accomplish this objective primarily by the acquisition of farmland and water supplies to create river meander corridors, riparian forests, and increased instream flows. The proposed implementation of these particular actions raises legitimate concerns for upstream and downstream communities, landowners and water suppliers.

CALFED's Ecosystem Restoration Program recommends the implementation of nearly 700 actions over a thirty year period, however, work has already begun on several of the program's main elements. For example, CALFED's draft environmental impact report and impact statement, released in March, recommends the acquisition of roughly 200,000 acres of Central Valley farmland (30,000 acres in the Sacramento Valley) to meet certain goals outlined in the Ecosystem Restoration Program. CALFED proposes to allocate $14 million in fiscal year 1998 Federal funds to acquire private property in order to create meander corridors along the Sacramento, San Joaquin and other Central Valley rivers.

CALFED's staff acknowledges the scientific uncertainty underlying the potential benefit to fish and wildlife from these actions. River meander and riparian forest projects necessarily require the acquisition of land along a river or stream in order, for example, to allow the river to inundate land during high flow periods. There are numerous consequences that may arise as a result of these projects, including river level and flow fluctuations and increased sediment and debris loading, which threaten existing water diversions and fish screens. Due to the unpredictable nature of these projects, and the risks they present, NCWA encourages CALFED to initially focus on restoration actions that fix known fish and wildlife problems. We recognize, however, a limited number of actions that attempt to replicate natural processes may be necessary to restore habitat for at-risk species.

There are several specific steps CALFED should consider before embarking on a large-scale river meander plan in order to avoid adverse social, economic or environmental affects to local communities, landowners, and water suppliers. This is consistent with CALFED's stated principle of implementing actions and a long-term plan that does not result in the redirection of adverse impacts.

NCWA has encouraged CALFED to consider adoption of a pilot program that may serve as a model for its future projects involving land acquisition. Although the specific principles of our recommendation are still under development, our goal is to accomplish restoration actions compatible vith economic activities, including farming, water district operation and flood control protection.

A first step is to attempt to utilize public lands with similar ecological characteristics prior to acquiring private property to achieve restoration measures. If public lands are unavailable, conservation easements, rather than outright fee title acquisition, should be a priority, and all acquisitions must be voluntary. Completion of California Environmental Quality Act and National Environmental Policy Act requirements should be initiated before the acquisition of private property. In cases where California Environmental Quality Act compliance is not required, such as the acquisition of rights to allow an existing levee to degrade and fail, a representative public process should be developed to determine the selection and implementation of specific actions. Establishment of a representative public process to ensure local involvement must be a cornerstone of any land acquisition program. Finally, CALFED must adopt clear assurances, or legal guarantees, that address issues of liability for future damage resulting from project implementation, as well as local tax and assessment responsibility.

3. Are we going to postpone any major program decisions or alternatives until we have the results of the early phases? Or are we going to agree on a basic blueprint and simply adjust it through adaptive management as we move along?

It is our understanding CALFED intends to utilize adaptive management in its implementation of the overall plan, including the staging of various program elements such as new storage projects—which will provide additional instream flows. Certain features of CALFED's Ecosystem Restoration Plan should be implemented now, especially projects that will resolve known problems and provide immediate environmental and economic benefits.

California's recent response to the declining spring-run salmon population is a good example of the benefit of implementing broad based restoration actions before the species is listed under Federal law, and the ensuing regulatory gauntlet hampers all voluntary recovery efforts. The United States' recent listing of the steelhead as threatened, and the proposed listing of the fall-run, late-fall run and spring-run salmon are further incentive to initiate restoration actions now that will hopefully alleviate punitive Federal regulations later. Adaptive management is a useful tool to guide project selection and implementation given dynamic natural conditions, such as drought and floods. Projects that require additional analysis to determine their merit should be delayed, or implemented on a pilot project basis, until

CALFED has established a better biological baseline, and expectation, of their potential benefit.

In conclusion, NCWA supports additional Federal funding for the CALFED program consistent with the Federal Bay-Delta Security Act, and we offer our continued assistance to Congress and the Subcommittee on Water and Power to respond to these issues in the future.

STATEMENT OF DICK DICKERSON, PRESIDENT, REGIONAL COUNCIL OF RURAL COUNTIES

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITEE:

I want to thank you for the opportunity to provide testimony on behalf of the Regional Council of Rural Counties (RCRC) to the Subcommittee with regards to the CALFED Bay-Delta Program's, public participation program.

I am the President of the RCRC, and organization of twenty-seven rural California Counties. Our membership encompasses a broad geographic area stretching from the shores of Mono Lake to the shores of Clear Lake, from the valley floor of Yosemite to the top of Mount Shasta, from the rich farmlands of the Sacramento and San Joaquin Valley to the dense Sierra forests. Our members are located within San Joaquin, Sacramento and Trinity Watersheds. Collectively, our members are the "source" areas for the San Francisco Bay-Delta. It is from our membership that over eighty percent of the water for the Delta comes. Our twenty-seven member counties number nearly half of all of California's fifty-eight counties.

The forests from within our membership area include the most significant snow pack areas in California. The water storage in those snow packs dwarfs the capacity of all of the reservoirs in the state. Snow melt during the spring and summer months is what keeps the Delta ecosystem alive. The health of the watersheds in our membership areas are, to the great extent, the early indicators of the health of the Delta's ecosystem not by any law of man, or map in a Federal office, but by the laws of nature. Any successful Bay-Delta solution will depend upon actions in our membership area, to implement ecosystem restoration, watershed management, water transfers, new water storage facilities and existing storage re-operation.

The Congressionally ordered Sierra Nevada Ecosystem Project Report, completed in 1996, concluded that the most valuable resource in that mountain range was water. Water accounted for sixty cents of every dollar of all natural resources values including timber, mining, recreation and grazing. Water is not only the lifeblood of the Delta ecosystem it is also the liquid gold of California's economy.

RCRC has participated in the CALFED Bay-Delta program since early 1996. Through the past two years we have actively supported a CALFED solution and willingly worked to achieve a balanced solution. We have worked very hard to assure that there would be a watershed restoration component in the CALFED Common Program Elements. We strove to develop an Ecosystem Restoration Program Plan, which would be grounded in reality and site specific—taking advantage of local expertise. We have advocated an open public process not only in the current CALFED program, but also in actual implementation actions and governance.

RCRC is represented in the CALFED process at three levels. Our Water Committee Chairman (Robert Meacher, Plumas County), serves on the Bay-Delta Advisory Committee (BDAC). Our water and natural resources consultant John S. Mills, services the Ecosystem Restoration Roundtable. Mr. Meacher, Mr. Mills and other RCRC elected officials and staff also participate in numerous BDAC work groups such as; ecosystem restoration, water transfers, assurances, and finance.

The expectation for adequate public participation within CALFED is predicated on the ability of the public to understand the subject matter. To have the opportunity to meaningfully express their interests and concerns to those making decisions and for those making the decisions to evaluate and respond to public input. This is, when effective, an interactive and ongoing process.

The CALFED Bay-Delta Program, if completed, will be the most complex ecosystem restoration program ever carried out within the United States. It will affect the lives of tens of millions of Californians now and hundreds of millions yet to come in the future.

It will cost billions of dollars and involve the use of significant portions of California's land area to achieve success. This process should involve not only water managers and Federal and state agency personnel, but also the general public whose lives will be affected by a CALFED solution. The solution will be complex and should involve, to the greatest extent possible, as much of the public as is practical.

Notwithstanding the participation of RCRC I have referenced, we believe that there are two very serious problems with the CALFED public participation program and that they are inextricably linked.

It is our experience that the CALFED schedule is too short. It fails to allow time for most of the affected parties to even become acquainted with the information being presented let alone provide meaningful input. While it is true that the process has been underway for over two years, it is only the past six months that clear project features and components of a solution have been assembled in any understandable manner. It is only in the past two months that a Draft Environmental Impact Statement has been released for public review and comment. Unfortunately, during this same time period the California Department of Water Resources released their Water Plan Update (Bulletin 160-98) with an April 15 deadline for comment.

The Bureau of Reclamation set an April 17 deadline for comments on their own 5,000 page Programmatic Environmental Impact Statement. To comply with CVPIA. Most local governments were simply overwhelmed with the paper load. For the general public, faced with earning a living, the invitation to "participate" in these processes on that schedule was quite impossible.

In addition, providing meaningful comments was further frustrated by significant portions of a CALFED solution package being incomplete at this time. For while we now know what the various alternatives for conveyance are, there are missing pieces to the puzzle. For example:

- There is no Assurance package. For our membership the issue of protections and guarantees of performance is of paramount importance.
- There is no Water Transfers package. Water transfers, while an important component of any CALFED solution, pose the most direct threat to our source areas economies if not properly designed and implemented.
- There is no complete Watershed Strategy. At best CALFED has put together a strategy of how to do a watershed strategy. The watershed restoration and management component of a CALFED solution is critically important to our members.
- There is no clear direction on new surface storage. Without new storage of surface water, the chances of producing a CALFED solution that would not negatively affect our members, is very slim.

Therefore we feel that we are being forced to comment on an incomplete CALFED package in an unrealistic time frame. We are not optimistic that our comments would have any influence on the process given the lack of time for CALFED staff to evaluate and incorporate changes. We must underscore that we do not feel meaningful public input can be accommodated in the CALFED process given it is to be completed in the next seven months. That is a schedule for confrontation not consensus.

We believe that the public involvement in the CALFED process has been structured in such a manner as to make it very difficult for meaningful participation. For example, Mr. Meacher, our BDAC representative has at times received his meeting agenda packet less than 24 hours before a BDAC meeting. He cannot be expected to read, assimilate and provide meaningful suggestions on a two-inch thick document in such a short period of time.

Most CALFED meetings take place in Sacramento. While this is convenient for the agency personnel, most of the interested public are located elsewhere. CALFED's recent regional meetings throughout the state for the Draft Environmental Impact Statement are an improvement. However, they are too little too late.

Regular CALFED regional workshops, on specific subjects, should have been held throughout the solution area, not just in Sacramento. This latter problem has resulted in increasing landowner concerns in our member counties regarding just what it is CALFED is doing and how it will affect their way of life.

The CALFED Ecosystem Restoration Program Plan, a multi-volume plan to restore the environment of the Delta, was mailed out to only 550 recipients—according to CALFED's own mailing list. CALFED's choice of who the document went to was also of concern. In one State Senate District in the Sacramento Valley, only two farm bureaus received copies. No copies were received by Women in Agriculture or by any Chamber of Commerce. However, more than twenty-five copies went out to environmental groups such as the Sierra Club, the Nature Conservancy and Restoring the Earth. Also on the "A" list of recipients were universities which received twenty copies in places as far away as U.C. Riverside and Berkeley. Federal and state agencies obtained over forty copies. Those who stood to be most affected by the plan, those who's land might have been "retired" or those whose water rights might be acquired, or those whose land might be converted to habitat, were left in the dark. Public frustration, expressed to us, the local elected officials, was significant. They have asked us, and we are asking you, to help expand and improve the public participation process in a meaningful way.

The CALFED program has only rarely been able to take the time to address specific concerns of local landowners and examine ways to mitigate specific changes to their program. We believe that this must change.

The CALFED program has only rarely been able to hold "field" meetings with local conservancies, landowners and local government to find innovative ways to restore the environment without new regulations and takings. We believe that this must change.

The CALFED program has seemingly expected rural California to supply the land, water and job sacrifices to fix the Delta without question in the manner of traditional top down agency mandates. We believe that this must change.

CALFED has scheduled its own document releases and review periods in apparent ignorance or oblivion of the actions being taken by other CALFED agencies. We believe that this must change.

CALFED expects all California to step forward to help fix the Delta when it is convenient for CALFED, in a location convenient for CALFED in a manner convenient for CALFED. We believe that this must change.

One of CALFED's own brochures read, "*Ultimately, it is the active participations of the entire public that will help fix the Bay-Delta.*" That Mr. Chairman, and members of the Committee, we believe will not change.

STATEMENT OF BILL GAINES, DIRECTOR, GOVERNMENT AFFAIRS, CALIFORNIA WATERFOWL ASSOCIATION

Good afternoon. Mr. Chairman and members of the Committee, my name is Bill Gaines, and I am the Director of Government Affairs for the California Waterfowl Association. Thank you for the opportunity to come before you today to discuss the private sector's role in the CALFED Bay/Delta Program.

Historically, the Bay/Delta watershed provided over 4 million acres of naturally occurring wetland habitat for Pacific Flyway waterfowl and other wetland-dependent species. Over the course of the last century, largely due to agricultural conversion, urban expansion, and flood control projects, nearly 95 percent of this once vast wetland base has been lost. Yet, our little remaining habitat must still provide critically important nesting and wintering habitat for nearly 25 percent of our continental waterfowl population, as well as an estimated 50 percent of California's threatened and endangered species.

Recognizing this serious threat to our natural resources, the California Waterfowl Association was established in 1945 with the mission of conserving California's waterfowl, wetlands, and sporting heritage. Over the course of the last half-century, our Association has worked cooperatively with Legislators, State and Federal agencies, other organizations and private landowners to actively seek water supplies for wetlands, and to develop, influence, fund, and implement wetland programs which facilitate the preservation, enhancement, and restoration of California's waterfowl habitat. Today, fifty-three years later, the California Waterfowl Association is largely recognized as the leader in California's wetland and waterfowl conservation effort. As Federal and State agencies, private organizations, landowners, and individuals move forward with the implementation of the CALFED Bay/Delta Program, the California Waterfowl Association has, once again, assumed the role of lead voice for public and private wetland and waterfowl interests.

Due to significant changes in California's natural hydrology, much of our remaining interior wetlands must now be "managed"—artificially irrigated and intensively managed to create marsh conditions. As a result of this very unique condition, the quantity and quality of waterfowl habitat available in California in any given year is largely dependent upon the availability of wetland water supplies. For many years, the lack of a firm water supplies for California's managed Central Valley wetland areas resulted in limited habitat of minimum quality in all but the absolute wettest of water years. In the fall of 1992, a significant positive step was taken toward addressing these critical annual wetland water needs when the Central Valley Project Improvement Act (CVPIA) was passed by Congress and signed into law. By guaranteeing firm annual water supplies to Central Valley public refuges and private wetlands within the Grassland Resource Conservation District, this landmark legislation marked a critical positive milestone in the California waterfowl conservation effort. But, with still less than 10 percent of our historical habitat remaining, much remains to be done.

The CALFED Bay/Delta Program is a long-term effort to address ecosystem health, water quality, water supply reliability, and levee system integrity in the

Bay/Delta watershed. Because the restoration, enhancement, and maintenance of waterfowl habitat throughout much of this watershed also depends upon these areas of concern, properly implemented, the CALFED Bay/Delta Program represents a tremendous opportunity to address the needs of migratory and nesting waterfowl, and the other wetland-dependent species.

Today, I have been asked to provide our Association's view regarding public participation in the CALFED Bay/Delta Program. As a 501(c)3 nonprofit organization representing nearly 13,000 Bay/Delta stakeholders statewide, the California Waterfowl Association also has a significant interest in the private sector's ability to contribute to the CALFED process.

Let me begin to address this question with the statement that, although California's "water wars" and deteriorating ecosystem health are well chronicled, the CALFED Bay/Delta Program is, far and away, the most significant and positive multi-interest effort ever undertaken to address water and environmental concerns in California, or perhaps throughout the nation. The sheer magnitude of this landscape effort results in unintended barriers and natural disincentives to public participation. At times, even those individuals or the representatives of agencies or organizations who are fortunate enough to be able to dedicate "full-time" to this much needed effort struggle to obtain a comprehensive grip on this sweeping Program and its dynamic process. Clearly, providing for a Program which offers ample public participation opportunities, as well as real-time public awareness of its continual progress and potential impacts, is, in itself, a tremendous challenge for the Bay/Delta Program team.

Irregardless of the stumbling blocks associated with assuring full stakeholder participation in such a mammoth program, the California Waterfowl Association believes the CALFED team has made every effort to design a process which facilitates and encourages important public input and returns real-time information flow. Yes, our Association—even as a member of the Program's Ecosystem Restoration Roundtable—has experienced times of serious frustration due to our inability to positively influence CALFED Program decisions. But, our Association does not contribute this frustration to a CALFED agency team set on implementing the Program "their way," but rather to the tremendous difficulty associated with trying to address a myriad of Bay/Delta concerns in a fashion which is palatable to each of the many stakeholder interests which must be served.

In trying to achieve this difficult goal, the California Waterfowl Association believes that CALFED agencies have made every reasonable effort to design a Program which allows Bay/Delta stakeholders to contribute to the Program's implementation, as well as its problem-solving/decision-making process. The ability of the private sector to be heard in this process ranges from the high profile role of formal committees established to provide direct advisory input to CALFED agencies, to hands-on workshops in small rural towns throughout the watershed, to other public outreach efforts which are enough to choke even the hardiest of mailboxes.

As each of you is probably aware, CALFED agencies have tried to facilitate formal public input and interaction by establishing the Bay/Delta Advisory Council, or BDAC. This body, which is chartered by the Federal Advisory Committee Act, is comprised of a variety of stakeholder interests—including the California Waterfowl Association, water districts and utilities, environmental and fishing organizations, the California Farm Bureau, and others. Combined, this regularly meeting group of more than thirty diverse private interests provides an on-going medium for direct top-level public participation in the Program's decision-making process.

In addition to BDAC; formal stakeholder interaction is also provided by the CALFED Ecosystem Restoration Roundtable—a roughly 20 member BDAC subcommittee. Similar to BDAC, this multi-interest team meets regularly in a public setting to discuss the concerns of individual interest groups, to ensure the coordination of CALFED Program activities with other restoration programs in the Bay/Delta watershed, and to help define priorities for on-the-ground CALFED projects.

In addition to our seat on BDAC, the California Waterfowl Association is also active on the CALFED Ecosystem Restoration Roundtable, and I fill this role. As a direct result of our involvement at the Roundtable level, we have been able to positively influence a small, but important, selection of Program decisions—most notably the addition of waterfowl and their habitats as a secondary priority of the Program.

In addition to the ability of the private sector to influence CALFED policy decisions via BDAC and the Ecosystem Roundtable, the public is also offered an opportunity to direct the Program's biological priorities, and the actual selection of restoration projects. Thirteen species, habitat, and/or region specific technical panels, as well as an umbrella Integration panel, have been created by CALFED agencies. These technical teams—which consist of a mixture of agency, academic, and stakeholder specialists—not only provide input on the types of restoration actions needed to address targeted Program concerns, but also play a lead role on the review and selection of proposals submitted for CALFED funding.

The formal opportunities for private sector input that I have outlined are supplemented by the sometimes seemingly overzealous effort of CALFED agencies to reach out to those organizations, landowners, and individuals who have shown an interest in the Program. In our opinion, a tremendous amount of time, expense and effort has been put forth by the CALFED team to arrange, announce, and attend regional workshops, scoping meetings, and other public outreach efforts, as well as to continually bombard those on the massive mailing list with Program updates and other information. I can assure you that, as one of those on CALFED's ever growing mailing list, delivery of the daily mail can be, at times, a depressing event.

It is important to note that, in addition to the care taken to facilitate private sector participation in CALFED decision-making, other important precautions are included in the proposal selection process to protect against unintended negative impacts to any individual landowner or interest-group. First, and perhaps most importantly, restoration projects are only done on a willing landowner basis.

Clearly, certain specific parcels may, for whatever reason, be identified as critical for a certain habitat type or species. But, no project will be initiated without full, willing landowner participation. Second, efforts are being made to leave land in private ownership by giving preference to permanent conservation easements over fee title acquisition. Finally, the latest Request for Proposal (RFP) includes local-public involvement as part of the formal proposal evaluation criteria.

Nevertheless, regardless of the sweeping efforts to address public concerns in the CALFED Program, the role of the private sector will be forever limited by several unavoidable factors. First, as I mentioned before, due to the staggering sheer size of the effort, few private organizations—much less individuals—have the time or aptitude to become sufficiently knowledgeable on the Program and its process, to know when, where, and how to "weigh-in" to best serve their concerns. Perhaps most frustrating, even those who are fortunate enough to understand the process are limited by the Program's charter to address so many differing concerns while avoiding unwanted impacts to the many diverse stakeholder interests.

I believe the California Waterfowl Association is a good example of a private interest who has a relatively thorough knowledge of the Program, yet has been limited in its ability to fully address each of its concerns. Today, I am here to ask for your help.

Our Association fully appreciates and supports the goal of the CALFED Program to address water supply reliability, and the importance of addressing the habitat needs of listed fish species in achieving this objective. Our "managed" wetlands will also benefit greatly from achieving this goal. Yet, if the Program is to make a sincere effort to restore the integrity of the Bay/Delta ecosystem, it must also more fully consider the serious habitat needs of native wildlife—most notably wintering and nesting waterfowl, and other species which share their habitats.

California's Central Valley—largely the same geographical area being addressed by the CALFED ecosystem restoration program—is widely recognized as one of the most important waterfowl regions in North America. Yet, as I mentioned earlier, this area has suffered the significant loss of over 90 percent of its historical waterfowl habitat—the greatest percentage decline on the continent.

In the mid 1980's, in response to serious reductions in North American waterfowl populations, the North American Waterfowl Management Plan (NAWMP) was signed by the Federal Governments of Canada, the United States, and Mexico. This Plan established broad waterfowl population goals and identified seven priority areas on the North American continent in need of habitat restoration and enhancement. California's Central Valley was one of these identified priority areas.

Two years later, in 1988, a habitat restoration program—in many ways like CALFED—was initiated to address NAWMP objectives in our Central Valley. This public/private conservation effort—known as the Central Valley Habitat Joint Venture—carefully established biologically based acreage objectives for the preservation, enhancement, restoration, and maintenance of waterfowl habitat throughout much of the CALFED project area. Recognizing the importance of private landowner support to the success of the Joint Venture, a serious effort was made to minimize the changes to existing land use necessary to meet waterfowl needs. As such, the quantity of acreage targeted for wetland restoration was somewhat limited, and heavy emphasis was placed upon leaving land in agricultural production and simply working with the landowner to increase its wildlife values.

The tremendous loss of Central Valley habitat, as well as the critical importance of the region to migratory waterfowl is well documented. Clearly, the CALFED Program's ecosystem restoration effort could, and should, play a significant role in this critical conservation effort. Yet, thus far, the best efforts of our Association to elevate waterfowl and their habitats to a high priority of the CALFED Program have been relatively unsuccessful.

Congress has already recognized the importance of the migratory waterfowl resource through its support of the NAWMP, and its authorization and annual funding of the North American Wetland Conservation Act (NAWCA)—the Plan's Federal funding source. Today, I ask for your assistance in creating a CALFED Program which not only helps to meet these needs, but also facilitates greater landowner support by providing full Federal funding to the CALFED ecosystem restoration effort, and earmarking a reasonable portion of those dollars for projects which are entirely consistent with the expected habitat objectives of the Central Valley Habitat Joint Venture.

In conclusion, the California Waterfowl Association would like to applaud the CALFED team for what, we believe, is a more than reasonable effort to design a Program which maximizes the role of the private sector in the decision-making process. We ask those who may disagree to consider the tremendous difficulty associated with obtaining complete public satisfaction with a program of this size and scope. We also ask Congress to help us fully realize the potential of the CALFED Program to appropriately address the needs of our North American waterfowl populations and other native plant and animal species who share their habitats.

On behalf of the members of the California Waterfowl Association, and waterfowl enthusiasts throughout the North American continent, I thank you for the opportunity to come before you today, and I would be happy to answer any questions you may have at this time.

United States House of Representatives
Committee on Resources
Subcommittee on Water and Power Resources
The Honorable John Doolittle, Chairman

FINANCING THE BAY-DELTA SOLUTION

Prepared Statement of David Yardas
Environmental Defense Fund

Washington, D.C.
May 12, 1998

Mr. Chairman and Members of the Subcommittee:

Thank you for the invitation and opportunity to present the views of the Environmental Defense Fund on the important subject of "CALFED Financing."

As a signatory to the 1994 Bay-Delta Accord, EDF has devoted considerable time and resources over the past 3-1/2 years assisting the CALFED Bay-Delta program in its efforts to develop a comprehensive solution that restores ecosystem health and improves water management throughout the massive Sierra Nevada-Central Valley-San Francisco Bay/Sacramento-San Joaquin Delta Estuary watershed.

For example, EDF staff currently serve on the Bay Delta Advisory Committee (BDAC), the Ecosystem Roundtable, and the Roundtable's scientific advisory panel (a.k.a. the "Integration Panel"). We have also participated actively in the BDAC Ecosystem, Assurances, and Finance workgroups (among others), as well as the CALFED Operations Group. We are founding members of the California Bay-Delta Water Coalition, the stakeholder-initiated funding collaboration that took shape around the successful 1996 effort to secure enactment of state Proposition 204 and its federal counterpart, the California Bay-Delta Environmental Enhancement and Water Security Act (the "Bay Delta Act"), in the passage of which this subcommittee played a crucial role. We were also recently named to the California Secretary of Resources' Water Finance Advisory Committee, a group established to provide guidance on research now being conducted at the University of California on "the extent and capacity of the private sector to provide financing for the actions that ultimately emerge from the CALFED process."

Both Finance and Funding are Critical Perhaps the single most important issue at stake in the entire discussion of the CALFED Bay-Delta program is who, in the end, will be asked to pay for what.[1] An important variant of this issue, and one that in our view remains central to the development of a sustainable long-term solution, involves the need for and use of different types and sources of funds for different elements of the program – such as the need for and creative management of reliable, sustained, and sufficient use-based funds as part of the long-term ecosystem restoration effort. Although there are important inter-relationships between these "finance" and "funding" issues, my testimony today will focus primarily on key issues relating to the finance side of the equation.

Public vs. User Funds As the members of this Subcommittee are no doubt aware, the principal public discourse on these important matters has been shaped of late not so much by the ideas and issues set forth the CALFED Phase II Draft, but by the recent provision of public ecosystem funds under Proposition 204 and the Bay-Delta Act and, more recently, by Governor Wilson's proposal to include anywhere from $50 million to $500 million (or more) for "CALFED Water Facilities" as part of a 1998 general obligation state water bond.

Under Proposition 204, the absence of "user funds" in support of Bay-Delta ecosystem restoration was a significant problem -- in Sacramento as well as statewide – that was only resolved in part by ensuring that CALFED would, in the end, develop "an equitable allocation of program costs among beneficiary groups" as part of its formal charge. Responding to this charge has been a principal concern of the BDAC Finance Workgroup ever since, as summarized in various parts of the Phase II Draft.

Unfortunately, the current version of the proposed state water bond incorporates language developed by a self-described group of "supporters of surface storage" which attempts to pre-define an "equitable" result for CALFED in a way that (1) ignores history and (2) justifies the proposed use of public funds for private gain as follows:

> "[t]o date, a $1.5 billion revenue stream has been provided from federal, state, and water user funds for near-term ecosystem improvements, and *there is an equally pressing need for new [public] investment in water quality, water supply, and flood protection* to prepare the state for the 21st century" (emphasis added).[2]

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[1] The CALFED Phase II draft indicates that "common program" costs will sum to approximately $4-5 billion in 1996 dollars over a 20 30 year timeframe, while its "variable elements" – storage and conveyance facilities – will, if implemented, range from $2-8 billion. These are likely to be "low end" estimates, however, as they do not appear to include interest on debt for capital outlays or bond financing (where applicable), nor the ongoing costs of operation and maintenance, administration, management, stewardship, monitoring, adaptive management, etc.

[2] Other proposed findings and declarations are substantially biased in favor of the purported need for new dams, etc.

Quid-Pro-Quo? The above justification is both incorrect as a matter of fact[3] as well as a gross distortion of the essential "deal" that led EDF, and many other environmental organizations, to support a significant "downpayment" for the CALFED ecosystem program under Proposition 204 and the Bay-Delta Act, despite the criticisms levied by some that public ecosystem restoration funding is nothing but a disguised water-user bailout. Make no mistake: we stand by those agreements, and we continue to believe that every dollar authorized to-date will be needed if the health of the much-degraded Bay-Delta ecosystem is ever to be restored.[4]

In response to the Governor's initiative, however, we found it necessary to set forth our views in no uncertain terms in a lengthy letter to the state legislative sponsors of the proposed water bond. Our basic position, then and now, is that

> "...water users, not the public, should pay for the costs of all water supplies developed for their benefit. In addition, given the tens of billions of dollars in public subsidies already provided for statewide water development in the past [and] the massive environmental damage that is, we believe, a direct result of such historic subsidy policies, ... no new or additional public subsidies should be provided for water development projects or programs that are meant to facilitate, in whole or in part, the depletion of additional waters from California's beleaguered aquatic environments. One way or another, the longstanding practice of giving the public's water away for free must finally come to an end..."[5]

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[3] For example, this figure appears to be based upon a summation of (1) CVPIA federal ecosystem funds (i.e., approximately $238 million from all sources obligated since 1992, or an assumed $480 million over the 10-year period spanning FY 1993-2002), (2) bond funds already obligated for Category III purposes from Prop 204 ($60 million), (3) bond funds available for state CVPIA cost sharing from Prop 204 ($93 million), (4) sequestered Bay-Delta ecosystem funds from Prop 204 ($390 million), (4) authorized and appropriated federal ecosystem funds under the Bay-Delta Act ($85 million), (5) authorized but not (or not yet) appropriated federal ecosystem funds under the Bay-Delta Act ($345 million), and (6) stakeholder contributed Category III funds under the Bay Delta Accord ($33 million). However, even with CVPIA funds included (they should arguably be viewed separately as part of the pre-Accord baseline), the amounts actually provided for ecosystem purposes since 1992 still only amount to about $416 million -- by no means a trivial sum, but only about 28 percent of the $1.5 billion claimed to have "provided from state, federal, and water user sources" for these purposes to date. (The $1.084 billion "balance" includes funds that will likely be available but which are by no means assured, as well as funds that are either highly speculative, substantially encumbered, or simply no longer available.)

[4] This does not, of course, mean that the funds currently authorized are ideal in every respect. For example, our ability to establish acquisition, O&M, and stewardship reserves, or to control the pace of year-to-year outlays in a way that is fully responsive to the needs and opportunities identified and vetted through a rigorous scientific and stakeholder-intensive funding allocation process, is substantially limited given the "use it or lose it" nature of the federal appropriations process and the fact that state funds are derived from bond-issued debt.

[5] We would be pleased to provide the Committee with a complete copy of our February 3, 1998 letter, which explains these and related points in greater detail.

We went on to offer our support -- as we would again today -- for public-private partnership funding for programs that will provide above-baseline ecosystem restoration benefits (and in many cases a host of indirect but significant water and power user benefits as well), for programs which will serve to reduce overall water use (e.g., conservation and demand management), and for programs which ensure that more end uses can be served without any increase in baseline depletions (i.e., increased end-use efficiency investments through reclamation, recycling, and appropriately structured conjunctive use programs, among others).

As explained further below, however, EDF will oppose the provision of new water development subsidies as part of a "comprehensive" CALFED solution, even if purported environmental enhancements or other alleged public benefits are involved. This brings me back to the Phase II Draft, and the deliberations of the BDAC Finance Workgroup.

The "Benefits-Based" Approach According to the Phase II Draft, "[s]haring the costs of the Solution based on the benefits being created is the cornerstone principle of the CALFED Financial Strategy." (Implementation Strategy, page 15.) While EDF supports the basic notion that those who would benefit from newly developed supplies should pay the "true costs" associated therewith, the benefits-based approach is of ongoing concern in at least two fundamental respects.

No Acknowledgment of How We Got Here The fundamental philosophy behind the benefits-based approach is that "costs will be paid for by the beneficiaries of the actions, as opposed to seeking payment from those who, over time, were responsible for causing the problems being experienced." This, in effect, means that the "playing field" is assumed to be level, all but sweeping under the rug nearly a century's worth of water development activities that have, by virtue of all but ignoring their associated environmental impacts, necessitated CALFED's programmatic efforts in the first place. Taken literally, this version of the benefits-based approach precludes any assessment whatsoever of, among others, a host of historic investments and subsidies biased substantially in favor of environmentally-damaging water development, prior unmet environmental mitigation obligations, the ongoing environmental costs of diversions, depletions, exports, impoundments, and pollution from existing facilities, or the related environmental costs of new water development.

Problematic Definition of Ecosystem Benefits The second major concern relates to the definition of ecosystem benefits. One aspect of the problem (discussed further below) is the need to distinguish between alleged "benefits" and much-needed "repairs." Another is the difficulty in quantifying any number of non-market benefits (and costs). But most egregious to EDF is the assertion that the environment needs new and/or bigger dams, or massive new isolated conveyance canals, in order to deal with problems that have arisen, above all, from the construction and operation of thousands of dams, thousands of miles of levees and canals, and literally billions of dollars in related water development investments.[6]

The extreme consequences of a benefits-based approach so-defined would be to (1) preclude user-fee assessments or other forms of use-based funding to assist in implementing the CALFED ecosystem restoration program over time, and (2) provide a thinly-veiled justification for public funds to underwrite a new round of water project development – funds that would, once again, serve to understate the true cost of new or expanded dams, diversions, and depletions – i.e., costs that most of the principal proponents of such facilities simply cannot afford.[7]

To its credit, the CALFED Phase II Draft identifies as an outstanding issue "whether or not any adjustment for past impacts is appropriate prior to using the benefits [based] approach." (Implementation Strategy, page 15.) From EDF's point of view, there is no question that the answer to that question is a resounding YES – not to be punitive or divisive, but to ensure that CALFED develops and implements a truly "equitable" result over time – one that acknowledges the problems of the past, sends the right market price signals in the future, and ensures that use-based ecosystem funding in particular is available when needed on a sufficient, sustained, and properly manageable basis.

CALFED's Work in Progress A draft document currently under discussion in the BDAC Finance Workgroup -- *Beneficiaries Pay: Implications for Cost Allocation* – goes a step beyond the Phase II Draft in attempting to sort-through and resolve these important outstanding issues. While it continues to discount the importance of better understanding just how it is we got to where we are today, it proposes in lieu thereof a "forward looking" alternative that includes at least several promising features. These include (1) a proposed surcharge on all water users in the Bay-Delta system, the revenues of which

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[6] See, e.g., the Metropolitan Water District of Southern California's Board Memorandum 9-11 (February 25, 1998), which cites the "broad based benefits accruing from storage facilities, including environmental water, flood control, and recreation," as justification for public funds for storage based on "an equitable apportionment of costs applying the beneficiaries pay principle." (The same memo goes on to suggest that even further public subsidies may be justified "on public policy grounds ... to assist the transition of the water user community into an era of substantially greater environmental responsibility.") In our view, if replenishment of depleted streamflows, re-establishment of pulse flows, or other ecosystem needs are the issue, there are numerous ways to address them without incurring the substantial costs or impacts of new dams – e.g., dry-year option agreements, financial reserve accounts, existing reservoir pass-through agreements, or the banking of unused ecosystem entitlements in existing facilities (among others).

[7] According to press reports from last month's Subcommittee hearing in Fresno, "farmers can't afford to buy abundant river water now flowing to the Pacific Ocean" (i.e., the flood flows that would presumably be captured by the new or expanded dams that these same farmers want CALFED to build) "because of federal environmental fees." (*Valley farmers want lowered fees for water*, Fresno Bee, April 16, 1998.) Similarly, CVP farmers in the Sacramento Valley have long enjoyed waivers or discounts on these fees because of alleged "payment capacity" problems. Yet the cost of any such "newly developed water" would be at least an order of magnitude greater (and almost certainly a good deal more) than the highly-subsidized price -- including the subject environmental fees -- that these farmers currently pay.

will be used to assist in funding the CALFED common programs, (2) clarification that "the users of [storage and conveyance] facilities must pay the full cost of [these] facilities," (3) assurance that the share of any such facilities dedicated to ecosystem purposes will be treated as a mitigation cost for ongoing water development impacts (i.e., not charged to the public), and (4) assurance that, if public funds are provided for facility planning purposes, they will be cost-shared by user funds "up front" and reimbursed by the eventual contractors should such facilities be constructed.

There are, of course, many important details in this refinement that still need attention – for example, the definition of "ongoing impacts" is currently limited to so-called "direct" impacts (e.g., entrainment), and does not appear to consider such factors as hydrograph alterations, loss of sediment, loss of upstream, riparian, and wetland habitat, water quality and temperature effects, evaporation, depletion, etc. However, on balance, it is clearly a step in the right direction, with one significant exception: we cannot, and should not, sweep the past under the rug.

Why History Matters From the outset, EDF has raised concerns, in the BDAC Finance Workgroup and elsewhere, about CALFED's proposed focus on post-Accord "benefits" to the exclusion of a well-documented understanding of the extent and magnitude of previous water development investments (both public and private) as well as the ecosystem debts outstanding as a consequence thereof. For our part, we acknowledged the role of "other factors" contributing to the demise of ecosystem resources in our support for public ecosystem funding under Proposition 204 and the Bay-Delta Act, and even in our prior support for federal non-reimbursable and state cost share requirements in conjunction with establishment of the user-financed CVPIA Restoration Fund in 1992.

Even so, it remains our view that any honest effort to account for the resources previously dedicated to manipulating the Bay-Delta's water resources to the considerable detriment of its public environmental resources would make clear that (1) the "playing field" is far from level and that (2) "mitigation" for those impacts has not, in any sense, been achieved. For example:

- Approximately 5,300 dams – roughly 2,000 "large" dams and another 3,300 "smaller" dams (below 25 feet in height or 50 AF of capacity) – have been constructed throughout California during the last 50-100 years. Our statewide surface storage capacity (including California's apportioned share of Colorado River storage) already exceeds 60,000,000 acre feet.

- For the CVP, SWP, and California's apportioned share of Colorado River facilities – but excluding hundreds of large "local" projects (and thousands of smaller ones) developed in whole or in part by non-federal, non-state entities – the major storage dams account for at least 900,000 acre-feet of "lake surface" evaporation each year. (This is roughly the same as the maximum amount of "new yield" that CALFED is currently examining under its most aggressive, and expensive, water development scenario.)

- California's dams – located on every major river but one throughout the entire Bay-Delta system -- have combined to cut off access to more than 95 percent of the best and most productive spawning grounds and streamside habitat for wild salmon and other migratory fish species. (Similar statistics apply to the loss of downstream floodplains and wetlands from the construction of several thousand miles of levees.)

- During the last 30 years, Delta exports have grown from approximately 1.5 million AF/year to an average of 6.0 million AF/year, with a 1989 peak of 6.7 million AF. During this time, populations of longfin smelt, Delta smelt, striped bass, steelhead, and every run of chinook salmon except the hatchery-dominated fall-run have declined by 80-95 percent or more from their 1967 base. (Data are only sporadically available before that time.) The San Joaquin River's mainstem spring run chinook population went extinct in the early 1950's, following completion of Friant Dam.

- Taken together, the combination of existing federal, state, and local water projects facilitate the impoundment, regulation, diversion, and ultimately depletion of an estimated 49 percent of unimpaired runoff into the Bay-Delta system each year -- as much as 70 percent or more in drier years.

- The CVP and SWP dams and their associated waterworks alone represent an historic investment of public resources (construction costs only) of approximately $8.5 billion over time: $3.4 billion for the CVP (1937-94), and $5.1 billion for the SWP (1952-95). Stated in current dollars, these investments are equivalent to approximately $12.5 billion for the CVP (circa 1994) and $9.2 billion for the SWP (circa 1998) -- a combined total well in excess of $22.0 billion in current dollars.

- While some of these investments have been or will be repaid with time, there is no question that some very substantial sums will not. For example, our preliminary estimates suggest that irrigation repayment subsidies for the CVP through 1994 amount to approximately $4.9 billion. (This estimate is based on interest free irrigation repayments only, and does not include many other well-documented CVP subsidies -- e.g., payment capacity waivers, repayment deferrals, below market interest rates for the M&I and power repayment functions, and the below-market and no-interest repayments slated to occur over the next 30-40 years.) Similarly, our preliminary estimate of SWP repayment subsidies, based on below-market interest rates and interest free repayments on applicable portions of invested capital over a 64-year repayment period, range from $3.5 to $5.0 billion. Note, however, that none of these figures includes the substantial environmental costs that should have been allocated to direct project beneficiaries,[8] nor any charge for use of the public's water.[9]

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[8] For example, the California Research Bureau notes that, "when DWR allocated costs for Oroville Dam ...[its] calculations on the benefits to fish and wildlife [which are allocated to and paid for by the public]

The overall magnitude of these historic water development investments and preliminary subsidy estimates is especially important given the "quid pro quo" assertions being made by the supporters of surface storage subsidies in the Governor's water bond – i.e., the ecosystem funds provided to-date amount to only about 2 percent of the historic construction investment in CVP and SWP facilities expressed in current year dollars (see above). They are also directly relevant because, according to CALFED, it is expressly assumed that "new storage would provide additional water to SWP and CVP water users" (Phase II Interim Draft, p. 106).

EDF believes that a more comprehensive accounting of exactly this sort, involving all aspects of Bay-Delta water development (i.e., investments, repayments, rebates, subsidies, mitigation and restoration outlays, etc.) would do much to inform CALFED's efforts to resolve the "financial baseline" issue, and would thus help to ensure an "equitable allocation of program costs" moving forward – one that all might support.

Recommendations Expecting, however, that such a rigorous financial baseline accounting will not be undertaken by CALFED during the next six months, EDF recommends the following approach as a basis for guiding the proposed use of public funds in the future to ensure an appropriate, equitable, and durable long-term result:

- the ecosystem restoration program (as well as other common programs) should be implemented through a combination of public and use-based funds, including the funds necessary to secure restorative ecosystem flows when and where needed through direct re-acquisition of water and habitat and acquisition of related interests;[10]

- new surface storage and conveyance facilities should be treated as the new water projects that they are and, if implemented, paid for in full based on their full financial and ecosystem costs, and including a annual "rental charge" for depletion of

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did not take into consideration the fact that building the dam would have an [adverse] effect on the existing environment." See *Financing the State Water Project*, California Research Bureau, California State Library, CRB-IS-94-004 (June 1994).

[9] EDF estimates that the environmental mitigation and restoration surcharges paid by CVP water and power contractors will serve to reduce the project's calculated repayment subsidy over the entire repayment period from approximately 95 percent (pre-CVPIA) to approximately 75 percent. By comparison, it appears that SWP contractors have so far paid about 75 percent of the project's annual "operating expenses" (including debt service as well as O&M and assigned mitigation costs) – i.e., an estimated subsidy of approximately 25 percent, exclusive of unmitigated environmental costs, Monterey Accord rebates, etc.

[10] For these purposes, a broad-based set of watershed charges linked to diversions, depletions, exports, impoundments, and water quality degradation factors should be used to build upon the payments already required by existing law (e.g., the mitigation and restoration surcharges and increased revenues that fuel the CVPIA Restoration Fund).

the public's water -- by their direct beneficiaries (water and power users, floodplain residents, etc.), not by the public at large; and

- any final dedications of new storage or conveyance capacity, yield, etc. to alleged "ecosystem" purposes should be treated as partial mitigation for the new and ongoing direct and indirect ecosystem impacts that are certain to accompany such facilities.

Above all, whatever CALFED does, it should ensure that, at long last, the true costs of developing and using the public's water -- financial, environmental, and otherwise, including both ongoing impacts and any "newly developed" supplies – are fully internalized in future water prices and paid for by the direct beneficiaries of those investments. To this end, any number of "conventional" cost allocation practices – low-interest, interest-free, and deferred repayment provisions, payment capacity waivers, purported recreational as well as fish and wildlife enhancements, non-reimbursable flood control benefits, and the like – must be discarded: the adverse environmental impacts associated with such policies and practices are well documented,[11] and they simply have no place in the future implementation of a "balanced" CALFED solution.

"Better Together?" A principal product of the so-called ag-urban process to-date has been the notion that we must all "get better together" under CALFED – a slogan that we have elsewhere referred to as an "already time-worn phrase." It's not that the idea itself is objectionable -- to the contrary, a host of current and prospective ecosystem restoration efforts and activities are already achieving this objective, as would, we believe, a more flexible market- and price-based water allocation system -- but rather its selective application by the ag-urban stakeholder group when it appears to suit their agenda.[12]

Thus, when it comes to the overall CALFED goal of improving "water supply reliability," we continue to believe that a strong and sustained commitment to large-scale ecosystem restoration provides the best long-term assurance for all.

In addition, rather than rushing to build the next generation of unaffordable water projects (and asking the public to pay for them), we should instead explore and implement any number of readily-available alternatives – water banking in existing facilities, acquisition

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[11] This issue is discussed in detail in several recent publications, including *The Trouble With Dams* (by Robert S. Devine, The Atlantic Monthly, August 1995) and in our jointly-authored article, *Reforming Western Water Policy: Markets and Regulation* (by Tom Graff and David Yardas, Natural Resources and Environment, Winter 1998).

[12] Never mentioned in this context is the fact that environmental interests were excluded from the closed-door Monterey Accord negotiations between SWP contractors and the Department of Water Resources…nor the efforts of CVP contractors during the 104th Congress to repeal the very foundation upon which the Bay-Delta Accord is based…nor the Kern County Water Agency's recent "takings" litigation under the federal Endangered Species Act…nor the San Luis Delta Mendota Water Authority's lawsuit attempting to enjoin implementation of the CVPIA's dedication of environmental water…

of existing dams.[13] appropriately structured conjunctive use programs, wet meadow, floodplain, and riparian restoration, and a host of fiscal and market-based approaches – which can be used to promote improved water supply reliability and water use efficiency in a way that takes full advantage of California's already massively-plumbed waterscape. These are, we believe, the most cost-effective, flexible, and environmentally benign ways to achieve our common objectives over time.

Finally, if it is to meet its own "durability" objective, CALFED must finally address the problems that have been used to justify constructing and subsidizing both the state and federal water projects in the past (but which have not, in the end, been addressed). This means that a truly comprehensive solution must include meaningful and comprehensive groundwater management, a finite water-depletion budget, comprehensive water metering, a robust and protective ecosystem baseline, and both market- and price-based reforms for an antiquated water allocation system that continues to significantly undervalue our most precious natural resource – inflating demands, exacerbating shortages, and viewing water left in the stream as water "wasting to the sea."

In closing, I would simply like to add that, the above comments notwithstanding, EDF acknowledges and commends the efforts of our Bay Delta Water Coalition partners in pursuing their "enlightened self interest" through ongoing support for a host of near- and long-term ecosystem restoration efforts. This, we believe, remains the key not only to California's water future, but to our neighbors along the Pacific Coast, the Pacific Flyway, and throughout the Colorado River basin, who's long-term interests are inexorably tied to those of a healthy and restored Bay-Delta ecosystem.

Thank you again for the opportunity to provide these comments.

[13] For example, the Pacific Gas and Electric Company announced last week that it will decide by this summer whether to sell or spin off to shareholders some 68 hydroelectric plants in California involving approximately 3.2 MAF of surface storage capacity with an estimated book value of $1.2 billion.

TESTIMONY OF LESTER A. SNOW

Monitoring and Performance Standards

Mr. Chairman, members of the Subcommittee on Water and Power Resources, I am Lester A. Snow, Executive Director of the CALFED Bay-Delta Program. I appreciate the opportunity to appear before you today and provide information on how CALFED is addressing monitoring and performance standards for the CALFED Bay-Delta Program and to answer any questions you might have about the Program.

Before I respond specifically to the questions you have asked I would like to give some background on the near-term ecosystem restoration projects that are being funded by the 1998 Federal Bay-Delta Ecosystem Restoration Appropriation.

As with all large scale projects and restoration efforts it is important to set priorities for which actions are of highest priority and therefore should be funded and implemented first. CALFED is at the first stage of implementation of the Ecosystem Restoration Program. The projects selected for funding in 1998 meet the highest priorities identified by a technical team of agency and nonagency scientists. Those priorities are consistent with our broad ecosystem goals which are described in Attachment I.

CALFED believes, as do the many stakeholders participating in the program, that it is critical to proceed with near-term ecosystem restoration efforts prior to the finalization of the long term ecosystem plan and strategy. There is much known about the status of the species and habitats within the Bay- Delta system regarding their decline and immediate needs. This information provides a strong direction for identifying which actions should be taken in the near-term. In addition, given the magnitude of the problems facing the Bay-Delta ecosystem we are not at risk of over shooting the goals for restoration. Given the long time line needed to restore the system it is critical to begin these restoration efforts now.

Questions: How do we evaluate effectiveness of the funding we are providing? What clear and unambiguous performance standards are being adopted to determine if we are close to success or have achieved success?

Regarding the effectiveness of the funding and performance standards -- We are evaluating the effectiveness and performance of restoration efforts on three levels:

- Project Implementation Monitoring. Each restoration project is being evaluated/monitored to ensure that it is being implemented as planned. This includes review of schedule, budget, and deliverables which are included in the quarterly report required of each project. (At this level the performance standard is completion of the project as funded.)

- Project Effectiveness Monitoring. Each restoration project is being monitored to evaluate the effectiveness of the project at meeting its ecological/biological objectives. A primary consideration for project selection and funding was the ability of the project to meet ecological objectives that contribute to the goals of ecosystem health identified below. (At this level the performance standard is the achievement of the ecological/biological objective which varies for each project.)

- Ecosystem Monitoring. CALFED has identified four goals for ecosystem recovery in its Ecosystem Restoration Strategic Plan. To measure success in meeting these goals, state and federal agencies and stakeholders are developing quantifiable performance standards and indicators of ecological health. Projects will be monitored over a longer term process to assess the progress towards ecosystem recovery and health. A more detailed description of the Strategic Plan and ecosystem monitoring and performance standards is provided in Attachment I.

An example of how the three levels of performance are measured is included in the box below and in Figure 1. In this example we use the Gorrill Dam Fish Screen and Ladder project which is one of the first projects implemented through this program and can serve as a model.

Example: Gorrill Dam Fish Screen and Ladder on Butte Creek

Project Objective: Reduce delays and obstacles to salmon migration.

Project Implementation Monitoring:

The Gorrill Dam Fish Screen and Ladder project is divided into two tasks. Task 1 is design and permitting and Task 2 is construction. Each task includes a specific schedule and budget as well as deliverables. The contract for the project will require that progress on all aspects of each task be reported quarterly. The contract manager will be evaluating this information to ensure the project is making adequate progress. The completed project will be inspected to ensure that the operating standards for the screen and ladder are met. The information will be summarized in the quarterly report which will be provided to Congress, the Ecosystem Roundtable, and CALFED agencies.

Project Effectiveness Monitoring:

Effectiveness of the Gorrill Dam Fish Screen and Ladder project will be assessed by monitoring the number returning adult spring- and fall-run chinook salmon on Butte Creek and the timing of their migration. The number of out migrating juvenile salmon will also be monitored. This data on post project migration will be evaluated relative to pre-project migration data to determine project success.

Ecosystem Monitoring:

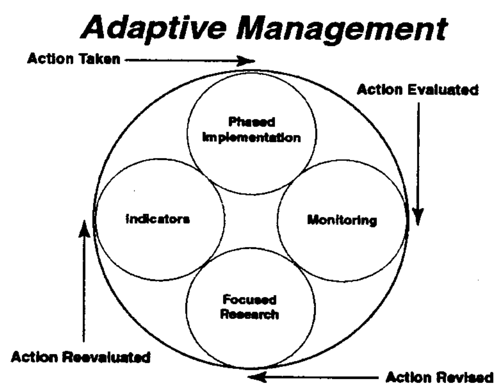
The Gorrill Dam project is directed at reaching the Goal A (see attachment I) which is "recovery of listed species dependent on the Delta." To evaluate progress towards this goal, a performance standard (quantifiable objective), such as a spring-run salmon population level, will need to be set. The number of returning spawners, the number of outmigrants, and the timing of migration are indicators of progress towards the goal and objective. Although the final performance standard has not been developed, the current abundance of spring-run is significantly below levels needed for a sustainable population. The current average abundance is only 2,400 spring-run chinook salmon, which is well below the levels called for in the Recovery Plan for Sacramento-San Joaquin Native Fishes (Nov. 1996). The plan requires that the number of wild spawners reaches a mean number of 8,000 fish and does not drop below 5,000 fish for 15 years, three of which are dry or critical years. This illustrates the need to begin restoration efforts before final performance standards are set.

Question: Are we going to postpone any major Program decisions or alternatives until we have the results of the early phases? Or are we going to agree on a basic blueprint and simply adjust it through adaptive management?

CALFED is exploring three basic alternatives (approaches) to solving the problems in the Bay-Delta system. Considering the complexity and large number of items to be completed for each alternative, implementation will likely be conducted in several stages over 30 or more years. CALFED will develop an implementation plan which outlines the order in which portions of the Program should be staged and linked with other portions of the Program.

CALFED is adopting an adaptive management approach in all components of the program. No decision has been made at this time regarding selection of an alternative or decisions on major program components, but consistent with the principles of adaptive management it is possible that major decisions could be staged over time. Staging would require monitoring and assessment of progress on program implementation.

Adaptive management acknowledges that we will need to adapt the actions that we take to restore ecological health and improve water management. No long-term plan for management and restoration of a system as complex as the Bay-Delta can predict exactly how the system will respond to Program efforts, or foresee events such as earthquakes, climate change, or introduction of new species to the system. Therefore, during each stage of implementation, milestones and decision points will be identified to guide future actions into the next stage. This allows actions whose results are uncertain to be taken, evaluated and the results of those evaluations used to refine future actions and inform future decisions. Adaptive management is illustrated below.



Attachment I

Description of CALFED Ecosystem Restoration Strategy

Ecosystem Restoration Strategic Plan

The Strategic Plan is an integrated planning, scientific, and adaptive management framework by which to successfully implement and evaluate restoration of the large and complex Bay-Delta ecosystem. The plan will define the goals and performance standards for a rehabilitated ecosystem, the actions/projects to achieve the goals, and a process to monitor the health of the ecosystem and the effectiveness of the actions in approving the ecosystem.

The current draft of this document includes four goals which define success of the program. The goals are:

A. Achieve recovery of the listed native species dependent on the Delta and Suisun Bay, support recovery of listed native species in the Bay-Delta estuary and its watershed, and provide for continued conservation of currently unlisted species.
B. Rehabilitate the natural capacity of the Bay-Delta estuary and its watershed to support, with minimal ongoing human maintenance, native aquatic and associated terrestrial biological communities.
C. Maintain and enhance populations of selected species for safe consumption and sustainable commercial and recreational harvest, consistent with goals A and B.
D. Protect or restore a range of key, functional habitat types for biodiversity, scientific research, and other public values.

These goals are what we want to accomplish through ecosystem restoration. To further quantify these goals, there is a need to develop ecosystem performance standards (quantifiable objectives) which are the quantifiable end points of what we would like to accomplish for ecosystem recovery. Indicators of ecological health (performance indicators) are the things that are measured to determine if the performance standards have been met.

Indicators of Ecological Health

Indicators of ecological health are being developed to measure the ecological integrity of the Bay-Delta system. Indicators are the specific measures which determine whether the performance standards have been met. Indicators for the CALFED Program are being developed by a team of agency and stakeholder experts. The first step in indicator identification is development of conceptual ecosystem models. These conceptual models show the cause and effect relationships between different parts of the ecosystem. For example, they show how streamflows, riparian habitat, nutrients, and water temperature interact to affect species such as salmon populations. These characteristics of the ecosystem identified in the conceptual models are then further defined and grouped in an ecosystem classification typology. The typology identifies the component pieces of the ecosystem for which specific indicators can be identified. Examples of indicators could include an index of the amount, quality, and distribution of habitat types, measurements of listed species, or some measure of the number of exotic species.

Ecosystem Performance Standards

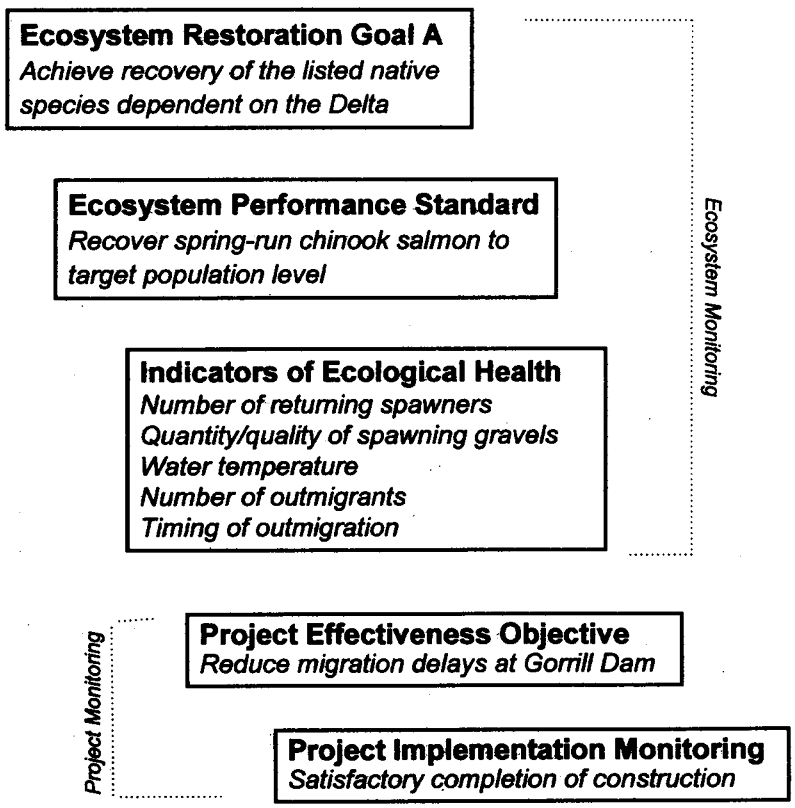
Like individual projects, there is a need to develop performance standards to measure success for the entire CALFED ecosystem restoration program. We are developing ecosystem performance standards to quantify the four goals for ecosystem recovery. Through the development of the Strategic Plan, a team of independent scientists are working with agency and stakeholder experts to quantify these performance standards.

Monitoring and Assessment

A great deal of research and monitoring has occurred over the last 20 years that will form the basis for developing the performance standards and indicators of ecological health for the ecosystem restoration program. For example, the goals addressing recovery of species populations (A and B) have ongoing monitoring efforts in place. For many species, existing recovery plans identify the population recovery levels (performance standards) which are being considered in the CALFED Program. For the other goals additional work is needed to broaden the current monitoring efforts to ensure that all indicators are being adequately assessed and that the appropriate research is being undertaken to evaluate the effectiveness of restoration projects. CALFED is in the process of developing a comprehensive monitoring and evaluation program that will build on existing monitoring efforts to meet these new needs.

Figure 1.

Measuring Performance: Example



Testimony of
Gary Bobker, Senior Policy Analyst
The Bay Institute of San Francisco
Before the United States House of Representatives
Committee on Resources
Subcommittee on Water and Power
Washington, D.C.
May 12, 1998

Mr. Chairman and members of the subcommittee:

My name is Gary Bobker. I am a senior policy analyst at The Bay Institute of San Francisco. I also serve as co-chair of the CALFED Ecosystem Roundtable, which advises the state and federal governments on how to best allocate funds dedicated to environmental restoration purposes in the San Francisco Bay-Delta system. I would like to thank you for your invitation to provide my views regarding monitoring and performance standards for the CALFED Bay-Delta Program, which is developing a long-term ecosystem restoration plan as part of its work, and the CALFED Restoration Coordination Program, which funds near-term Bay-Delta restoration activities.

While I am appearing before the subcommittee today on behalf of The Bay Institute, the perspective I want to share with you reflects three years of experience at the Ecosystem Roundtable and its predecessor, working with a diverse array of stakeholders and agencies to achieve consensus on a more comprehensive and efficient program to fund restoration efforts.

The subcommittee is raising important issues in this hearing, questions that should be asked early and often in the process. Indeed, the issue of monitoring and performance standards gets directly to the heart of CALFED's near- and long-term restoration efforts. CALFED represents an opportunity unprecedented in California water policy to develop a comprehensive approach to restoring the health of the Bay-Delta, by addressing problems from the headwaters to the Golden Gate, by integrating local, regional, state and federal restoration activities under the umbrella of a scientifically rigorous landscape-level plan, and by securing assured oversight, management and funding mechanisms to sustain restoration for the next thirty years and beyond. As with the rest of the Bay-Delta Program, CALFED's restoration efforts also carry a responsibility to ensure that funds appropriated are used effectively and efficiently. Both the opportunity for a comprehensive approach and the responsibility to make sound ecosystem investments necessitate defining success clearly, and incorporating measurement of progress toward attaining success into every aspect of implementation.

The opportunity and responsibility represented by CALFED is taken very seriously by The Bay Institute. We are a non-profit research and advocacy organization whose mission is to protect and restore the ecosystems of San Francisco Bay, the Sacramento-San Joaquin Delta, and the rivers, streams and watersheds tributary to the estuary. Over the last three years, the Institute has provided extensive policy guidance and technical expertise toward the development and review of long-term solutions to the problem of managing the San Francisco Bay-Delta estuary. The Institute was a lead negotiator for the environmental community in the process which eventually resulted in California's Proposition 204, approved by the voters in November 1996. Institute board members and staff serve on the CALFED Bay-Delta Advisory Council, the CALFED Ecosystem Roundtable, and numerous technical workgroups which provide recommendations to the CALFED Program. We have also served as CALFED Program coordinator for the Environmental Water Caucus, a coalition of regional, state and national conservation and fishing organizations active in California water policy. Finally, our Ecosystem Restoration Project, undertaken in collaboration with scientists from the University of California and the Environmental Defense Fund, has been working to build a sound conceptual framework and accurate baseline historical information to help guide the CALFED Program's long-term ecosystem restoration efforts.

In order to answer the questions posed by the subcommittee, I think it would be useful to review how restoration planning uses a four-step adaptive management process to achieve its goals. Adaptive management is an approach that tests various ways of achieving previously set goals. In short, it's what you do when you know where you want to go but you're not always sure how to get there. The reason we need an adaptive management approach is that after a century of altering the environment of the Bay-Delta, by diking wetlands, building massive water projects and polluting streams, it is a challenging task to try and reverse the damage. There are no Cliffs Notes for restoring ecosystems, and each area where large ecosystem restoration efforts are underway - the Everglades, Chesapeake Bay, the Columbia Basin, and the Bay-Delta - must grapple with its own set of challenges.

In the first step of an adaptive management approach, define success. Defining success in achieving ecosystem restoration involves the establishment of clear, quantifiable goals and objectives that represent desirable conditions for key characteristics of the ecosystem (such as species abundance, habitat quality and quantity, and ecological functions). The ability to measure progress toward achieving success involves the development of ecological indicators that reflect changes in these key characteristics of the ecosystem. Taken together, these goals and indicators constitute performance standards for ecosystem restoration.

Second, design a blueprint for achieving success. Designing a blueprint involves the development of a landscape-level (e.g., Bay-Delta system-level) implementation plan that uses the best available scientific information to guide efforts to achieve ecosystem performance standards. Based on conceptual models of how the ecosystem functions - and will react to restoration actions - the plan describes in detail the nature of restoration actions and the scale at which various restoration actions are necessary to achieve performance standards. Where uncertainties exist as to what scale of restoration action is necessary, or, more likely, as to how to successfully implement a desired restoration action, the plan proposes to test its assumptions and acquire better information in experimental projects and programs during the early stages of implementation.

Third, monitor implementation, including: compliance with specific project/program design; indicators of success in achieving specific project/program objectives; indicators of overall ecosystem performance.

Fourth, revise the implementation blueprint based on monitoring results to better achieve performance standards.

The moral of the story, as it were, is that we will inevitably make mistakes. The point of monitoring and performance standards is to learn from those mistakes, and incorporate the lessons back into the blueprint that guides our long-term restoration efforts.

Keeping this basic adaptive management approach in mind, I would like to turn now to the questions posed by the subcommittee.

Hearing question #1:
How do we evaluate the effectiveness of the CALFED funding we are providing?

The CALFED Ecosystem Roundtable, and the Category III steering committee which preceded it (established to partly implement the funding provisions of the Bay-Delta Accord), began their efforts by developing a near-term implementation strategy that contains specific priorities for how restoration funding should be allocated over the next few years.

These priorities reflect the two most urgent needs of the Bay-Delta system today. The first set of priorities focuses on species of special concern that urgently need attention, particularly those which do not currently receive federal or state protection. These species include the San Joaquin River fall-run and the Sacramento River winter- and spring-run chinook salmon; Delta and longfin smelt; Sacramento splittail; steelhead trout; striped bass; and migratory waterfowl. The second set of priorities focuses on the need to acquire greater expertise in successfully restoring and maintaining physical habitat. These habitats include fresh and saltwater tidal wetlands; shaded riverine habitat; midchannel islands; and North Delta agricultural wetlands and grasslands. These priorities, and a detailed strategy to develop programs and projects to address them, are re-evaluated and revised annually by a technical panel of Bay-Delta scientists who advise the Roundtable. While this priority-setting process needs further refinement, it represents a major improvement over the early Category III decision-making process.

All projects and programs that receive CALFED funding are required by the Roundtable to include a monitoring component. The monitoring component generally reflects the first two elements of an adaptive management: measuring compliance with the specific project or program design approved for funding, and measuring success in achieving the specific objectives of the project or program objectives. In measuring success, the focus is on monitoring effects on high-priority species of concern, such as spring-run chinook salmon, and learning what management actions are most effective in achieving and sustaining restoration of high-priority physical habitats, such as wetlands.

For instance, the Roundtable identified increased spawning opportunities for San Joaquin River fall-run chinook salmon as a high priority. Funding was subsequently approved in 1997 for gravel replenishment programs on the Stanislaus and Tuolumne Rivers. After new gravels are introduced into the streams later this year, Fish and Game biologists will be wading through the river looking at rocks and pebbles to evaluate how the gravels distributed downstream, how much potential spawning habitat was expanded, and how this habitat is being utilized by salmon. (A summary of funded projects and programs in 1997 and 1998, with specific examples, is included as Attachment A).

We have also been concerned with standardizing and coordinating monitoring programs, and expanding the near-term monitoring effort to begin addressing indicators of overall ecosystem performance. The Category III steering committee began this process by funding work to monitor restoration activities at different sites in order to help develop a more standardized monitoring protocol. The Roundtable has significantly increased funding for monitoring and evaluation, and recently recommended full funding for the Comprehensive Monitoring and Research Program being developed by the U.S. Geological Survey, the joint state-federal Interagency Ecological Program, and the San Francisco Estuary Institute.

Finally, it should be understood that the benefits of these near-term restoration projects and programs extend well beyond the biological priorities that drive our monitoring and performance criteria. Broadly speaking, improving conditions for species of special concern and learning to more effectively implement habitat restoration measures will result in a healthier ecosystem and more reliable conditions for offstream users of the Bay-Delta's waters. More particularly, water districts and individuals who divert water from the Bay-Delta will continue to receive reliable water supplies while meeting fishery protection requirements as a result of the almost $21 million approved to date for fish passage improvements and fish screening projects.

Hearing question #2:

What clear and unambiguous performance standards are being adopted to determine if we are close to success or have achieved success in the CALFED Program?

The task of developing clear performance standards for the CALFED Program is an absolutely critical one. It is also a complex and challenging task.

In 1995 and 1996, The Bay Institute, EDF and UC Berkeley held a series of technical workshops to begin the process of identifying the key physical and biological characteristics of the Bay-Delta ecosystem for restoration, and developing ecological indicators for these key characteristics. (The executive summary of the final report, "Restoration of the Bay-Delta-River System: Choosing Indicators of Ecological Integrity," is included as Attachment B). Subsequently, CALFED assembled an Ecological Indicators technical workgroup to refine the suite of potential indicators. In order to select indicators, however, it is first necessary to have goals and objectives that clearly define the success you seek to measure using indicators. That this need for clear, quantifiable goals and objectives was a gap in the CALFED effort was recognized by the independent scientific review panel convened by CALFED to review the ecosystem program in October 1997.

Realizing the importance of this task, a group of Bay-Delta stakeholders and agency staff began work in 1997 to develop recommendations to CALFED for a strategic plan that would identify clear, quantifiable goals and objectives as the foundation of an overall implementation strategy. This group represented a remarkable collaboration of varied, and often opposed, interests, including the Central Valley Project Water Association, the San-Luis and Delta-Mendota Water Authority, the Metropolitan Water District of Southern California, California Urban Water Agencies, The Bay Institute, Natural Heritage Institute, the U.S. Environmental Protection Agency, and the U.S. Fish and Wildlife Service.

The group developed an outline for a strategic plan; made recommendations on the workplan and staffing necessary to draft this plan; and proposed revisions to CALFED's then-current ecosystem restoration goals. The proposed goals focus on:

- recovery of native protected species, and conservation of currently unprotected species;

- rehabilitation of the ecosystem's innate capacity to support natural biological communities;

- maintenance of healthy populations of target fish and wildlife species for harvest and consumption; and,

- protection and restoration of key habitat types throughout the Bay-Delta system.

Development of specific quantified objectives that flow from these broad goals is the prerequisite next step for making further progress on the long-term ecosystem restoration program.

While we have been frustrated by the time the Program has taken to address this crucial issue, we are pleased that the effort to develop a strategic plan is finally underway. CALFED has assembled a team of leading scientists to lead the strategic planning effort.

The team includes Dr. Michael Healey of the University of British Columbia, a nationally recognized authority on adaptive management in fishery issues, and Dr. Robert Twiss, an emeritus professor at UC Berkeley and an internationally recognized expert on environmental planning. This team will be assisted by a larger standing body of technical experts in the Bay-Delta system, by the new Comprehensive Monitoring and Research Program effort, and by the CALFED Ecological Indicators Workgroup. (A journal article summarizing recent work on indicators development is included as Attachment C). The team's work will be reviewed by the CALFED independent scientific review panel.

It should be noted that the clarification of goals and the detailed consideration of an adaptive management process to achieve them, now underway in the CALFED ecosystem restoration program, is sorely needed for the other components of the Bay-Delta long-term solution.

Hearing question #3:

Are we going to postpone any major program decisions or alternatives until we have the results of the early phases? Or are we going to agree on a basic blueprint and simply adjust it through adaptive management as we move along?

The two approaches described in the third question posed by the subcommittee - deferred decision making and agreement on a basic blueprint - are not in fact mutually exclusive. A basic blueprint can and should be developed which makes appropriate decisions, and defers inappropriate ones. To understand why and how this could be so, we need to revisit the fact that CALFED is developing a landscape-level (or programmatic) plan, and that it is employing an adaptive management approach to implementation.

Landscape-level planning: a landscape-level plan is intended as a broad brush, "low-resolution" map that accomplishes the following purposes:

- it serves as the overall guidance document for integrated restoration planning and implementation activities in different watersheds and ecological zones throughout the Bay-Delta, by considering the relationships between different watersheds and zones;

- it evaluates whether the scale of restoration proposed is sufficient to achieve the mission of the CALFED Program and comply with the state and federal Endangered Species Acts and other environmental laws, and provides guidance for future permitting activities;

- it estimates the funding stream necessary to support the long-term restoration program; and,

- it identifies institutional and legal arrangements necessary to manage the long-term restoration program.

While a landscape-level plan will identify the scale of restoration that should occur throughout a particular watershed or zone, it is not intended to substitute for a more detailed evaluation at the watershed or zone level. A series of watershed or zone-specific implementation plans will need to be developed to identify specific land and water acquisitions, water quality control and watershed management initiatives, and other projects or programs at the site-specific level. This watershed/zone implementation planning process will rely heavily on partnerships with local decision makers and interests, in order to fully utilize local expertise and provide increased openness and accountability in the implementation program.

In summary, a landscape-level plan will include decisions on restoration at the landscape level, but defers decisions on restoration at the site-specific level to subsequent stages of implementation.

<u>Adaptive management</u>: In the scientific world, more information is always desirable. However, a blueprint for restoration using the adaptive management approach will

differentiate between those areas where a sound conceptual framework and an information baseline exists for decision-making and those areas where significant gaps and uncertainties regarding ecosystem function and baseline data occur. For instance, the value of large-scale restoration of key physical habitats is very widely accepted by the conservation science community, and large-scale habitat restoration should be a central feature of an ecosystem restoration plan (albeit phased to acquire on-the-ground restoration expertise and monitor results). On the other hand, the role played by exotic species in the dynamics of the Bay-Delta ecosystem is extremely significant but poorly understood. Increased monitoring and research activities are necessary before comprehensive programs can be developed to control and reduce exotics in the system.

Again, it should be noted that this approach - implementation strategies where the decision-making basis is strong, increased research and monitoring where the data are nonexistent or poorly understood - should be applied with equal vigor to all elements of the CALFED Bay-Delta Program.

In conclusion, I want to repeat that environmental, water user, and other interests are united in agreeing with this subcommittee that establishing performance standards and monitoring performance against those standards is a critical part of the CALFED long-term solution. CALFED is now working with stakeholders in a serious effort to design a comprehensive performance evaluation and monitoring regime. Further decisions by CALFED to expand this effort will probably be necessary, but there is a strong commitment from all the parties involved to follow this effort through to its conclusion as a prerequisite of a long-term solution.

TESTIMONY OF A. ALAN MOGHISSI

BEFORE THE SUBCOMMITTEE ON WATER AND POWER
US HOUSE OF REPRESENTATIVES

May 12, 1998

Mr. Chairman:

Thank you for inviting me to testify before this Committee and talk about such an important subject. My name is Alan Moghissi and I am currently President of the Institute for Regulatory Science (RSI). My testimony includes a biographical summary. You may notice that I am not an ecologist. Therefore, my perspective is that of a research director who had to fight for funding; a manager of Federal funds who had to ensure that these funds were efficiently spent; and a scientific journal editor who must accept or reject submitted papers. In every case, ecological research was and continues to be a part of these activities. My professional life has been devoted to environmental protection. Consistent with essentially all environmental laws, I believe that protection of humans is the primary objective of environmental protection, and protection of ecological health is necessary in the context of protection of human health and welfare. Furthermore, I believe that humans have a moral obligation to avoid harming other living things. Thus, in accordance with these beliefs, I have fostered the science and art of risk analysis—particularly risk assessment. Of interest to this Committee may be my activity as manager of a health and environmental risk analysis research program while I was at the U.S. Environmental Protection Agency (EPA). I am proud to have initiated a number of projects to improve the performance of risk assessment, including a highly successful project to develop methods for ecological risk assessment—one method which is considered to be the standard ecological risk assessment method today. Unfortunately, the results of these efforts were not favored by the management and the entire program was abruptly canceled. Currently, the RSI—in cooperation with the American Society of Mechanical Engineers (ASME)—is performing a program to peer review projects supported by the Office of Science and Technology, the research arm of the Office of Environmental Management (EM) of the U.S. Department of Energy (DOE). By their very nature, environmental programs are multidisciplinary, and thus the cooperation of a number of professional societies became necessary to perform this important task. To date, we have reviewed about forty projects, including some dealing with ecological issues. Note that the ASME performs the oversight of the review and ensures that the rules of peer review common to all scholarly organizations are followed. The actual review is performed by Review Panels that are formed to perform a review and are disbanded once the review is complete. It must also be noted that the reports of the review panels are provided to the users within one week after the meeting of the Review Panel.

A review performed in Richland, Washington may be used as an example: At issue was a proposal to inject dithionate (a reducing agent) underground to reduce chromium VI (a chemical alleged to have carcinogenic potential) to chromium III (a benign chemical considered to be an essential element). This project was of particular interest because several Native American Tribes were concerned over the impact of this process on the salmon in the Columbia River. The Review Panel met on February 5-9, 1997 and listened to a number of presentations—including those from representatives of Native American Tribes. The review report was submitted to the recipients on February 11, 1997.

Before I respond to the questions of interest to the Subcommittee, I would like to discuss certain issues that are likely to be relevant to the subject of this hearing.

CALFED Bay-Delta Program consists of two distinct and entirely separate parts. The first part consists of the societal goal to reach an acceptable level of ecological health. The second and equally important part is a set of issues collectively referred to as the science of the project, which includes: the scientific foundation of the chosen strategy; methods used to implement the strategy; actions to apply these methods; and assessment of the data gathered as a result of application of the chosen methods. The science of the project can be boiled down to the following three questions:

1. How does one determine that the science used in the decision is of acceptable quality?
2. What is ecological health and how is it defined?
3. How can ecological health be measured?

Let us address each issue independently. The acceptability of scientific information is based on peer review. Much like many other contested areas of science, there is a great deal of misuse of the term "peer review"—partly based on misunderstanding of the process, and possibly due to potential bias of those who consider peer review to be a hindrance to continuation of their activities because they are forced to demonstrate compliance with peer review requirements. However, peer review is well-established and routinely performed—at least within that segment of the scientific community which constitutes basic and applied sciences, including the entire field of engineering. Countless scientific and engineering journals rely upon peer review as the single most important criterion for acceptability of submitted manuscripts, and subsequently publish an exceedingly large number of pages of credible information. Peer review is also used by funding federal agencies in the U.S. in awarding grants and contracts to perform scientific research, development, and technical services.

Is it possible to find contradictory information in the peer-reviewed scientific literature? The answer is a qualified yes. In order to look at the reason for the problem, one must appreciate that there are various classes of scientific information. In the classical scientific assessment, the science starts with a hypothesis; becomes a theory; and finally, when it has been found to be generally valid, ends up to become a law. Furthermore, scientific laws are applied to numerous segments of the production and construction industry, health care, service industry, and many other areas that benefit humanity. The scientific information can also be classified into three major categories, each having a subcategory totaling six classes as follows:

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Class I - Confirmed science: This class consists of clear, reproducible, and generally agreed-upon information.

Class II - Engineering and other applied sciences: This class consists of application of class I scientific information. It is true that application of scientific laws requires a certain level of judgement. However, these judgements may not contradict class I scientific information.

Class III - Extrapolation: This class consists of extrapolation of scientific information beyond the validity of the gathered data. The overwhelming majority of predictive models fall into this category. Obviously, the more applicable the data, the less uncertain the result of this class of information.

Class IV- Scientific judgement: The expert system used in the decision process falls into this class. In effect, in the absence of the needed data, knowledgeable individuals are asked to judge a subject. For obvious reasons, the larger the number of participants in such an effort, the more likely its results. However, historically the number of misjudgements is so large that the shortcomings of such an approach must be clearly considered before judgement is used.

Class V - Speculation: This class constitutes the limit of scientific acceptability. Speculative information is seldom—if ever—scientific.

Class VI - Pseudo-science: This class, often called junk science, constitutes information that is presented as science but is clearly contradicting class I and class II scientific information.

One way to place a scientific assertion in one of the above categories is to ask many properly-chosen peers to review it. The higher the level of agreement among the reviewers, the closer the assertion is to the top of the list of classes.

Peer review is often confused with technical advice. There is a consensus within the scientific community that an individual who has a stake in the outcome of the review may not participate in the review process. Thus, a properly-managed peer review would have required that the CALFED reach agreement with a reputable organization to select peer reviewers and perform the peer review. Furthermore, CALFED should have responded to the findings and recommendations of the reviewers. Finally, in a program like CALFED, the findings and recommendations of the reviewers—along with the response of the CALFED managers—should have been made available to the public. It is likely that the process chosen by CALFED was in the language of the scientific community technical advice and not peer review.

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The second question deals with the health of an ecosystem. There is a consensus within the scientific community that ecological health cannot be measured. This has been recognized by the CALFED program managers and is stated by many scholarly organizations—including the National Research Council. Instead, ecological indicators must be chosen and used as predictors of overall ecological health. The CALFED program uses two approaches for this purpose: The first approach, referred by the program as Landscape Level Assessment, is the application of a method known as landscape ecology. This assessment is essentially descriptive and attempts to marry ecology and geography. It maps changes in land use, forests, various aspects of water use, etc. Furthermore, in recent years, more sophisticated methods have been added to this process, including multispectral satellite and aerial imagery and geographic information system. However, as of this date, there is no method known that would provide quantitative or even semiquantitative information to assess the ecological health of a system.

The second approach used by CALFED consists of Environmental Monitoring and Research Program. As the title implies, this program is monitoring for fish and certain parameters for water quality. The Program has identified certain species of fish that are collected during the screening of water in various parts of the system. This approach has the potential to be used as an indicator of ecological health.

It is most surprising that CALFED, including its Ecosystem Restoration Program Plan (ERPP), is either unaware of ecological risk assessment methods or has chosen to disregard them. Ecological risk assessment quantifies the status of specific ecological elements that are predetermined to be of significance. Precisely because ecological health cannot be measured, ecological risk assessment provides the most logical approach to assess and quantify the level of ecological health for that specific element. To be sure, CALFED and its ERPP recognize the need to have objective measures and the need for quantitative metrics. However, the focus of the program appears to be on activities rather than reliance upon these quantitative measures. Despite these shortcomings, the ERPP appears to be well-organized and is asking the relevant and significant questions with some exceptions.

The ERPP has identified the following six steps for its refinement and implementation:

1. Refine ERPP
2. Create an Ecosystem Science Program
3. Prepare Conceptual Models
4. Develop Testable Hypothesis
5. Conduct Immediate Focused Research
6. Develop and begin a phased implementation program

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However, a closer look shows that the second step is in fact the continuation of the first step. More importantly, it is not clear how the stakeholders would be able to develop an ecosystem science program as envisioned in the second step. One would expect that they would express their wishes and that uninvolved scientists would convert these wishes into a scientific program. Furthermore, as indicated above, there appears to be no attempt to provide clear and unambiguous measures of success or accomplishments. Missing in the entire process is the peer review of the science as described above—an unfortunate omission.

Another issue of concern is the implicit assumption in the entire project that the ecosystem is a static process whereby the ecological conditions remained about the same for hundreds or thousands of years, and they changed only after humans interfered. It is true that construction of dams or other obstructions changed the ecological status of a water system. Conversely, it is equally true that the ecological system is dynamic and subject to considerable change with time.

A careful assessment of CALFED and its ERPP indicates that it contains three major segments, each serving a different audience.

1. The first and the stated goal is improvement of ecological health of the area covered by CALFED. This goal can be accomplished by assessment of the status of clear and unambiguous ecological elements. There are numerous approaches to accomplish this goal. By far, the most desirable method is ecological risk assessment. The description of ecological risk assessment is beyond the scope of this testimony; however, the excellent book of Suter and numerous writings of Barnthouse can be used as a guide. A more simplified approach may consist of using data gathered by ERPP on various species of fish and other species. In this case, it is necessary to develop a goal of population density of each one of these species. This goal, by its nature, will be arbitrary. However, there are ecological methods to determine the population density of species. The data gathered during the current screening process may be used as an approximation for determination of population density of various fish species. Note that both goal and method must take into consideration inherent uncertainties in the ecological dynamics.

2. The ERPP includes a number of activities whose primary purpose is to enhance the status of ecological science. To be sure, these activities will have a positive impact on CALFED. However, they have only a secondary importance in quantifying the progress in improving the status of ecological elements. Therefore, this segment of the program, if supported, should follow the same criteria used by organizations such the National Science Foundation, to accept or reject a specific project. This is particularly valid for steps 2 through 5 of ERPP.

3. The third and unstated goal of CALFED and its ERPP is to satisfy the desires of advocacy organizations. In a democratic society, the voice of the people determines the outcome of a decision.

Testimony of Alan Moghissi
May 12, 1998

Accordingly, it would be unrealistic to assume that the desires of advocacy organizations, regardless of their scientific validity, can be disregarded. Environmental advocacy organizations—like any other special interest group—have the right to impact societal decisions. Clearly, they feel strongly about the status of the Bay Area water systems, their tributaries, and associated areas. Accordingly, it is necessary to include their representatives from the beginning of the process and include their desires in the intermediate and final decisions. It is, however, imperative to recognize that science and advocacy are inherently contradictory. Therefore, environmental advocacy groups may participate in establishing goals. If their scientists want to participate in the scientific process, they must follow scientific principles.

Let me now respond to questions raised in your letter of invitation to me. You asked, "how do we evaluate the effectiveness of the funding we are providing?"

The scientific method by which effectiveness of an action is measured is cost-benefit or risk-benefit analysis. The quantitative measures recommended above can be used to assess the effectiveness of the level of funding. For example, reaching the goal of a population density can be measured against the amount of funds expended. To the best of my knowledge, this is the only scientifically-available method to assess the efficacy of funding. Note that because the program contains a significant level of support for basic ecological research, the contribution to basic science must be taken into consideration.

Your second question asks, "what clear and unambiguous performance standards are being adopted to determine if we are close to success or have achieved success?" The answer to this question requires some explanation. Although ERPP included items that deal with objective and quantifiable criteria, it is not clear that these are or will be used to assess the success. However, certain data are being collected that have the potential to be used for such a purpose. Thus, the objective of the program would be better served if the data were used to assess the success of the program.

Your third question is probably the most important issue facing the CALFED. It asks, "Are we going to postpone any major program decisions or alternatives until we have the results of the early phases? Or are we going to agree on a basic blueprint and simply adjust it through adaptive management as we move along?"

The answer to this question requires a definition of what constitutes a major decision. Because the program has avoided the development of quantitative measures up to this date, it is not possible to make a decision. How can a decision—whether major or minor—be made if one does not know where one is located within a process. Therefore, it is likely that the program must be reoriented to ensure that quantitative data become available to provide the necessary information to proceed.

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May 12, 1998

Mr. Chairman, let me propose the following approach:

1. The CALFED should provide clear and objective measures to demonstrate the status of its success. The success of the program should be measured in terms of quantitative goals achieved as compared to the funds expended.
2. The entire program should separate science from societal objectives. The scientific aspects of the project should clearly and unambiguously avoid advocacy or the participation of advocacy groups. If scientists from advocacy groups participate in that effort, they should do so as scientists—not as representatives of advocacy organizations. Furthermore, they must follow the established rules of science—particularly the rules of peer review.
3. The program would benefit from a peer review similar to that performed jointly by the ASME and RSI (ASME/RSI) for the Department of Energy. However, in order for the review to be successful, the CALFED may not participate in the selection of reviewers and must respond to the findings and recommendations of the review panel.
4. CALFED should try to use science described under Class II in the classification described above. The process described by CALFED and its ERPP is likely to include Class III and Class IV science. It is imperative that CALFED recognize the limitations of these classes of science and implement its program accordingly.

I have attached to this testimony a copy of the report describing the results of the first year of review performed jointly by ASME and RSI for the Department of Energy. I have also attached a copy of the review performed by RSI to assess the water quality program of the Commonwealth of Virginia. These reports demonstrate the value of peer review. They include meritorious aspects of each program as well as areas requiring improvements. You may also notice that the review does not stop with criticizing a project. It includes constructive comments and recommendations on how these deficiencies can be corrected. Additionally, please note that neither DOE nor the Commonwealth of Virginia had any input in the selection of reviewers for the ASME/RSI Peer Review Process.

Thank you for the invitation, and I shall be happy to answer any questions.

Testimony of Alan Moghissi
May 12, 1998

A. Alan Moghissi, Ph.D.
Biographical Sketch

Dr. A. Alan Moghissi is currently President of the Institute for Regulatory Science (RSI), a non-profit organization dedicated to the principle that societal decisions must be based on best available scientific information (BAS). The activities of the Institute include research and science education at all levels—particularly the education of minorities.

Dr. Moghissi received his education at the University of Zurich, Switzerland and the Technical University of Karlsruhe in Germany, where he received a Doctorate degree in physical chemistry. Following his immigration to the U.S., Dr. Moghissi joined the U.S. Public Health Service which, upon the formation of the U.S. Environmental Protection Agency (EPA), became a part of that Agency. Dr. Moghissi served in a number of capacities at the EPA, including Director of the Bioenvironmental/Radiological Research Division; Principal Science Advisor for Radiation and Hazardous Materials; and Manager of the Health and Environmental Risk Analysis Program. Prior to his retirement from the EPA, Dr. Moghissi represented the Office of Research and Development (R&D) in a number of work groups responsible for drafting regulations. As the representative of the EPA's R&D, he emphasized the need for reliance upon peer-reviewed information as the basis for regulatory activities. Subsequent to his retirement from the EPA in 1985, Dr. Moghissi formed the Institute for Regulatory Science (RSI). One of the first contracts awarded to RSI in 1987 involved the development and implementation of environmental health and safety training programs for senior staff of the U.S. Department of Energy (DOE) and DOE contractors. At that time, the DOE adopted the application of environmental requirements to its operations, and recognized that its senior staff required training in all aspects of environmental laws and regulations.

In 1989, Dr. Moghissi joined the University of Maryland at Baltimore as Assistant Vice President for Environmental Health and Safety, and in 1993 was appointed Associate Vice President for Environmental Health and Safety at Temple University in Philadelphia, PA. During his tenure at these institutions, the functions of RSI were transferred to these universities. In 1995, RSI was reconstituted as an independent institute with Dr. Moghissi as its President. He has held other academic appointments as Visiting Professor, Georgia Institute of Technology and the University of Virginia, as well as affiliations with the University of Nevada and Catholic University of America.

Dr. Moghissi's extensive research experience has dealt with diverse subjects ranging from the measurement of pollutants to the assessment of the biological effects of environmental agents. A major segment and focus of his research is concentrated on scientific information upon which laws, regulations, and judicial decisions are based. During the last 20 years of his career, he has emphasized the need for reliance upon "Best Available Science" (BAS) as the foundation for regulatory decision-making, and has strongly promoted and advocated the peer review process as the cornerstone of BAS. In addition, he has fostered the formation of a consensus in certain contested areas of science by reliance upon professional societies as an appropriate and effective vehicle to organize, plan, and conduct training courses, professional meetings, training workshops, and similar approaches to develop and prepare consensus reports on specific topics.

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Since 1987, Dr. Moghissi has been the principal investigator of a number of grants and contracts to foster the development and application of BAS. Consequently, a joint collaborative program was developed between RSI and the American Society of Mechanical Engineers (ASME). In 1997, a grant from DOE (No. DE-FG02-97CH10876) was awarded to RSI, with Dr. Moghissi as principal investigator, to expand and implement the joint ASME/RSI peer review program. Recognizing the need for the inclusion of many scientific and engineering disciplines, the joint ASME/RSI program currently includes provisions for the cooperation and active participation of several other professional societies.

Dr. Moghissi has published more than 300 papers, including several books. He is Editor-in-Chief of *Environment International* and *TECHNOLOGY: Journal of The Franklin Institute*, which is a continuation of one of America's oldest, continuously published journals of science and technology. Dr. Moghissi is a member of the editorial boards of several other scientific journals, and is active in a number of civic, academic, and scientific organizations. He is an officer of ASME; an honorary member of the National Council on Radiation Protection and Measurements; a member of the International Academy of Indoor Air Sciences; and an Academic Councilor of the Russian Academy of Engineering.

Table 13. Matrix of actions to Implement the Central Valley Habitat Joint Venture

Objective	Sacramento Valley: Butte Basin	Sacramento Valley: Sutter Basin	Sacramento Valley: American Basin	Sacramento Valley: Colusa Basin	Sacramento Valley: Yolo Basin	Sacramento-San Joaquin Delta: Delta	Sacramento-San Joaquin Delta: Suisun	San Joaquin Valley: San Joaquin Basin	San Joaquin Valley: Tulare Basin	Total
. Protect 80,000 acres of existing wetlands										
Acres	640(F) 9,360(E)	500(E)	2,000(E)	2,000(E)	5,000(E)	2,300(F) 700(F)	0	15,000(F) 37,500(E)	5,000(F)	17,940 62,060 80,000
Priority	5	8	2	7	1	6	9	3	4	
. Secure 402,450 (ac. ft.) of firm water for NWR's, WA's & GRCD										
NWR's	0	30,000	0	105,000	0	0	0	41,500	31,000	207,500
WA's	36,000	0	0	0	0	0	0	24,800	4,150	64,950
GRCD	------	------	------	------	------	------	------	130,000	------	130,000
Priority	4	3	N/A	5	N/A	N/A	N/A	2	1	402,450
3. Restore 120,000 acres of wetlands & protect with easements or fee purchase										
Acres	29,100	11,000	10,000	13,100	10,000	19,500	0	20,000	0	112,700
Priority	4	1	2	6	5	3	------	7	------	
. Enhance 291,555 acres of existing public and private wetlands										
Acres -										
Federal		2,590		20,450			1,100	16,580	2,300	43,020
State	8,600					3,500	10,900	8,590	12,105	43,695
Private	17,550	500	3,150	5,985	8,700	5,850	46,000	95,130	21,975	204,840
Priority	4	1	2	6	5	3	------	7	------	291,555
5. Enhance habitat on 443,100 acres of agricultural lands										
Acres	108,832	57,758	20,948	111,285	35,239	68,392	0	15,290	25,345	443,100
Priority	4	1	2	6	5	3	------	7	------	

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The Bay Institute
of San Francisco

January 6, 1998

Lester Snow, Executive Director
CALFED Bay-Delta Program
1416 Ninth Street #1155
Sacramento, Ca. 95814

RE: PRELIMINARY LIST OF STEPS NECESSARY TO RESOLVE OUTSTANDING CALFED ISSUES

Dear Lester,

As you know, The Bay Institute believes that to date a number of key program areas have not been adequately addressed or analyzed by the CALFED Bay-Delta Program. We have been concerned that omission of these areas not only represents a serious weakness in the planning process but would also mean that the Program had failed to adequately discharge its environmental documentation obligations under the National Environmental Policy Act and the California Environmental Quality Act.

We were therefore pleased to hear that you have decided not to identify a preferred alternative in the draft Programmatic Environmental Impact Report/Statement scheduled to be issued sometime this year. For the reasons stated above, we agree that it would be premature to designate a preferred alternative in this early draft. The Program should instead concentrate on conducting additional analyses and resolving outstanding issues that are prerequisite to designation of a preferred alternative. We offer the following preliminary suggestions regarding key areas where additional analyses are necessary:

1. Ecosystem restoration:

A strategic plan should be developed by mid-1998 to guide the long-term ecosystem restoration program. This plan should clarify:

• goals and objectives;

• conceptual models of ecosystem function;

• basic restoration strategies;

• methodologies for assessment of the viability of populations, habitats, and ecosystems used to refine objectives and develop basic restoration strategies; and,

• the adaptive management strategy (including research agenda, monitoring and assessment criteria, scientific review, prioritization criteria, etc.).

The strategic plan should be developed using:

• a core drafting team of agency and independent experts in environmental planning, landscape ecology, adaptive management and other disciplines;

• a larger team of agency, stakeholder and independent technical experts working collaboratively (in small workgroups and focused invited participant workshops) with the strategic plan drafting team to address key strategic plan issues; and,

• an independent scientific review panel.

The ERPP implementation menu should be reviewed and revised (based on the strategic plan components) by late 1998.

2. <u>Demand management</u>:

The Program's impact analyses should be immediately expanded to include:

• more widely varying ranges of demand reduction (from land retirement, reclamation, agricultural and urban water conservation, changes in pricing including increased costs from proposed new storage and conveyance facilities, etc.) in modeling all of the alternatives.

• modeling of reoperation of the existing system at lower demand levels (of particular importance to the evaluation of Alternative 1).

A technical panel of national and international technical experts in engineering, agricultural and resource economics, land-use planning and other disciplines should be convened in early 1998 to review the components of the existing water use efficiency common program, and the degree to which additional application of innovative technologies, changes in land use, use of financial incentives and disincentives, and other demand management mechanisms should be included in a common program or evaluated as part of a discrete alternative.

3. Water transfers:

A comprehensive proposal should be developed by mid-1998 for implementing a regulated water market. This proposal should specifically identify those institutional, legal, and financial components necessary to facilitate permanent and/or long-term transfers of water and water rights to instream uses.

The proposal should be developed using outside expertise in the following areas: water transfers law; the development of environmental water acquisition mechanisms in other western states; and the development of third-party impact mitigation mechanisms.

4. Water supply reliability:

Demand assumptions for offstream users should be articulated and justified in early 1998, in order to:

- help evaluate the ability of alternative sources of water supply (Bay/Delta surface supplies, Colorado River surface supplies, groundwater supplies, conservation, recycling, etc.) to contribute to meeting reasonable offstream needs, and,

- refine and, as appropriate, quantify the Program's water supply objectives.

The Program's analysis of the impacts of the various alternatives on water supply reliability should incorporate the results of the demand management and water transfers analyses discussed above.

5. Water quality:

The Program's impact analyses should be immediately expanded to include:

- more comprehensive evaluation of the potential benefits of source protection, pollution prevention, and watershed restoration elements;

- prioritization criteria for implementation of water quality measures;

- comparative cost analysis of meeting drinking water quality standards by treatment and source protection versus conveyance changes; and,

- more thorough evaluation of in-Delta water quality impairments of each conveyance alternative.

An independent scientific review panel of technical experts in aspects of water quality regulation and management should be convened in early 1998 to review the water quality common program.

6. Levee maintenance:

A technical panel of experts in land-use planning, engineering, flood management, agricultural and resource economics, and other disciplines should be convened in early 1998 to evaluate the long-term sustainability of levee maintenance and associated agricultural activities in the Delta, with particular emphasis on:

- areas with peat soils; and,

- identification of financial and policy incentives and disincentives to maintain levees.

Building on the findings of the panel, a Delta land use report containing comprehensive recommendations for how the Program should address long-term Delta land use should be completed by mid-1998. This report should be developed using outside expertise in land-use planning, engineering, flood management, agricultural and resource economics, and other disciplines as appropriate.

7. Storage

The Program's impact analyses should be immediately expanded to include a comparative cost analysis of meeting water supply reliability objectives using new storage facilities versus an efficient, regulated water market, and other innovative water management approaches.

8. Phasing:

A phasing strategy should be evaluated in which:

- more environmentally sensitive, less costly Program components (e.g., habitat restoration, demand management) are tested during the initial phases of CALFED implementation (i.e., 25 years); and,

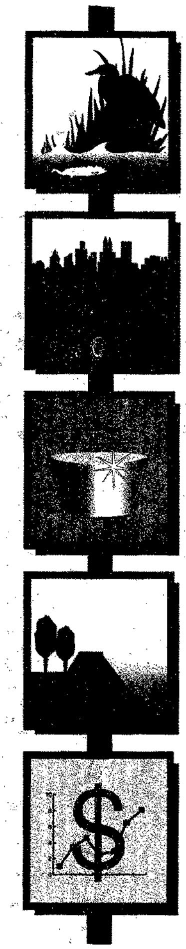
- additional elements are implemented under pre-agreed conditions only if a) certain program objectives are not met and b) previous implementation milestones are achieved.

We reiterate that this list is preliminary and is not intended to represent a comprehensive inventory of all areas where further work is needed. We would be happy to meet with you and your staff to discuss these preliminary recommendations and to help map out a course for addressing the key outstanding issues which must be resolved before a preferred alternative can be selected by the Program.

Sincerely,

Gary Bobker
Senior Policy Analyst

cc: R. Perciasepe, P. Metzger, F. Marcus, P. Wright, T. Hagler, K. Schwinn, USEPA
D. Wheeler, M. Luesebrink, Ca. Resources Agency
M. Spear, W. White, USFWS
Environmental Water Caucus



CALFED
BAY-DELTA
PROGRAM

Briefing Packet

May 1998

CALFED
BAY-DELTA
PROGRAM

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May 8, 1998

The Honorable John T. Doolittle
United States House of Representatives
1526 Longworth House Office Building
Washington, D.C. 20515

Dear Congressman Doolittle:

We have assembled this Briefing Packet to provide additional background information for the hearing on the CALFED Bay-Delta Program. This briefing book contains:

- Background information on each of the four panels: Statewide Water Needs, CALFED Financing, Monitoring and Performance Standards, and Public Participation.
- The CALFED Bay-Delta Program *Phase II Interim Report.*

The Phase II report is included because it describes the Phase II process we are currently undertaking, describes the three alternatives and fundamental Program concepts, and identifies the comparative technical advantages of each alternative. The CALFED Program is divided into three discrete phases. In Phase I, completed in September 1996, the Program identified the problems confronting the Bay-Delta system, developed a mission statement and guiding principles, and devised three basic alternative approaches to solving the identified problems. Currently, in Phase II, the Program has refined the preliminary alternatives, is conducting a comprehensive programmatic environmental review, and is developing an implementation strategy. Phase III, beginning in 1999, will begin implementation over the next 20 to 30 years.

I hope you will find this information helpful. The Program is always available to answer any questions you or your staff may have.

Sincerely,

Lester A. Snow
Executive Director

Statewide Water Needs

The CALFED Bay-Delta Program is striving to balance competing needs in the Bay-Delta system while increasing water supply reliability. Program actions will bring about a closer balance between supply and demand. However, even with all the CALFED actions in place, some economic and environmental hardships will occur in driest years, when projected supplies cannot completely satisfy California's demand for water. The figure below depicts the relative effect during drought periods of various water management measures contemplated within the CALFED Program.

Demand projections, depicted by the top line in the figure, represent the needs of a statewide population estimated to surpass 45 million by 2020. Even with the continued implementation of current levels of water conservation and the loss of some irrigated agricultural lands in the Central Valley, statewide demand is still projected to increase because of population growth. As our understanding of the Bay-Delta ecosystem has improved, we have also recognized additional environmental water needs, such as increased instream flows. There is uncertainty regarding future demands, so these demands are depicted by the range shown in the figure.

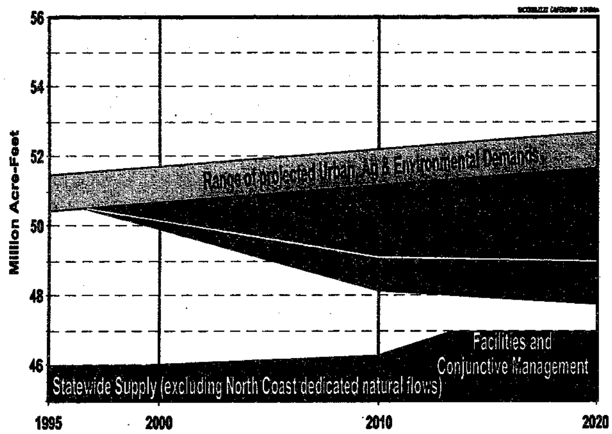
Statewide water supply projections, shown at the bottom the figure, represent all of the water sources available to the state. These supply projections represent projections of developed supplies and supplies dedicated to environmental purposes. (Water dedicated to remain in north coast rivers and streams has been excluded from the graph.) All other supply sources are included -- from local groundwater to reclaimed water, and from the Colorado River to the Central Valley's rivers and streams.

Also depicted on the figure are potential supply increases and demand reductions that might be achieved through conjunctive management, new surface storage, new conveyance facilities, and a host of efficiency measures, including more extensive urban and agricultural water conservation and water recycling.

Demand reductions anticipated from increased water use efficiency and water recycling are detailed in the CALFED Phase II Interim Report. Collectively, they represent the potential for roughly 4 million acre feet of reduced future demand. This level of savings will increase over time: much of the urban conservation potential reflects a reduction from future demand levels that are projected but not yet reached.

The use of new surface storage, conjunctive management of ground and surface water resources, and new facilities could improve the flexibility to manage water that is available for the state's urban, agricultural, and environmental uses. Though the expected contribution to supply in acre feet is significantly less than that expected from water use efficiency, the ability to increase the value of water through storage, improved conveyance, and changes in system operations could provide numerous benefits that do not show up as "increased yield." Rather, these benefits are seen through improvements in water supply reliability.

DROUGHT YEAR PROJECTIONS



CALFED Financing

Costs of the CALFED Program will range between about $500 million and $600 million annually. This amount includes capital repayment, energy costs, and costs of operations and maintenance. Program capital costs will range from about $9 billion to $10.5 billion, including the common programs elements, storage, and construction. Approximately $4 billion of this cost will be for the common program elements. Up to $5 billion would be for storage facilities, if a decision was made to implement all of the storage analyzed (6 million acre feet).

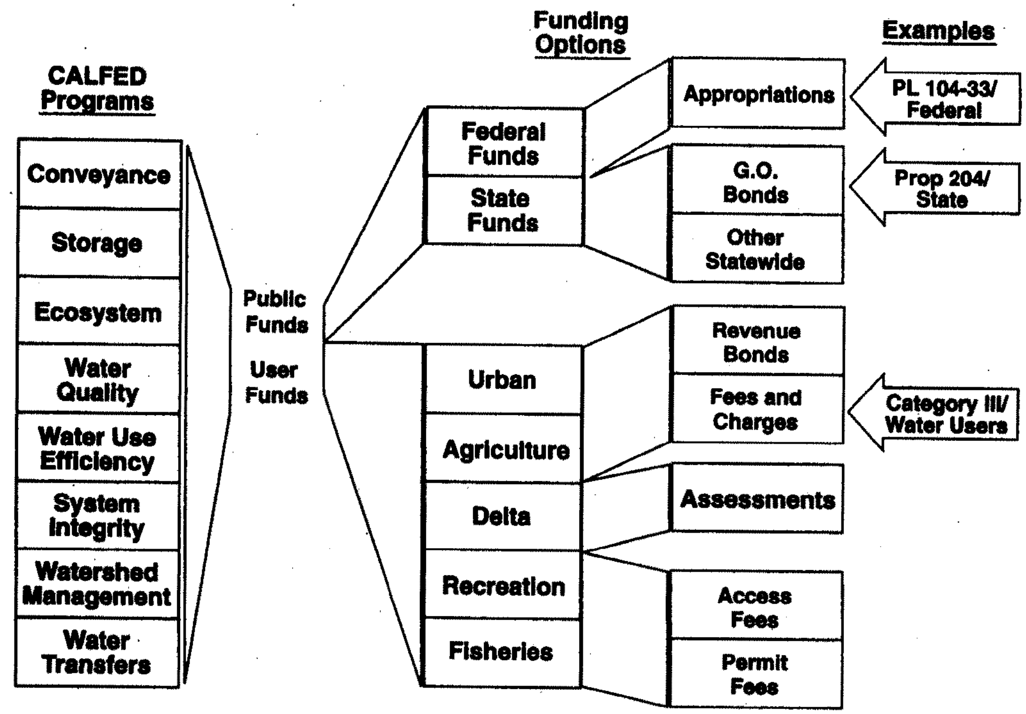
BDAC has established a finance work group to gather information and further analyze financial issues. The work group is comprised of members with diverse backgrounds and interests representing urban, agricultural, environmental and state and federal agencies.

Current thinking of the Finance Work Group and CALFED agencies is that financing of the CALFED Program will be borne by both the general public and by end users (such as water users), with those costs distributed on a benefits-based approach. That is, those who enjoy the benefits of Program actions will pay the costs associated with producing those benefits. For example, for purposes of storage and conveyance facilities, the benefits-based principle means that users of these facilities would pay the full cost of the facilities. In addition, while public financing may fund a portion of the Common Programs, there may be Common Program benefits to water users in the Bay-Delta System that would support the need for a user fee.

A cost-sharing agreement has already been executed for near-term ecosystem restoration activities. Additionally, federal and state agencies are working on a longer-term cost-sharing arrangement for that portion of Program costs that are eventually allocated to the general public. Initial arrangements would share these costs equally between the federal and state governments.

Program financing is already coming into place. For example, for the ecosystem restoration program, water users and the state and federal governments have dedicated funds to implement these ecosystem restoration projects. Water users have contributed about $30 million to the Category III program, while state funding through Proposition 204 has contributed over $450 million. $85 million in federal funding has been appropriated in 1998 to implement PL 104-33 (the California Bay-Delta Environmental Enhancement and Water Security Act).

Long Term Solution Funding Mix



Monitoring and Performance Standards

As with all large scale projects and restoration efforts it is important to set priorities for which actions are of highest priority and therefore should be funded and implemented first. CALFED is at the first stage of implementation of the Ecosystem Restoration Program. The projects selected for funding in 1998 meet the highest priorities identified by a technical team of agency and nonagency scientists. Those priorities are consistent with our broad ecosystem goals which are described in Attachment I.

Questions: How do we evaluate effectiveness of the funding we are providing? What clear and unambiguous performance standards are being adopted to determine if we are close to success or have achieved success?

Regarding the effectiveness of the funding and performance standards -- We are evaluating the effectiveness and performance of restoration efforts on three levels:

- Project Implementation Monitoring. Each restoration project is being evaluated/monitored to ensure that it is being implemented as planned. This includes review of schedule, budget, and deliverables which are included in the quarterly report required of each project. (At this level the performance standard is completion of the project as funded.)

- Project Effectiveness Monitoring. Each restoration project is being monitored to evaluate the effectiveness of the project at meeting its ecological/biological objectives. A primary consideration for project selection and funding was the ability of the project to meet ecological objectives that contribute to the goals of ecosystem health identified below. (At this level the performance standard is the achievement of the ecological/biological objective which varies for each project.)

- Ecosystem Monitoring. CALFED has identified four goals for ecosystem recovery in its Ecosystem Restoration Strategic Plan. To measure success in meeting these goals, state and federal agencies and stakeholders are developing quantifiable performance standards and indicators of ecological health. Projects will be monitored over a longer term process to assess the progress towards ecosystem recovery and health. A more detailed description of the Stategic Plan and ecosystem monitoring and performance standards is provided in Attachment I.

  An example of how the three levels of performance are measured is included in the box below and in Figure 1. In this example we use the Gorrill Dam Fish Screen and Ladder project which is one of the first projects implemented through this program and can serve as a model.

Example: Gorrill Dam Fish Screen and Ladder on Butte Creek

Project Objective: Reduce delays and obstacles to salmon migration.

Project Implementation Monitoring:

The Gorrill Dam Fish Screen and Ladder project is divided into two tasks. Task 1 is design and permitting and Task 2 is construction. Each task includes a specific schedule and budget as well as deliverables. The contract for the project will require that progress on all aspects of each task be reported quarterly. The contract manager will be evaluating this information to ensure the project is making adequate progress. The completed project will be inspected to ensure that the operating standards for the screen and ladder are met. The information will be summarized in the quarterly report which will be provided to Congress, the Ecosystem Roundtable, and CALFED agencies.

Project Effectiveness Monitoring:

Effectiveness of the Gorrill Dam Fish Screen and Ladder project will be assessed by monitoring the number returning adult spring- and fall-run chinook salmon on Butte Creek and the timing of their migration. The number of out migrating juvenile salmon will also be monitored. This data on post project migration will be evaluated relative to pre-project migration data to determine project success.

Ecosystem Monitoring:

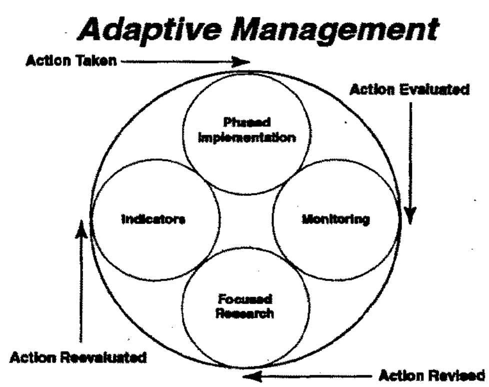
The Gorrill Dam project is directed at reaching the Goal A (see attachment I) which is "recovery of listed species dependent on the Delta." To evaluate progress towards this goal, a performance standard (quantifiable objective), such as a spring-run salmon population level, will need to be set. The number of returning spawners, the number of outmigrants, and the timing of migration are indicators of progress towards the goal and objective. Although the final performance standard has not been developed, the current abundance of spring-run is significantly below levels needed for a sustainable population. The current average abundance is only 2,400 spring-run chinook salmon, which is well below the levels called for in the Recovery Plan for Sacramento-San Joaquin Native Fishes (Nov. 1996). The plan requires that the number of wild spawners reaches a mean number of 8,000 fish and does not drop below 5,000 fish for 15 years, three of which are dry or critical years. This illustrates the need to begin restoration efforts before final performance standards are set.

Question: Are we going to postpone any major Program decisions or alternatives until we have the results of the early phases? Or are we going to agree on a basic blueprint and simply adjust it through adaptive management?

CALFED is exploring three basic alternatives (approaches) to solving the problems in the Bay-Delta system. Considering the complexity and large number of items to be completed for each alternative, implementation will likely be conducted in several stages over 30 or more years. CALFED will develop an implementation plan which outlines the order in which portions of the Program should be staged and linked with other portions of the Program.

CALFED is adopting an adaptive management approach in all components of the program. No decision has been made at this time regarding selection of an alternative or decisions on major program components, but consistent with the principles of adaptive management it is possible that major decisions could be staged over time. Staging would require monitoring and assessment of progress on program implementation.

Adaptive management acknowledges that we will need to adapt the actions that we take to restore ecological health and improve water management. No long-term plan for management and restoration of a system as complex as the Bay-Delta can predict exactly how the system will respond to Program efforts, or foresee events such as earthquakes, climate change, or introduction of new species to the system. Therefore, during each stage of implementation, milestones and decision points will be identified to guide future actions into the next stage. This allows actions whose results are uncertain to be taken, evaluated and the results of those evaluations used to refine future actions and inform future decisions. Adaptive management is illustrated below.



Attachment I

Description of
CALFED Ecosystem Restoration Strategy

Ecosystem Restoration Strategic Plan

The Strategic Plan is an integrated planning, scientific, and adaptive management framework by which to successfully implement and evaluate restoration of the large and complex Bay-Delta ecosystem. The plan will define the goals and performance standards for a rehabilitated ecosystem, the actions/projects to achieve the goals, and a process to monitor the health of the ecosystem and the effectiveness of the actions in approving the ecosystem.

The current draft of this document includes four goals which define success of the program. The goals are:

A. Achieve recovery of the listed native species dependent on the Delta and Suisun Bay, support recovery of listed native species in the Bay-Delta estuary and its watershed, and provide for continued conservation of currently unlisted species.
B. Rehabilitate the natural capacity of the Bay-Delta estuary and its watershed to support, with minimal ongoing human maintenance, native aquatic and associated terrestrial biological communities.
C. Maintain and enhance populations of selected species for safe consumption and sustainable commercial and recreational harvest, consistent with goals A and B.
D. Protect or restore a range of key, functional habitat types for biodiversity, scientific research, and other public values.

These goals are what we want to accomplish through ecosystem restoration. To further quantify these goals, there is a need to develop ecosystem performance standards (quantifiable objectives) which are the quantifiable end points of what we would like to accomplish for ecosystem recovery. Indicators of ecological health (performance indicators) are the things that are measured to determine if the performance standards have been met.

Indicators of Ecological Health

Indicators of ecological health are being developed to measure the ecological integrity of the Bay-Delta system. Indicators are the specific measures which determine whether the performance standards have been met. Indicators for the CALFED Program are being developed by a team of agency and stakeholder experts. The first step in indicator identification is development of conceptual ecosystem models. These conceptual models show the cause and effect relationships between different parts of the ecosystem. For example, they show how streamflows, riparian habitat, nutrients, and water temperature interact to affect species such as salmon populations. These characteristics of the ecosystem identified in the conceptual models are then further defined and grouped in an ecosystem classification typology. The typology identifies the component pieces of the ecosystem for which specific indicators can be identified. Examples of indicators could include an index of the amount, quality, and distribution of habitat types, measurements of listed species, or some measure of the number of exotic species.

Ecosystem Performance Standards

Like individual projects, there is a need to develop performance standards to measure success for the entire CALFED ecosystem restoration program. We are developing ecosystem performance standards to quantify the four goals for ecosystem recovery. Through the development of the Strategic Plan, a team of independent scientists are working with agency and stakeholder experts to quantify these performance standards.

Monitoring and Assessment

A great deal of research and monitoring has occurred over the last 20 years that will form the basis for developing the performance standards and indicators of ecological health for the ecosystem restoration program. For example, the goals addressing recovery of species populations (A and B) have ongoing monitoring efforts in place. For many species, existing recovery plans identify the population recovery levels (performance standards) which are being considered in the CALFED Program. For the other goals additional work is needed to broaden the current monitoring efforts to ensure that all indicators are being adequately assessed and that the appropriate research is being undertaken to evaluate the effectiveness of restoration projects. CALFED is in the process of developing a comprehensive monitoring and evaluation program that will build on existing monitoring efforts to meet these new needs.

Figure 1.

Measuring Performance: Example

Ecosystem Restoration Goal A
Achieve recovery of the listed native species dependent on the Delta

Ecosystem Performance Standard
Recover spring-run chinook salmon to target population level

Indicators of Ecological Health
Number of returning spawners
Quantity/quality of spawning gravels
Water temperature
Number of outmigrants
Timing of outmigration

Ecosystem Monitoring

Project Effectiveness Objective
Reduce migration delays at Gorrill Dam

Project Implementation Monitoring
Satisfactory completion of construction

Public Participation

CALFED Bay-Delta Program

Public involvement has been a key feature of the CALFED Program from the beginning. Since CALFED was created, CALFED has worked with the public, urban and agricultural water users, fishing interests, environmental organizations, businesses, and watershed organizations to define and evaluate alternatives for solving the problems confronting the Bay-Delta system. Ultimately, it is the active participation of the entire public that will help fix the Bay-Delta.

CALFED has conducted and/or participated in hundreds of public forums across the state to provide information on the CALFED Program and learn about local concerns. To inform the public of the upcoming hearings or meetings and to distribute current documents, we have established a database mailing list of approximately 10,000 addresses. Currently CALFED is conducting 17 public hearings in all areas of the state affected by the CALFED Program to discuss the draft Programmatic EIS/EIR and receive public comments (see attached figure -- Public Hearings Schedule).

To provide an ongoing public forum for the entire CALFED Program, an advisory group was formed. The federally-chartered group of more than 30 representatives from the state's leading urban, agricultural, business and environmental interests are serving as members of the Bay-Delta Advisory Council (BDAC), which meets regularly in a public setting to review the Program's progress and provide comments and advice. A general diagram of the CALFED Program structure showing the numerous work groups and technical teams is attached (see Program Structure).

Restoration Coordination Program

The Restoration Coordination Program manages the near-term ecosystem restoration efforts for the CALFED Program. Public and nonagency technical input is a key component of the program. To ensure broad input into the identification of ecosystem priorities and the selection of restoration projects, CALFED has formed both policy and technical advisory groups to guide the program (see attached diagram -- Restoration Coordination).

The Ecosystem Roundtable was formed to provide policy guidance for all aspects of the near-term ecosystem restoration efforts. The Roundtable, a subcommittee of BDAC, meets monthly in a public forum and includes a broad representation of urban and agricultural water users, environmental and fishery groups, and rural county and watershed groups. The Roundtable provides advice on all aspects of the program, such as identification of near-term ecosystem priorities, selection of projects for funding and tracking and monitoring of program performance.

In addition to the Ecosystem Roundtable, CALFED has formed technical teams and panels to also to advise on the identification of priorities and selection of projects for funding. For the 1997 funding cycle a two-step process was established for review and selection of projects. CALFED received over 300 proposals for funding and created 13 technical panels to review and score the proposals based on the subject of the proposals. All proposals that scored 40 or more were directed to the Integration Panel that was charged with final selections of proposals. For both the technical panels and the Integration Panel, members were chosen based on their expertise and knowledge of the subject matter. The panels consisted of both agency and nonagency members to provide broader perspectives and balance. The Ecosystem Roundtable also advised on the final selection of the members for the panels.

Project Selection Criteria.

In the 1997 funding cycle, all projects had to meet three minimum criteria. The project had to comply with all applicable laws and regulations, it could not prejudge the ultimate decision on the CALFED long-term program, and most importantly it had to involve only willing sellers or landowners. Seven criteria were used to evaluate and score projects. These ranking criteria included:

- Ecological and biological benefits;
- Applicant's ability;
- Technical feasibility and timing;
- Compatibility and benefits to non-ecosystem CALFED objectives;
- Cost;
- Cost-sharing and local involvement; and
- Monitoring, assessment, and reporting.

In evaluating a project for cost-sharing and local involvement, applications were evaluated using considerations such as whether they had local support, whether they had already notified adjacent landowners or had a plan to do so, whether the action was supported by a local watershed plan, and whether the project had the potential for local benefits or impacts.

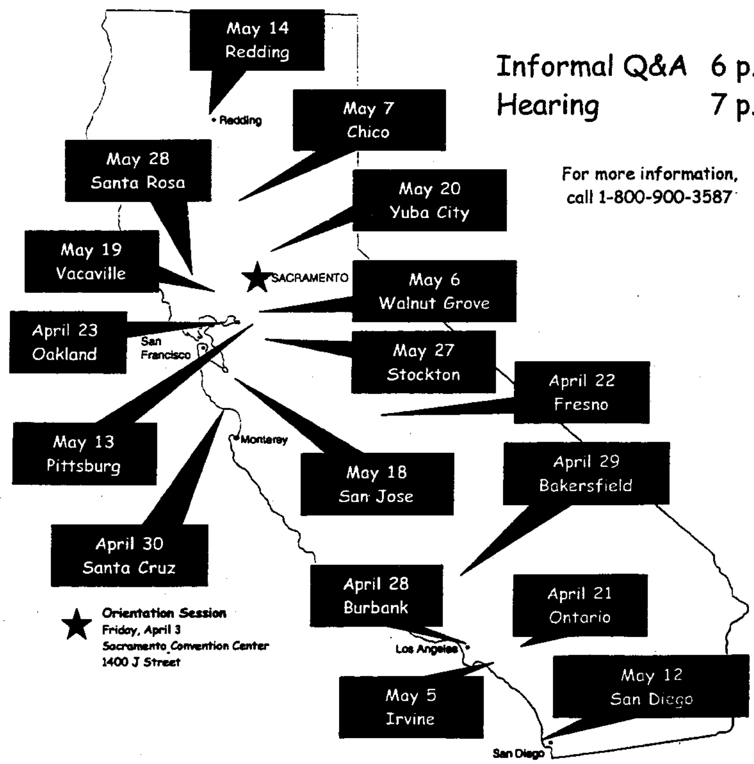
Project Implementation

CALFED has taken several important steps to ensure that projects are implemented with due consideration for local interests. Appropriate documentation must be prepared for each project under the California Environmental Quality Act and the National Environmental Policy Act as needed which provides an opportunity for public input. Furthermore, for approved projects that involve land acquisition, CALFED and the contracting agencies are requiring that the project manager notify adjacent landowners as parcels are identified for acquisition. CALFED has also supported numerous local watershed planning efforts where the local interests, including landowners, business interests, environmentalists, and local governments can develop their own plan on how best to manage their local watershed. This commitment to local empowerment and involvement is one of the most important keys to a long-term successful restoration plan.

CALFED BAY-DELTA PROGRAM

Public Hearings Schedule

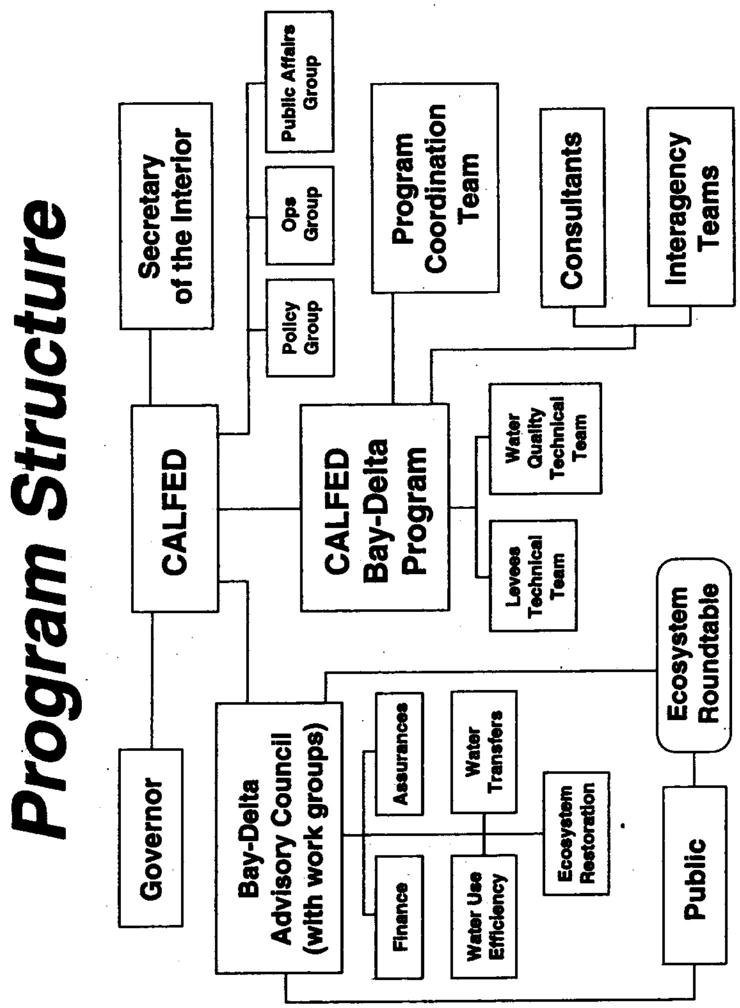
CALFED will hold 17 public hearings to gain input on the draft Programmatic Environmental Impact Statement/Environmental Impact Report. An orientation session will be held in Sacramento April 3.

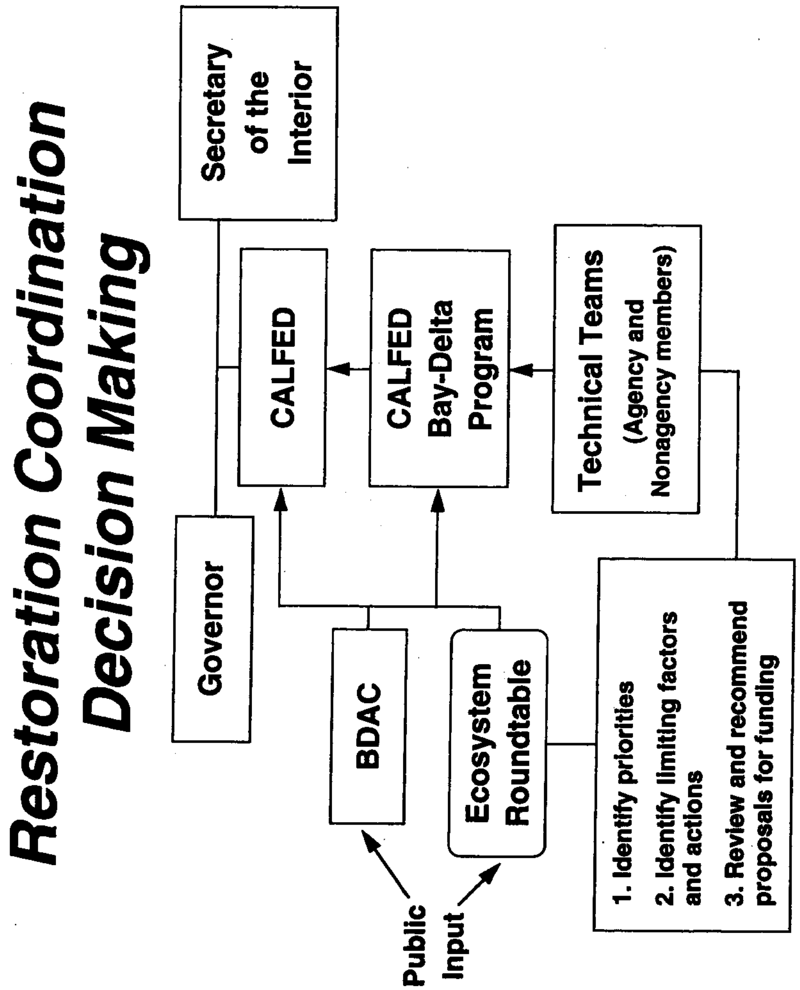


Informal Q&A 6 p.m.
Hearing 7 p.m.

For more information, call 1-800-900-3587

For more information ■ (916) 657-2666 ■ (916) 654-9780 FAX ■ 1-800-700-5752 Information Line ■ http://calfed.ca.gov


Program Structure
Governor
Secretary of the Interior
CALFED
Policy Group
Ops Group
Public Affairs Group
CALFED Bay-Delta Program
Program Coordination Team
Consultants
Interagency Teams
Water Quality Technical Team
Levees Technical Team
Bay-Delta Advisory Council (with work groups)
Finance
Assurances
Water Use Efficiency
Water Transfers
Ecosystem Restoration
Ecosystem Roundtable
Public


Restoration Coordination Decision Making
Secretary of the Interior
Governor
CALFED
CALFED Bay-Delta Program
Technical Teams (Agency and Nonagency members)
BDAC
Ecosystem Roundtable
Public Input
1. Identify priorities
2. Identify limiting factors and actions
3. Review and recommend proposals for funding

CALFED PHASE II
INTERIM REPORT

March 1998

CALFED Bay-Delta Program
1416 Ninth Street, Suite 1155
Sacramento, California 95814

Either we have hope within us or we don't. It is a dimension of the soul and is not essentially dependent on some particular observation of the world. It is an orientation of the spirit, an orientation of the heart. It transcends the world that is immediately experienced and is anchored somewhere beyond its horizons. Hope in this deep and powerful sense is not the same as joy that things are going well or a willingness to invest in enterprises that are obviously headed for early success, but rather an ability to work for something because it is good, not just because it stands a chance to succeed. Hope is definitely not the same thing as optimism. It is not the conviction that something will turn out well, but the certainty that something makes sense regardless of how it turns out. It is hope, above all, which gives the strength to live and continually try new things.

– Vaclav Havel

EXECUTIVE OVERVIEW

At the confluence of California's two largest rivers, the Sacramento and San Joaquin, the San Francisco Bay and adjoining Sacramento-San Joaquin Delta (Bay-Delta)together form the largest estuary in the western United States. The Bay-Delta is a haven for plants and wildlife, supporting over 750 plant and animal species. The Bay-Delta supplies drinking water for two-thirds of California's citizens and irrigation water for over 7 million acres of the most highly productive agricultural land in the world.

There is a rich history of conflict over resource management in the Bay-Delta system. For decades the region has been the focus of competing interests--economic and ecological, urban and agricultural. These conflicting demands have resulted in several resource threats to the Bay-Delta: the decline of wildlife habitat; the threat of extinction of several native plant and animal species; the collapse of one of the richest commercial fisheries in the nation; the degradation of the Delta as a reliable source of high-quality water; and a Delta levee system faced with an unacceptably high risk of failure.

Even though environmental, urban, and agricultural interests have recognized the Delta as critical, for decades they have been unable to agree on appropriate management of the Delta resources. Consequently, the numerous "traditional" efforts made to address the Bay-Delta problems, including government decrees, private remediation efforts, and seemingly endless rounds of litigation, have failed to reverse the steady decline of the Delta as fish and wildlife habitat or as a reliable source of high-quality water.

A significant breakthrough in this ongoing conflict occurred in 1994, when state and federal agencies and representatives of the major interest groups signed the Bay Delta Accord. The Accord contained agreements on interim water quality protections for the Bay-Delta, on several procedural and substantive concerns under the state and federal endangered species acts, and on a multi-million dollar effort to address nonflow factors affecting ecosystem health in the Bay-Delta. The Accord represented the first successful attempt at a comprehensive approach to Bay-Delta problems, addressing environmental concerns about the ecosystem as well as providing more certainty and reliability for water users. The CALFED Bay-Delta Program (Program) is a continuation of the consensus-seeking, comprehensive approach to California water management issues hoped for in the Accord.

The CALFED Bay-Delta Program is an open, collaborative, state-federal-stakeholder effort seeking to develop a comprehensive long-term plan to restore ecosystem health and improve water management for beneficial uses of the Bay-Delta system. The Program is fundamentally different from previous efforts because it seeks to address ecosystem restoration, water quality, water supply reliability, and levee and channel integrity as co-equal program purposes. The Program is developing a comprehensive package of Program elements that, together, must:

- Improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta to support sustainable populations of diverse and valuable plant and animal species

- Provide good water quality for all beneficial uses

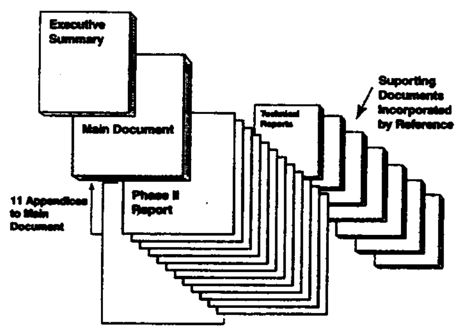
- Reduce the mismatch between Bay-Delta water supplies and current and projected beneficial uses dependent on the Bay-Delta system

- Reduce the risk to land use and associated economic activities, water supply infrastructure, and the ecosystem from catastrophic breaching of Delta levees

The unprecedented scope of the Program cannot be overstated. The vast geographic extent of the area under consideration, the variety and complexity of the hydrological and ecological process involved, and the magnitude of the potential economic consequences for California's enormous commercial, agricultural, and industrial base all combine to make this effort the most ambitious of its kind anywhere in the world. In the United States, only the well-known efforts at addressing environmental and institutional problems in the Chesapeake Bay and in the Florida Everglades can serve as comparisons.

The CALFED Program has used public workshops, an advisory council, technical work groups, and an interagency team to identify and evaluate potential long-term solutions. This work was divided into three discrete phases. In Phase I, completed in September 1996, the Program identified the problems confronting the Bay-Delta system, developed a mission statement and guiding principles, and devised three basic alternative approaches to solving the identified problems.

In Phase II the Program has refined the preliminary alternatives, is conducting a comprehensive programmatic environmental review, of which this report is a portion, and is developing an implementation strategy. A final environmental document is targeted for completion in late 1998.



In Phase III, beginning in 1999, the Program, including any additional site-specific environmental review and permitting, will be implemented over the next 20 to 30 years.

This Phase II Report is one of many supporting documents published in conjunction with the draft Programmatic

Environmental Impact Statement/Environmental Impact Report (EIS/EIR). The main body of the EIS/EIR provides a technically oriented analysis of the broad environmental effects that might accompany Program implementation. This Phase II Report describes the CALFED process, solution alternatives and the fundamental Program concepts that have guided their development, and analyses that have revealed the comparative technical advantages of each alternative. Finally, this report describes how CALFED will use analysis results in a public process to proceed to selection of a preferred program alternative by late 1998. This Phase II Report and the Executive Summary of the EIS/EIR are being widely disseminated. The full EIS/EIR, other technical appendices, and supporting technical reports -- comprising thousands of pages -- are available from CALFED.

Some basic concepts related to the Bay-Delta system and its problems have guided the development of potential CALFED solutions. These concepts are discussed in more detail in Chapter 2. First, for water in the system, the greatest conflict occurs when it is scarce. We can take advantage of this time value of water to store water in surface and groundwater storage in times of high flow in order to release it for agricultural, environmental, and urban purposes in times of shortage, when the greatest conflicts exist among the competing uses.

Second, many of the system's problems are interrelated, so the solution must be comprehensive; no single action or project can possibly resolve all of the conflicts.

The foundation of every CALFED alternative is the common Program elements: the ecosystem restoration program, water quality program, water use efficiency program, levee protection plan, water transfer policy framework, and watershed management coordination program. These common Program elements differ only slightly between alternatives. Each of the individual common Program elements is a major program on its own, and each represents a significant investment in and improvement to the Bay-Delta system. For example, the ecosystem restoration plan is the largest, most complex ecosystem rehabilitation effort ever undertaken anywhere.

A significant part of the overall performance of the CALFED Bay-Delta Program is attributable to the common Program elements. These common Program elements are described in more detail in Chapter 3, and full descriptions of each element are available in the technical appendices accompanying the Draft Programmatic EIS/EIR.

During the Phase II process, stakeholders have raised significant questions and issues about different aspects of the common Program elements. CALFED recognizes that addressing these questions and issues on common Program elements is fundamental to the success of the Program. In Chapter 3, we have included sidebar discussions of stakeholder concerns; in Chapter 3 and Chapter 5 we have laid out proposed processes for resolving these critical concerns.

The Program alternatives evaluated in this EIS/EIR fall into three basic approaches to solving the problems:

Alternative 1 - Includes programs for ecosystem restoration, water quality, levee and channel integrity, water use efficiency, water transfers, and watershed management coordination. In addition, Alternative 1 proposes existing Delta channels, with some modifications for water conveyance and various storage options.

Alternative 2 - Includes programs for ecosystem restoration, water quality, levee and channel integrity, water use efficiency, water transfers, and watershed management coordination. In addition, Alternative 2 proposes significant modifications of Delta channels to increase water conveyance across the Delta combined with various storage options.

Alternative 3 - Includes programs for ecosystem restoration, water quality, levee and channel integrity, water use efficiency, water transfers, and watershed management coordination. In addition, Alternative 3 includes Delta channel modifications coupled with a conveyance channel that takes water around the Delta with a various storage options.

Each alternative must satisfy six solution principles adopted by the CALFED Bay-Delta Program. Any acceptable solution will:

- Reduce major conflicts among beneficial uses of water
- Focus on solving problems in all problem areas. Improvements for some problems will not be made without corresponding improvements for other problems
- Be implementable and maintainable within the foreseeable resources of the Program and stakeholders
- Have political and economic staying power and will sustain the resources they were designed to protect and enhance
- Have broad public acceptance and legal feasibility, and will be timely and relatively simple to implement compared with other alternatives
- Will not solve problems in the Bay-Delta system by redirecting significant negative impacts, when viewed in their entirety, within the Bay-Delta or to other regions of California

In Phase II, the Program has performed technical analyses to determine how the three alternatives perform when measured against 18 distinguishing characteristics. All of the alternatives share a high level of performance by virtue of the program elements that are common to all three: ecosystem restoration, water quality, levee and channel integrity, water use efficiency, water transfers, and watershed management coordination. The distinguishing characteristics are intended to help CALFED and members of the public determine the relative performance levels of each alternative. The distinguishing characteristics:

MORE CRITICAL DISTINGUISHING CHARACTERISTICS	LESS CRITICAL DISTINGUISHING CHARACTERISTICS
• IN-DELTA WATER QUALITY	• STORAGE AND RELEASE OF WATER
• EXPORT WATER QUALITY	• WATER TRANSFER OPPORTUNITIES
• DIVERSION EFFECTS ON FISHERIES	• SOUTH DELTA ACCESS TO WATER
• DELTA FLOW CIRCULATION	• TOTAL COST
• WATER SUPPLY OPPORTUNITIES	• HABITAT IMPACTS
• ASSURANCES DIFFICULTY	• LAND USE CHANGES
• OPERATIONAL FLEXIBILITY	• SOCIO-ECONOMIC IMPACTS
• RISK TO EXPORT WATER SUPPLIES	• ABILITY TO PHASE FACILITIES
• CONSISTENCY WITH THE SOLUTION PRINCIPLES	• BRACKISH WATER HABITAT

Among these characteristics, some were found, through the evaluation process, not to vary greatly among the three alternatives, while other characteristics truly allowed us to distinguish differences in performance. These more critical characteristics are the ones in the left column above.

At this time, CALFED has not made any determination about how the alternatives perform in terms of the "assurances" or "consistency with solution principles" characteristics. Although extremely critical to the ultimate decision of a preferred program alternative, evaluation of these two characteristics is highly subjective, and CALFED intends to make that evaluation only after considering the comments of the interested public. As to the remaining distinguishing characteristics listed above, CALFED is presenting in this Phase II Report the results of the technical evaluations of these characteristics performed thus far. Based on the assumptions made in the technical evaluations, Alternative 3 appears to have the potential to provide greater performance on these particular characteristics. At the same time, however, Alternative 3 appears to present the most serious challenges in terms of assurances and implementability.

CALFED has not identified a preferred program alternative. A great deal of additional technical review and dialog will need to take place among elected officials, CALFED agencies, local agencies, interest groups, and the public before a decision can be made. Together, all interests will need to answer questions such as:

- Are the assumptions and technical evaluations performed by CALFED valid?

- Are the common Program elements contained in each alternative adequate to ensure overall Program success?
- How well does each alternative meet the CALFED solution principles? Is any one alternative clearly superior to others?
- Is the construction of water facilities (such as an isolated conveyance facility) acceptable to the public?
- Are beneficiaries willing to pay for a comprehensive Bay-Delta solution?
- Can we devise an adequate assurance package of actions and mechanisms to assure that the Program will be implemented and/or operated as agreed?

Deliberations that enable us to answer these questions and select the preferred program alternative will be the focus for the rest of Phase II of the Program. This report will help you prepare to participate in these deliberations. It is structured to introduce the Program (Chapter 1) and describe some significant fundamental Program concepts (Chapter 2). It also describes the Program alternatives (Chapter 3), explains the technical evaluation (Chapter 4), and explains the process that CALFED will use to identify a preferred program alternative (Chapter 5). Chapter 5 discusses many policy and programmatic questions on which CALFED is requesting specific input. Resolution of these questions and issues is imperative before State and Federal decision makers and interested stakeholders can decide on a comprehensive solution.

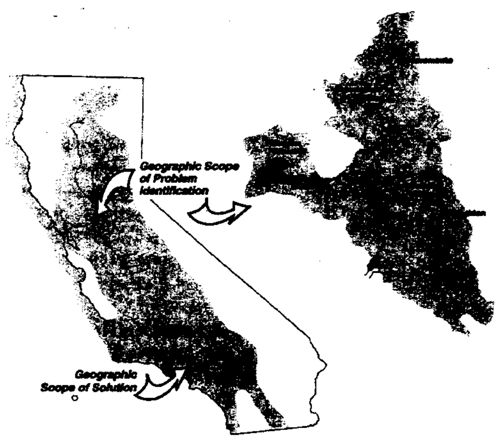
The format of this report includes "sidebars" that identify the issues of concern or areas where greater detail is provided on a particular topic. Because this is a summary report of the Phase II process, it includes references to sections in the Programmatic EIS/EIR where additional information and/or detail may be found.

TABLE OF CONTENTS

1. INTRODUCTION

A maze of tributaries, sloughs, and islands, the San Francisco Bay/Sacramento-San Joaquin Delta estuary (Bay-Delta) is the largest estuary on the West Coast. It is a haven for plants and wildlife, supporting over 750 plant and animal species. The Bay-Delta is critical to California's economy, supplying drinking water for two-thirds of Californians and irrigation water for over 7 million acres of the most highly productive agricultural land in the world.

The Bay-Delta is also the hub of California's two largest water distribution systems - the Central Valley Project (CVP) operated by the U.S. Bureau of Reclamation and the State of California's State Water Project (SWP). The CVP an SWP were built to provide river regulation, improvements in navigation and flood control, water supplies for irrigation, municipal, and industrial uses, and hydropower generation. In addition, at least 7,000 other permitted water diverters, some large and some small, have developed water supplies from the watershed feeding the Bay-Delta estuary. Together, these water development projects divert about 20 percent to 70 percent of the natural flow in the system depending on the year.



When combined with the effects of increased population pressures throughout California, the introduction of exotic species, and numerous other factors, these water diversions and the related facilities have had a serious impact on the fish and wildlife resources in the Bay-Delta estuary. This impact, as well as other effects of the continued resource conflicts in the Bay-Delta system, are discussed in detail below.

Geographic Scope for Problems and Solutions

The geographic **scope for the problems** consists of the legally defined Delta, Suisun Bay (extending to the Carquinez Strait) and Suisun Marsh.

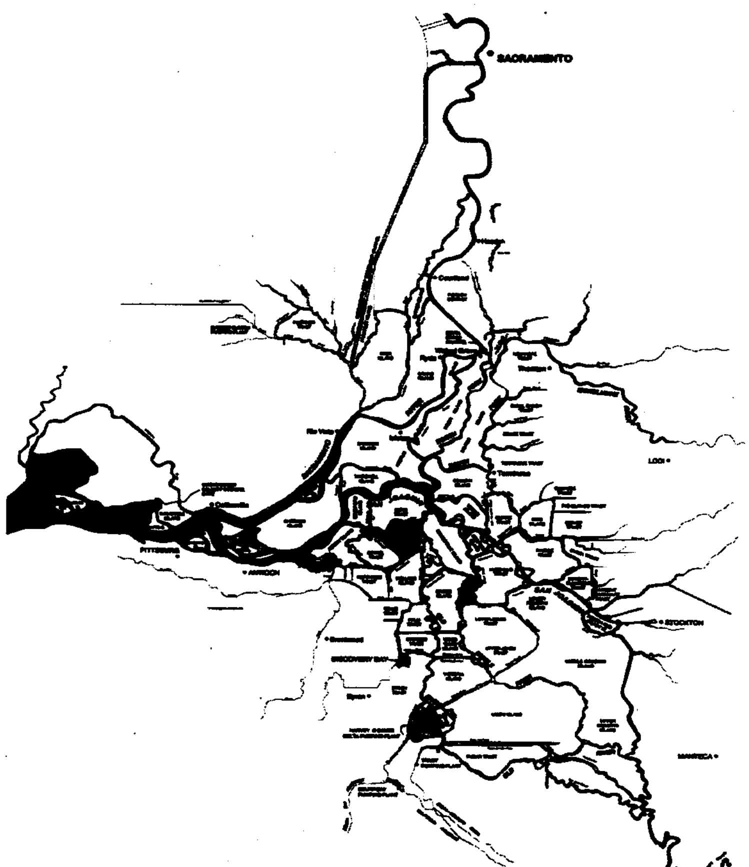
The geographic **scope for developing possible solutions** includes a much broader area that extends both upstream and downstream of the Bay-Delta. This solution scope includes the Central Valley watershed, the Southern California water system service area, San Pablo Bay, San Francisco Bay and near-shore portions of the Pacific Ocean out to the Farallon Islands and north to the Oregon border.

Although all agree on the importance of the Bay-Delta estuary for both fish and wildlife habitat and as a reliable source of water, few agree on how to manage and protect this valuable resource. In the past two decades, these disagreements have increasingly taken the form of protracted litigation and legislative battles; as a result, progress on virtually all water-related issues has become mired down, approaching gridlock.

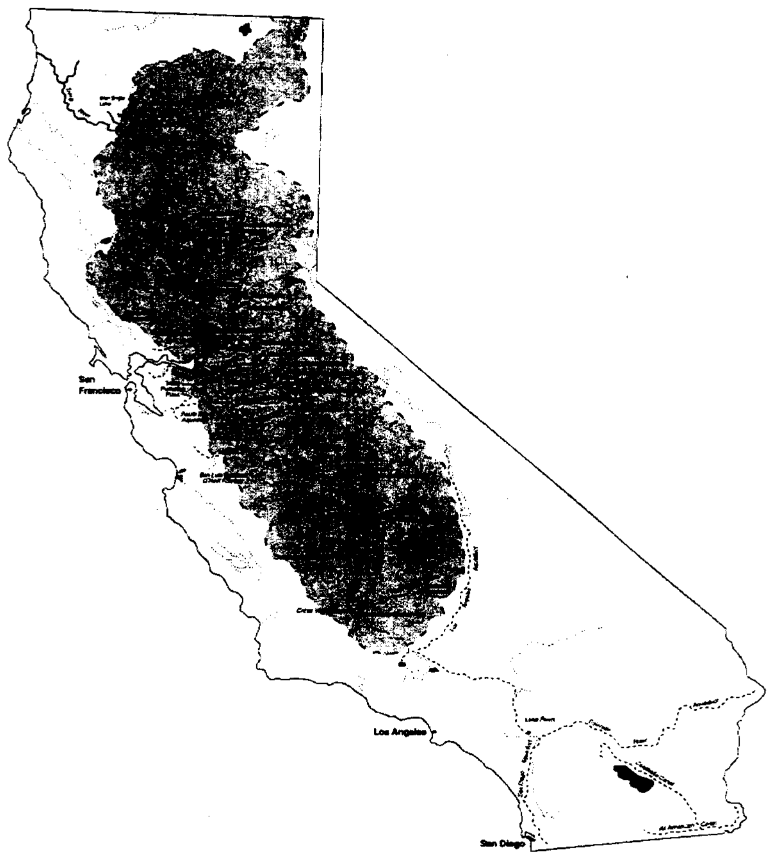
The CALFED Bay-Delta Program was established to reduce conflicts in the system by solving problems in the resource areas of ecosystem quality, water quality, water supply reliability, and levee and channel integrity. The Program seeks to do this by developing a long-term comprehensive plan that will restore ecological health and improve water supply and water supply reliability for beneficial uses of the Bay-Delta system. The Program has crafted alternatives that recognize the importance of water quality improvements that will protect Delta drinking water supplies and improve the quality of aquatic habitat. Maintaining and improving the integrity of Delta levees and channels will protect agricultural, urban, and environmental uses within the Delta and protect the quality of water used elsewhere in the state. Water conservation and recycling programs can assure the efficient use of existing water supplies and any new supplies developed through the Program.

Given the rich history of conflict in the Bay-Delta system, CALFED recognizes that any proposed program to address this broad spectrum of resources will be controversial. Stakeholders participating in the CALFED process have already identified significant concerns about virtually every component in the Program. Many of these concerns are summarized in Chapter 3 and elsewhere in this report. CALFED encourages all members of the public to review the material in this report and the Draft EIS/EIR and to provide us with comments for further consideration.

The most intense conflict over the available water supply occurs during times of drought. It is during these times that fish and wildlife are most stressed and demands for water from the Delta are greatest. During periods of shortage, water holds its highest value for all uses. An important part of the CALFED approach to this conflict is to take water from the system in times of plenty and then to release these flows in times of need. By supplementing the existing flows during drought periods, the CALFED Program may be able to help prevent disastrous consequences to fish populations that travel through, live-in, or are in some way dependent upon the Delta for habitat during critical life stages. These additional flows will also improve water supply reliability. Through the creation of additional aquatic habitat along the rivers tributary to the Delta, removing obstructions to upstream fish migration, recreating spawning beds, restoring riparian vegetation, increasing the acreage of wetlands, and restoring more natural flow patterns within the Delta, CALFED hopes to help restore fish and wildlife whose viability has been threatened by land and water development.



Sacramento/San Joaquin Delta



Watershed for the Sacramento/San Joaquin Delta

A Vision for Year 2030
Return to a Healthy Bay-Delta System

The following is a vision of the future with implementation of a CALFED solution:

For a third straight year, biologists have observed record returns of winter-run and spring-run chinook salmon to their Central Valley spawning grounds. Over the past three decades, habitat rehabilitation and improvements in river flow management have provided the impetus for rebounding populations of all the major migratory and resident fish in the Bay-Delta. There are no longer any fish species in this system listed under the Endangered Species Act. The combination of a rigorous management program with augmented stream flows have minimized the adverse effects of undesirable exotic species in the aquatic environment. For the first time since the early part of the twentieth century, both the commercial fishing industry along coastal California and the sports fishery in the Bay-Delta and on the Sacramento and San Joaquin rivers are thriving.

Other wildlife resources in the Bay and Delta have experienced a similar revival. The substantial restoration of riparian habitat upstream and in the Delta has reversed the decline of both aquatic and terrestrial species that were threatened with extinction at the end of the last century. The innovative use of "set-back" levees and flood bypass easements on the upstream tributaries, and waterside berms in the Delta, provided critical dual benefits during last year's heavy rains. In addition, a portion of the flood waters were moved into storage for later use by water users and to provide environmental flows in drier times. Not only did the Valley avoid catastrophic levee failure and loss of agricultural resources, but the floodways provided a major stopover for the migratory waterfowl on the Pacific Flyway. With its patchwork of restored habitat and working farms, the Delta has become a favorite destination for hunters, anglers, and "eco-tourists" alike.

Unlike last year, with its heavy rains, this year promises to be extremely dry. Nevertheless, even though California's population now exceeds 50 million people, urban and agricultural water users will avoid the economic dislocation and inconvenience of unexpected water shortages. Innovative programs of water conservation and water recycling have allowed all water users to reduce their demand on California's water resources. With an efficient water market in place, many water providers are relying on short-term voluntary water transfers and local groundwater management programs to see them through the dry period. Although transfers were initially controversial, local governments and water agencies have worked out arrangements for water transfers that protect local economies and water resources. Sustained improvements in the fish and wildlife populations have led to reduced environmental restrictions on the operations of the state's water conveyance facilities, so water can be transferred from groundwater banks and other storage facilities to the areas of greatest need.

All of the state's water users have benefitted from better water quality in the Delta. Better management practices have substantially reduced the negative effects of agricultural run-off in the Delta and its tributaries, and most of the toxic discharges into the Bay and Delta have been curtailed by a combined program of regulatory enforcement and economic incentives. Even the long-term problem of toxic drainage from abandoned mines is close to resolution, as the substantial investments in treatment and containment over the past 30 years have drastically reduced the volume of heavy metals entering the Bay-Delta ecosystem. These water quality improvements have resulted in a cleaner, safer supply of drinking water for a large percentage of California's 50 million residents.

The return to a healthy Bay-Delta system that meets California's needs was made possible by a spirit of cooperation and grassroots involvement. Many groups are responsible for this success story including state/federal/local partnerships, conservancies, and local land owners.

Bay-Delta Resource Conflicts - 1998

Water Quality Problems

The Delta is a source of drinking water for millions of Californians and is critical to the state's agricultural sector. In addition, good water quality is required to maintain the high quality habitat needed in the Bay-Delta system to support a diversity of fish and wildlife populations. Yet, despite improvements in Bay-Delta water quality, the issue remains a primary concern in the Delta.

Water quality parameters of concern enter the Delta through a variety of sources, including sewage treatment plants, industrial facilities, forests, farms and farm fields, mines, residential landscaping, urban streets, and natural sources. They find their way to even the Delta's most remote areas where they interact with water, sediment, plants, and animals. The pollutants, pathogens, natural organics, and salts in Delta waters impact to varying degrees existing fish and wildlife, as well as human and agricultural use of these waters. The salts, entering the Delta through the Bay from the ocean and from agricultural returns upstream, decrease the utility of Delta waters for many purposes, including agriculture, drinking water, and the ecosystem. The level of natural organics in the water (mainly resulting from the natural process of plant decay on many of the Delta peat soil islands) is of concern because of the way natural organics react with other chemicals during the treatment process necessary to produce safe drinking water. During this treatment, certain by-products are created which may produce potentially adverse human health effects. Pathogens, which include viruses, Giardia and Crypto sporidium, enter the Delta through various sources and pose human health and treatment-related concerns.

Ecosystem Problems

The Bay-Delta system no longer provides a broad diversity of habitats nor the habitat quality necessary to maintain ecological functions and support healthy populations and communities of plants and animals. Declining fish populations and endangered species designations have generated major conflicts among beneficial uses of water in the Bay-Delta system. The health of the Bay-Delta ecosystem has declined in response to a loss of habitat to support various life stages of aquatic and terrestrial biota and a reduction in habitat quality due to several factors.

The steady decline in habitat quantity, quality, and diversity results from many activities both in the Delta and upstream. The earliest major damaging event was the unrestricted use of hydraulic mining in the river drainage along the eastern edge of the Central Valley, which greatly increased the amount of sediment entering the river systems. The hydraulic mining resulted in habitat degradation in Central Valley streams as channel beds and shallow areas filled with sediment. The reduced capacity of the sediment-filled channels resulted in an increase in frequency and extent of periodic flooding. This accelerated the need for flood control measures to protect adjacent agricultural lands. Levee construction to protect these lands eliminated fish access to shallow overflow areas, and dredging operations to construct levees eliminated tule bed habitat along the river channels. Since the 1850s, 700,000 acres of overflow and seasonally flooded land in the Delta have been converted to agriculture or urban uses. Many of the remaining stream sections have been dredged or channelized to improve navigation, increase stream conveyance during periods of flood, and facilitate water export.

Upstream water development, depletion of natural flows, and the export of water from the Delta have changed seasonal patterns of inflow, reduced annual outflow, and diminished the natural variability of flows into and through the Delta. Facilities constructed to support water diversions cause straying or direct losses of fish (e.g. unscreened diversions) and increased predation (e.g., Delta cross channel and Clifton Court Forebay). Entrainment and export of substantial quantities of food web organisms (eggs, larvae, and young fish) further added to habitat decline.

Habitat alteration and water diversions are not the only factors that have caused ecosystem problems. Water quality degradation caused by pollutants and increased concentrations of substances such as pesticides and herbicides may also have contributed to the overall decline in the health and productivity of the Delta. In addition, undesirable introduced species compete for available space and food supplies, sometimes to the detriment of native or economically important introduced species.

Bay-Delta Resource Conflicts - 1998
(Continued)

Water Supply Reliability Problems

The Bay-Delta system provides the water supply for a wide range of instream, riparian, and other beneficial water uses which are authorized by appropriative, riparian, and pre-1914 water rights. While some water users depend on the Delta system for only a portion of their water supply, others have become highly or totally dependent on Delta water supplies. As water use and competition among uses has increased during the past several decades, conflicts have increased among users of Delta water. Heightened competition and conflict during certain seasons or during water-short years has magnified the impact from natural fluctuations in the hydrologic cycle.

In response to declining fish and wildlife populations, water flow and timing requirements have been established for certain fish and wildlife species with critical life stages dependent on freshwater flows. These requirements have reduced flexibility to meet the quantity and timing of water exports from the Delta. There are concerns that additional restrictions that might be needed to protect species could increase the uncertainty of Delta water supplies. This basic disparity between water needs and water availability has created economic uncertainty in the water service areas and increased potential conflict over supplies.

A related concern is the vulnerability of the Delta water transport system of levees and channels to catastrophic failure due to earthquakes, structural failure, or overtopping during floods. This system is also vulnerable to general failure as a result of decreasing levee stability. Such failures in the system could result in interruptions in water use in the Delta or water transport across the Delta for periods that could vary in length from days to several months.

Levee System Integrity Problems

Settlers first constructed levees in the Sacramento-San Joaquin Delta during the late 1800s. Initially settlers built levees to turn tidal marshes into agricultural land and over time increased the levee heights to maintain protection as both natural settling of levees and shallow subsidence of Delta island soils (oxidation lowers the level of land over time) occurred. The increased levee heights combined with poor levee construction, and inadequate levee maintenance makes Delta levees vulnerable to failure, especially during earthquakes or floods. Delta island farmland, wildlife habitat, and critical infrastructure can be flooded as a result of a levee failure. Delta islands adjacent to a large body of open water created by flooded Delta islands can be exposed to increased wave action, possible levee erosion, and increased seepage if the levee is not repaired and the flooded Delta island drained. Levee failure on specific Delta islands can have direct or indirect impacts on water supply distribution systems. Direct impacts result from flooding of distribution systems such as the Mokelumne Aqueduct, and indirect impacts result from salty water moving up into the Delta, as an island is flooded. The increased salinity in the Delta would be of particular concern in a low water year, when less freshwater would be available to drive back the incoming salt water. Long-term flooding of specific Delta islands can have an effect on water quality by changing the rate and area of the mixing zone. A long interruption of water supply for in-Delta and export use by both urban and agricultural users could result, until the salt water could be flushed from the Delta.

Local reclamation districts are concerned with the cost of maintaining and improving the Delta levee and channel system. The complex array of agencies with planning, regulatory, disaster assistance, and/or permitting authorities over levees and channels creates additional obstacles in rehabilitation and maintenance efforts. Regulatory measures that protect endangered species or critical habitat can further increase the vulnerability of the system. These measures can conflict with and prolong or defer important levee rehabilitation and maintenance work needed to maintain system integrity.

The Program

The CALFED Bay-Delta Program began in May of 1995 to address the tangle of complex issues that surrounds the Delta. The CALFED Program is a cooperative, interagency effort of state and federal agencies with management or regulatory responsibilities for the Bay-Delta.

The CALFED agencies appointed an executive director to oversee the process of developing a long-term comprehensive plan for the Bay-Delta. The Executive Director selected staff from the CALFED agencies to carry out the task. In addition, the CALFED agencies and stakeholders worked with the interagency CALFED Program team through multi-level technical and policy teams.

The CALFED Program is a collaborative effort including representatives of agricultural, urban, environmental, fishery, business, and rural counties who have contributed to the process. The Bay-Delta Advisory Council (BDAC), a 34-member federally chartered citizens' advisory committee, provides formal comment and advice to the agencies during regularly scheduled public meetings.

CALFED

State Agencies

Resources Agency of California*
- Department of Water Resources
- Department of Fish and Game

California Environmental Protection Agency
- State Water Resources Control Board

Federal Agencies

U.S. Department of Interior
- Bureau of Reclamation*
- Fish and Wildlife Service*
- Bureau of Land Management
- U. S. Geological Survey

U.S Army Corps of Engineers*

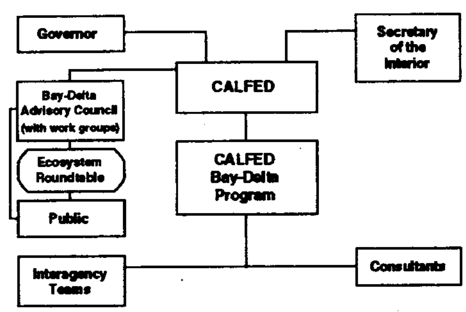
U.S. Environmental Protection Agency*

U.S. Department of Commerce
- National Marine Fisheries Service*

U.S. Department of Agriculture
- Natural Resources Conservation Service*
- U.S. Forest Service

Western Area Power Administration

* Co-lead agencies for EIS/EIR



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In addition, the CALFED process has included members of the public in development of every Program component from ecosystem restoration to financing.

Phase I

The Program was divided into three discrete phases. In Phase I, completed in September 1996, CALFED identified the problems confronting the Bay-Delta, developed a mission statement and guiding principles, and devised three preliminary categories of solutions. The goals established during Phase I are to provide good water quality for all beneficial uses; to improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta to support sustainable populations of diverse and valuable plant and animal species; to reduce the mismatch between Bay-Delta water supplies and current and projected beneficial uses dependent on the Bay-Delta system; and to reduce the risk to land use and associated economic activities, water supply, infrastructure and the ecosystem from catastrophic breaching of Delta levees.

Following scoping, public comment, and agency review, CALFED concluded that each Program alternative would include a significant core set of Program elements addressing levee system integrity, water quality improvements, ecosystem restoration, and water use efficiency measures. These Program elements have generally been referred to as the "common programs". In addition,

CALFED BAY-DELTA PROGRAM
MISSION STATEMENT
AND SOLUTION PRINCIPLES

The mission of the CALFED Bay-Delta Program is to develop a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta system.

In addition, any CALFED solution must satisfy the following solution principles:

- ***Reduce Conflicts in the System*** Solutions will reduce major conflicts among beneficial uses of water.
- ***Be Equitable*** Solutions will focus on solving problems in all problem areas. Improvements for some problems will not be made without corresponding improvements for other problems.
- ***Be Affordable*** Solutions will be implementable and maintainable within the foreseeable resources of the Program and stakeholders.
- ***Be Durable*** Solutions will have political and economic staying power and will sustain the resources they were designed to protect and enhance.
- ***Be Implementable*** Solutions will have broad public acceptance and legal feasibility, and will be timely and relatively simple to implement compared with other alternatives.
- ***Have No Significant Redirected Impacts*** Solutions will not solve problems in the Bay-Delta system by redirecting significant negative impacts, when viewed in their entirety, within the Bay-Delta or to other regions of California.

CALFED identified three preliminary alternatives to be further analyzed in Phase II. The three preliminary alternatives represented three differing approaches to conveying water through the Delta. The first conveyance configuration relies primarily on the existing conveyance system, with some minor changes in the south Delta. The second configuration relies on enlarging channels within the Delta. The third configuration includes in-Delta channel modifications and a conveyance channel that would move some water around the Delta. Each of these alternatives also includes consideration of new ground and surface water storage options. Also, the potential for no storage remains an option for each alternative.

MAJOR CONCLUSIONS FROM PHASE I

- The complexity of the problems will require a long-term sustained effort lasting perhaps 20-30 years to achieve a healthy Bay-Delta system.
- Based on public comment, significant Program elements are needed for levee system integrity, water quality, ecosystem restoration and water use efficiency in all alternatives. These Program elements remain relatively unchanged between the alternatives.
- The alternatives must encourage local participation and partnerships to further Program objectives rather than rely on an exclusively-regulatory approach.

Phase II

In Phase II, CALFED is refining the preliminary alternatives, is conducting comprehensive programmatic environmental review, and is developing the implementation strategy. The final environmental document is scheduled for release in late 1998. Thus far, in Phase II, CALFED has added greater detail to each of the Program elements (levee system integrity, water quality, ecosystem restoration, and water use efficiency) and has begun to craft frameworks for a water transfers policy and watershed management coordination. Pre-feasibility studies and modeling aided evaluation of many variations of the three broad alternatives. Phase II will conclude with the development and selection of a preferred program alternative, which will be reviewed in a Final Programmatic EIS/EIR. A programmatic EIS/EIR, also referred to as a first-tier document, is typically prepared for a series of actions that can be characterized as one large project and is required for actions proposed by or approved by state and federal agencies. In addition, Phase II will generate a final implementation plan including a financing package and an "assurance" package. The assurance package will be a set of actions and mechanisms designed to assure all agencies and stakeholders that the Program will actually be implemented and operated as agreed. The assurances package will most likely include provisions to phase or stage parts of the Program over time, and as discussed in detail below, will include mechanisms to revise the Program as new information or events arise.

This Phase II Report is one of many supporting documents published in conjunction with the Draft Programmatic EIS/EIR. The main body of the EIS/EIR provides a technically-oriented analysis of the broad environmental effects that might accompany Program implementation. This Phase II Report describes the CALFED process, solution alternatives and the fundamental Program concepts that have guided their development, and analyses that have revealed the comparative technical advantages, potential problems, and uncertainties of each alternative. Finally, this report describes how CALFED will use various analyses in a public process to develop a preferred program alternative by late 1998. This Phase II Report and the Executive Summary of the EIS/EIR are being widely disseminated. The full EIS/EIR, other technical appendices, and supporting technical reports -- comprising thousands of pages -- are available from CALFED.

Phase III

In Phase III, following completion of the Final Programmatic EIS/EIR, implementation begins. This period will include additional site-specific environmental review and permitting, as necessary. Because of the size and complexity of any of the alternatives, implementation is likely to take place over a period of decades. Part of the challenge for Phase II is designing an implementation strategy that acknowledges this long implementation period and keeps all participants committed to the successful completion of all phases of implementation.

Public Involvement

During Phase I, CALFED held scoping meetings, technical workshops, public information meetings, public BDAC meetings, and public BDAC workgroup meetings. This commitment to active public involvement has continued through Phase II with additional public meetings, presentations before focused groups, media outreach, special mailings of newsletters, regular updated information placed on the Program's website, and a new toll-free public information telephone line.

WHERE TO FIND PUBLIC OUTREACH INFORMATION

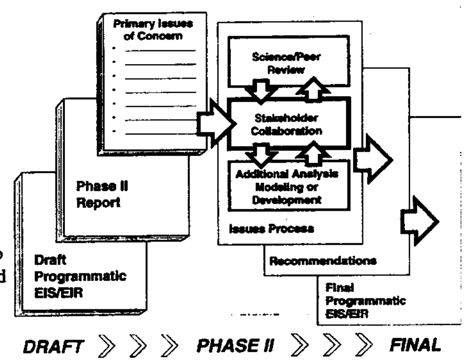
- Program's website (http:\\calfed.ca.gov)
- Toll-free public information telephone line (1-800-700-5752)
- *CALFED News*, *EcoUpdate* and Factsheets (available from CALFED Bay-Delta Program, 1416 Ninth Street, Suite 1155, Sacramento, CA 95814; phone 916-657-2666)
- BDAC and other public meetings

Next Steps in Phase II

Between the Public Draft Programmatic EIS/EIR and the Final EIS/EIR, work will continue on refining, evaluating, developing, and selecting a preferred program alternative. This will include additional technical evaluations of parts of the common programs as well as storage and conveyance options, selecting the method of Delta conveyance, studying potential operating criteria, and developing the package of financing and assurances. CALFED will work with elected officials, local agencies, interest groups, and the public over the coming months to develop a preferred program alternative that reduces major conflicts in the system, is equitable, affordable, durable, implementable, and will solve problems in the system without redirecting significant impacts.

The entire Program can benefit from further focused technical review and implementation planning. CALFED will work with stakeholders in developing implementation strategies for all Program elements to clarify the goals and objectives, underlying assumptions, tools and strategies, conceptual models, adaptive management, and measures of success. Chapter 5 more fully describes these efforts.

Work will continue between the Draft and Final Programmatic EIS/EIR on resolving the primary issues of concern that remain, many of which are identified in this Phase II Report. Additional issues may be identified during the public comment period for the Draft Programmatic EIS/EIR. A series of scientific/peer reviews and additional analyses will be linked through stakeholder collaboration to arrive at recommendations for the preferred program alternative and its associated implementation including financing and assurances.



Finally, during the Phase II process, stakeholders have raised significant questions and issues about different aspects of the common Program elements (the ecosystem restoration program, water quality program, water use efficiency program, Delta levee protection plan, water transfer policy, and watershed management coordination program). The success of these common Program elements is essential to the performance of the overall CALFED effort. CALFED recognizes that addressing these stakeholder questions and issues on common Program elements are fundamental to the success of the Program. In Chapter 3, we have included sidebar discussions of stakeholder concerns; in Chapter 3and Chapter 5 we have laid out proposed processes for resolving these critical concerns.

Some Delta Statistics

Area of the Watershed: The system drains more than 61,000 square miles, or 37% of the state.
Area of the Delta: The legal Delta includes 738,000 acres.
Delta Inflow*: Inflow ranges from 6 to 69 million acre feet (MAF) per year; average is 24 MAF.
Diversions: Over 7,000 diverters draw water from the system, including 1,800 in the Delta itself.
Delta Exports*: The SWP and CVP draw an average of 5.9 MAF (approximately 3.6 MAF for agriculture and 2.3 MAF for urban uses) from the Delta each year.
In-Delta Water Use: Net in-Delta water use averages approximately 1 MAF annually.
Flora: Over 400 plant species can be found in the Delta, not including agricultural crops.
Fauna: The Delta harbors about 225 birds, 52 mammals, and 22 reptile and amphibian species.
Fish: There are 54 fish species in the Delta, and a total of 130 in the Delta and Bay.
Marshes: There are 8,000 acres of tidal marsh in the Delta; originally, there were 345,000 acres.
Levees and Channels: Over 700 miles of waterways are protected by 1100 miles of levees.
Subsidence: Some Delta lands are more than 20 feet below sea level.
Delta Farmland: Over 520,000 acres are farmed in the Delta.
Principal Crops: The most commonly grown Delta crops are wheat, alfalfa, corn, and tomatoes.
Agricultural Value: Average annual gross value of Delta production is $500 million.
Recreation: Recreational use of the Delta is about 12 million user days per year

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* Simulated flow based on historical hydrology, but with existing storage and conveyance facilities in place and operating to meet 1995 levels of demand.

2. FUNDAMENTAL PROGRAM CONCEPTS

Three fundamental concepts related to the Bay-Delta system and its problems have guided the development of proposed CALFED solutions. These concepts are not new, but CALFED has looked at them in new ways to develop options for solving problems successfully. These concepts are so important that this chapter is devoted to a detailed description of them.

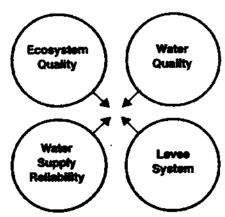
First, problems in the four resources areas (ecosystem quality, water quality, water supply reliability, and levee system integrity) are **interrelated**. We cannot effectively describe problems in one resource area without discussing the other resource areas. It follows that solutions will be interrelated as well; many past attempts to improve a single resource area have achieved limited success because solutions were too narrowly focused.

Second, there is great **variation** in the flow of water through the system and in the demand for that water at any time scale we might examine (from year to year, between seasons, even on a daily basis within a single season). The value of water for all uses tends to vary according to its scarcity and timing. We can take advantage of this variability to reduce conflict and solve problems in several resource areas.

Finally, the solutions we implement must be guided by **adaptive management**. The Bay-Delta ecosystem is exceedingly complex, and it is subject to constant change as a result of factors as diverse as global warming and the introduction of exotic species. We will need to adapt our management of the system as we learn from our actions and as conditions change.

This chapter describes each of these concepts in greater detail. An additional fundamental concept is that of **assurances**. The preferred program alternative will need to include a set of actions and mechanisms to assure that the Program will be implemented and operated as agreed. These actions and mechanisms must be able to foster more constructive relationships between the many California water interests that are traditionally more accustomed to conflict than to efforts at consensus decision-making. Assurances are discussed in Chapter 5.

Interrelationships



In the past, most efforts to improve water supply reliability or water quality, improve ecosystem health, or maintain and improve Delta levees were single-purpose projects. A single purpose can keep the scope of a project manageable but may ultimately make the project more difficult to implement. The difficulty occurs because a project with narrow scope may help to solve a single problem but have impacts on other resources, causing other problems. This in turn leads to conflict. Ultimately no problem is solved, or one problem is solved while others are created.

The CALFED Program takes a different approach, recognizing that many of the problems in the Bay-Delta system are interrelated. Problems in any one resource area cannot be solved effectively without addressing problems in all four areas at once. This greatly increases the scope of our efforts but will ultimately enable us to make progress and move forward to a lasting solution.

What are the problems that face the Bay-Delta system and why have they occurred? At the simplest level, problems occur when there is conflict over the use of resources from the Bay-Delta system. As California's population increases, we ask more of the system, and there is more conflict. Single-purpose efforts to solve problems often fail to address the conflict. To the extent that these efforts acquire or protect resources for one interest, they may cause impacts on other resources and increase the level of conflict. Major conflicts are summarized below.

- *Fisheries and Water Diversions.* The conflict between fisheries and water diversions results primarily from fish mortality attributable to water diversions. This includes direct loss at pumps, reduced survival when young fish are drawn out of river channels into the Delta, reduced spawning success of adults when migratory cues are altered, and reduced survival associated with reduced Delta outflows. The need to protect species of concern has necessitated regulations that allow sufficient fishery flows to remain in the natural system, which can restrict the quantity and timing of diversions.

- *Habitat and Land Use.* Habitat to support various life stages of aquatic and terrestrial plants and animals in the Bay-Delta has been lost because of conversion of that habitat to other uses, such as agriculture or urbanization. In addition, some habitat has been lost or adversely altered due to construction of flood control facilities needed to protect developed land. Efforts to restore the habitat can also create conflict with existing uses, such as agriculture and levee maintenance.

- *Water Supply Availability and Beneficial Uses.* As water use and competition for water have increased during the past several decades, so has conflict among users. A major part of this conflict is between the volume of instream water needs and out-of-stream water needs, and the timing of those needs within the hydrologic cycle.

- *Water Quality and Human Activities.* Water quality for ecosystem and consumptive uses can be adversely affected by a broad range of human activities. In addition to particular activities that discharge pollutants (such as current or abandoned mines or industrial sources), urban and agricultural areas produce degraded surface runoff that can seriously affect the Bay-Delta's many beneficial uses.

From these central conflicts, CALFED identified a series of problems in each resource area. From each problem, a Program objective was developed. The main problems and objectives are shown on the following page. A complete set of identified problems and program objectives is contained in the *Program Goals and Objectives Appendix* to the Draft Programmatic EIS/EIR.

BAY-DELTA PROBLEM AREAS & PROGRAM OBJECTIVES

ECOSYSTEM QUALITY

Problems	Objectives
• Important aquatic habitats are inadequate to support production and survival of native and other desirable estuarine and anadromous fish in the Bay-Delta system. Examples of fishes that have experienced declines related to changes in Delta habitat include delta smelt, longfin smelt, Sacramento splittail, chinook salmon, striped bass, and American shad.	• Improve and increase aquatic habitats so they can support the sustainable production and survival of native and other desirable estuarine and anadromous fish in the estuary.
• Important wetland habitats are inadequate to support production and survival of wildlife species in the Bay-Delta system.	• Improve and increase important wetland habitats so they can support the sustainable production and survival of wildlife species.
• Populations of some species of plants and animals dependent on the Delta have declined.	• Increase population health and population size of Delta species to levels that assure sustained survival.

WATER QUALITY

Problems	Objectives
• Water quality is often inadequate or is perceived as inadequate for drinking water needs.	• Provide good water quality in Delta water exported for drinking water needs.
• Delta water quality is often inadequate for agricultural needs.	• Provide good Delta water quality for agricultural use.
• Delta water quality is often inadequate for industrial needs.	• Provide good Delta water quality for industrial use.
• Delta water quality is often inadequate for recreational needs.	• Provide good Delta water quality for recreational use within the Delta.
• Water quality is often inadequate for environmental needs for the Bay-Delta system.	• Provide improved Delta water quality for environmental needs.

WATER SUPPLY RELIABILITY

Problems	Objectives
• Water supplies of the Bay-Delta system do not meet needs because of conflict among beneficial uses and because of system inadequacies.	• Reduce the conflict between beneficial uses and improve the ability to transport water through the Bay-Delta system.
• Bay-Delta system water supplies are uncertain with respect to short- and long-term needs.	• Reduce the uncertainty of Bay-Delta system water supplies to help meet short- and long-term needs.

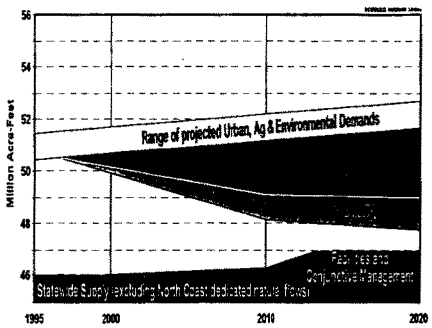
LEVEE SYSTEM INTEGRITY

Problems	Objectives
• Existing agricultural land use, economic activities and infrastructure in the Delta are at risk from gradual deterioration of Delta conveyance and flood control facilities as well as sudden catastrophic inundation of Delta islands.	• Manage the risk to existing land use, associated economic activities, and infrastructure from gradual deterioration of Delta conveyance and flood control facilities and catastrophic inundation of Delta islands.
• Water supply operations and facilities in the Delta are at risk from increased salinity intrusion which can result from sudden catastrophic inundation of Delta islands.	• Manage the risk to water supply facilities and operations in the Delta from catastrophic inundation of Delta islands.
• Water quality in the Delta is at risk from increased salinity intrusion which can result from sudden catastrophic inundation of Delta islands.	• Manage the risk to water quality in the Delta from catastrophic inundation of Delta islands.
• The existing Delta ecosystem is at risk from gradual deterioration of Delta conveyance and flood control facilities as well as catastrophic inundation of Delta islands.	• Manage the risk to the existing Delta ecosystem from gradual deterioration of Delta conveyance and flood control facilities and catastrophic inundation of Delta islands.

Will CALFED Solve California's Water Problems?

For many years, water managers have projected an increasing gap between California's water supply and the demand for that water. This gap can result in economic and environmental hardships when water needs are not met. The CALFED Program is striving to balance the Bay-Delta system to increase water supply reliability, but the Program will not completely close the gap between water supply and projected demand. Even with all the CALFED actions in place, there still may be economic and environmental hardship during drought years when supplies cannot satisfy California's demand for water. The figure below depicts the relative effect during drought periods of various water management measures contemplated within the CALFED Program.

Demand projections, depicted by the top line in the figure, represent the needs of a statewide population estimated to surpass 45 million by 2020. Even with the continued implementation of current levels of water conservation and the loss of some irrigated agricultural lands in the Central Valley, statewide demand is still projected to increase because of population growth. As our understanding of the Bay-Delta ecosystem has improved, we have also recognized additional environmental water needs, such as increased instream flows. There is uncertainty regarding future demands, so these demands are depicted by the range shown in the figure.



Statewide water supply projections, shown at the bottom of the figure, represent all of the water sources available to the state. (Water dedicated to remain in north coast rivers and streams has been excluded from the graph.) All other supply sources are included -- from local groundwater to reclaimed water, and from the Colorado River to the Central Valley's rivers and streams.

Also depicted on the figure are potential supply increases and demand reductions that might be achieved through conjunctive management, new surface storage, new facilities, and a host of efficiency measures, including more extensive urban and agricultural water conservation and water recycling.

Demand reductions anticipated from increased water use efficiency and water recycling are detailed later in this document. Collectively, they represent the potential for roughly 4 million acre-feet of reduced future demand. This level of savings will increase over time: much of the urban conservation potential reflects a reduction from future demand levels that are projected but not yet reached.

The use of new surface storage, conjunctive management of ground, and surface water resources, and new facilities could improve the flexibility to manage water that is available for the state's urban, agricultural, and environmental uses. Though the expected contribution to supply in acre-feet is significantly less than that expected from water use efficiency, the ability to increase the value of water through storage, improved conveyance, and changes in system operations could provide numerous benefits that do not show up as "increased yield". Rather, these benefits are seen through improvements in water supply reliability.

Following are the strategies for solving problems in the four resource areas:

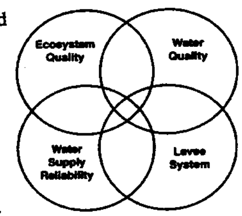
Ecosystem Quality - The primary ecosystem quality objective of the Program is to "Improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta to support sustainable populations of diverse and valuable plant and animal species." The strategy to achieve this objective is to reverse the decline in ecosystem health by reducing or eliminating factors that degrade habitat, impair ecological functions, or reduce the population size or health of species. These factors may cause direct mortality of plants and animals in the system, but more often they result in indirect mortality by degrading habitat conditions or functions. For this reason, the Program objectives emphasize the improvement of habitats and ecological functions.

Water Supply Reliability - The primary water supply reliability objective of the Program is to "Reduce the mismatch between Bay-Delta water supplies and current and projected beneficial uses dependent on the Bay-Delta system." The Program has a three-part strategy to reduce conflict and meet water supply reliability objectives. This strategy seeks to: reduce the mismatch between supply and beneficial uses through a variety of actions; reduce the impacts of water diversions on the Bay-Delta system; and increase the flexibility to store and transport water.

Water Quality - The primary water quality objective of the Program is to "Provide good water quality for all beneficial uses." Good water quality means different things to different users, and there are different ways to achieve the objective. For example, organic carbon that is naturally present in Delta water can contribute to carcinogenic treatment byproducts in drinking water, but this carbon does not generally pose problems for ecosystem quality. The Program's strategy to achieve the water quality objective includes reducing or eliminating parameters that degrade water quality at its source. Many of the Program's water quality sub-objectives concentrate on this direct source control approach.

Levee System Integrity - The primary levee system vulnerability objective of the Program is to "Reduce the risk to land use and associated economic activities, water supply, infrastructure, and the ecosystem from catastrophic breaching of Delta levees." Failure of Delta levees can result either from catastrophic events, such as earthquakes and floods, or from gradual deterioration. Subsidence of the Delta island peat soils and settling of levee foundations places additional pressure on levees and increases the risk of failure. The Program's strategy for achieving the system integrity objectives is to implement a comprehensive plan to address long-term levee maintenance, stabilization, and emergency levee management.

Significantly, there are many linkages among the objectives in the four resource areas and among the actions that might be taken to achieve these objectives. Solving problems in four resource areas at once does not require a four-fold increase in the cost or number of actions. Most actions that are taken to meet Program objectives, if carefully developed and implemented, will make simultaneous improvements in two, three, or even four resource areas.



What kinds of actions can be taken to solve problems in the Bay-Delta system? The actions can be grouped into categories of water use efficiency, water transfers, water storage, Delta conveyance modifications, levee system improvements, ecosystem restoration, water quality improvements, watershed coordination, and financing. Specific actions range from physical restoration of habitat in the Delta to water conservation measures. The actions in our problem-solving "toolbox" are described below, along with examples of the problems that can be solved and the multiple benefits that can be gained from each type of action. A more detailed description of various Program elements is presented in Chapter 3 of this document. Complete descriptions of Program elements are contained in various technical appendices to the Draft Programmatic EIS/EIR.

Water Use Efficiency Interrelationships

Water use efficiency measures include the conservation of water used in urban areas, in agricultural areas, and on wildlife refuges, as well as water recycling. Efficiency measures reduce water demand, thereby reducing the mismatch between supply and demand. Efficiency measures provide other benefits as well. Reduced demand can mean reduced diversion of water from the Bay-Delta system and reduced diversion impacts associated with the entrainment of fish. Efficient use can also yield water quality benefits. Careful application of water to gardens, lawns, and farm fields can result in less runoff of herbicides, pesticides, fertilizers, and salts back into water bodies that provide drinking water sources and aquatic habitats.

Water Transfers Interrelationships

A water transfer is a voluntary transaction in which a person or entity that possesses the right to use water can sell the use of the water for a period of time to another person or entity. Transfers reduce the mismatch between supply and demand by satisfying the strongest demands for water and compensating others for reducing their use of that supply. A water transfer that moves water from upstream of the Delta to Delta export (water diversion from the Delta used for purposes outside the Delta) regions may provide ecosystem benefits by increasing flow into the Delta or modifying the timing of flows in ways that may benefit the ecosystem. Transfers of water between two users in Delta export areas may reduce the need to pump water from the Delta and reduce the environmental impacts of that Delta pumping. Transfers can reduce the need for new or expanded reservoirs. In some cases, conserved water can be transferred so the ability to transfer water offers an economic incentive to conserve. Finally, water can be transferred from diverters to instream uses, restoring beneficial timing of flows and increasing Delta outflow during critical periods.

Transfers are not without potential impacts, and these impacts must be clearly recognized and either avoided or adequately mitigated. Increased flows from water transfers may benefit riverine fisheries, but export of this transferred water in the Delta can adversely affect fish in the Delta. In addition, transfers may result in potential critical impacts on groundwater resources and effects on local economies. Water transfers can cause depletion of groundwater if water users transfer their surface water supplies and replace them by pumping groundwater. Local economies can be affected if farmers fallow land and transfer the water. Both the buyer and seller may benefit, but third parties may be seriously affected. Creative water management approaches, such as periodic fallowing or switching to less water-intensive crops, can provide the benefits of transfers while minimizing these third party impacts. Nevertheless, an active water transfers market must recognize these potential impacts and offer mechanisms for avoidance or acceptable mitigation.

Water Storage Interrelationships

CALFED is evaluating additional storage as one approach to increasing water supply reliability and providing instream flow benefits during periods of greater ecosystem need. Water can be captured and stored in several different ways, including surface storage (dams and reservoirs) and storage in underground aquifers where groundwater can be banked or used in conjunction with surface supplies. Increasing the capacity to store water by building new dams or increasing the size of existing ones is controversial, because the construction and operation of dams can have serious environmental impacts. However, careful reservoir operation can yield a net environmental benefit while providing water for other uses. This fundamental Program concept is discussed in detail later in this chapter. In addition, storage facilities can be very costly. Historically, these costs have been subsidized by public funds. Current support, however, for public subsidies is less than it has been historically.

A broader discussion of the role of new storage facilities in the ultimate CALFED solution is included in Chapter 3. In spite of the potential benefits we have outlined, the development of new on or off stream storage has been extremely controversial in California. Environmental interests have frequently voiced concerns about both on-site and indirect impacts of new storage facilities. In addition, given that many of the most desirable storage sites have already been developed, the rising costs associated with constructing new storage have become a major hurdle in completing new projects. These issues must be addressed before any conclusions about storage projects are made.

Storage has the potential to offer different benefits, depending on its function, operation, and location in the Bay-Delta system. Storage upstream of the Delta has the potential to increase the amount of water flowing into the Delta during dry periods and the reliability of a predictable amount of water flowing into the Delta. This is possible because new storage lets more water be held upstream of the Delta in times of high flows. During dry periods, this water can be released to increase the flow for many purposes. Ideally, these releases can be planned to produce instream benefits for the ecosystem and water quality, as well as diversion benefits, from the same release of water. Off-aqueduct storage (south of Delta storage filled by deliveries from the Delta Mendota Canal or California Aqueduct) and in- or near-Delta storage has the potential to reduce demand on the Delta during periods when diversions would have the greatest impact, including times when vulnerable fish species could be at risk of entrainment from Delta pumping. Water can be exported from the Delta into this storage during less critical periods so that when water from the Delta is not available or when impacts of Delta pumping would be high users can turn to this stored water as an alternative.

Use of existing or new storage can also improve opportunities for water conservation and water recycling. For example, reservoirs or aquifers can hold water that is not needed at a specific time because conservation measures have reduced demand. This water can be carried over into subsequent years when water shortage might otherwise require more vigorous drought conservation measures. Local storage can make recycling projects more feasible by giving water managers flexibility to hold water and better balance a constant supply of recycled water against a demand that may be variable.

Delta Conveyance Modifications Interrelationships

CALFED has examined three broad choices for conveyance through the Delta: minor physical modifications coupled with operational changes, increases in the capacity of certain Delta channels to facilitate conveyance through the Delta, and a dual system that increases the capacity of certain channels and includes a new isolated channel to convey water from the Sacramento River around the Delta to water export pumps in the south Delta. To varying degrees, all three decrease the detrimental effects on the ecosystem and Delta water users of using the Delta for water conveyance while improving the effectiveness of the Delta as a conveyance hub.

Conveyance modifications can enable drinking water to be moved through the Delta with less risk of contamination by seawater or naturally occurring organic material found in the Delta. The conveyance modifications can also reduce the detrimental effects on fish of moving water through the Delta by reducing unnatural flow patterns, screening diversions, and providing alternative diversion points.

The technical issues associated with the decision about conveyance alternatives are explored in detail in the following chapters. CALFED recognizes that this discussion is occurring in the presence of substantial historical conflict over water use in the State (evidenced most dramatically by the divisive confrontation over the Peripheral Canal in 1982). CALFED believes that the process it has established to analyze and review water management issues (including Delta conveyance) offers the best hope for reaching consensus on these issues.

Delta Levee Improvements Interrelationships

Delta levee improvements reduce the risk that levees will fail during flood periods or as a result of earthquakes or gradual deterioration. This can protect not only lives and property of those who would otherwise have been flooded, but can also protect wildlife habitat from inundation. Strong levees also protect water quality for all who use Delta water. The land surface of Delta islands is often below the level of the water in surrounding channels, because the organic peat soils have subsided over time. When a levee fails, water rushes onto the island and draws salty water up into the Delta from the Bay. This salty water in the Delta channels may be unsuitable for irrigation of crops on lands that are not flooded, and may be unsuitable as a drinking water source for urban areas that get their water from the Delta. Regaining a suitable supply may not be possible in the short-term or the long-term.

Improvements to Delta levees can be made in ways that accommodate habitat restoration so that levees can simultaneously protect land uses, protect water quality, and support a variety of wetland, aquatic, and riparian habitats.

Ecosystem Restoration Interrelationships

Actions to restore ecosystem health are very diverse, encompassing actions that help restore ecological processes and functions and reduce the different kinks of stressors that have been placed on the Bay-Delta system. Many actions focus on the restoration of physical habitat including shaded riverine aquatic habitat along the banks of Delta channels, shallow water habitat, tidal and seasonal wetlands, and riparian forests. All of these habitat types can be compatible with levee restoration in various Delta areas. Other actions are designed to reduce fish mortality by screening diversions, both small diversions along rivers and channels and large Delta export diversions. Water flows are also important for fish and aquatic habitats. By acquiring water for the ecosystem through transfers and by using storage facilities to capture water at high flow periods, additional flows can be made available at appropriate times to meet the needs of aquatic species. Control of undesirable exotic species is also an important part of ecosystem management. Over time, these actions can lead to the Delta ecosystem being more resilient and less subject to damage from the effects of water diversions and levee maintenance resulting in less conflict and greater future flexibility.

Water Quality Interrelationships

Program actions to improve water quality focus on source control: improving the quality of water that flows through the Bay-Delta system by addressing water quality concerns at their source. In some cases, this may involve cleanup of abandoned mines that leach toxic heavy metals from mine tailings. In other cases, water quality may be improved by conserving water on a farm or an urban landscape, reducing the amount of runoff that finds its way back into streams. Modifications to Delta conveyance can improve water quality in the Delta by reducing salinity. This, in turn, can improve water supply reliability: high quality Delta water can be blended with lower quality water from other sources to stretch water supplies. Water quality improvements can also facilitate water recycling. When water is used it becomes saltier. Recycling this water may produce water with unacceptable salinity levels if source water is too salty to begin with.

Watershed Management Coordination Interrelationships

The watershed management coordination element of the Program consists of engaging local watershed organizations in planning and implementing the CALFED Program and coordinating among these organizations to more efficiently and effectively implement the CALFED Program. In the lower watershed, the focus will be on ecosystem restoration and water quality actions. In the upper watersheds, the immediate focus will be on partnership projects with local entities in the upper watershed to improve water quality and habitat, decrease erosion, and increase base flows in the tributaries to the Delta. This coordinated approach to improving the condition of watersheds can increase the reliability of predictable amounts of water flowing into the Delta during dry seasons by slowing down the rate at which water leaves the upper watershed.

Economic and Financial Interrelationships

The Program will propose extensive investments in the resources of the Bay-Delta system, to be implemented and paid for over the next several decades. Implementation will provide opportunities to economize in many ways, as single actions yield benefits in multiple resource areas. Other actions, such as water quality source control, may prove more economical than alternatives such as treatment of degraded water before use. Other aspects of the Program will be unavoidably costly. For example, if new reservoirs are included in the Bay-Delta solution, they will likely provide water at higher costs than existing projects. This is because the most economical storage sites have already been developed, and new reservoir operation would likely be more conservative and protective of the ecosystem. Thus, despite the opportunities for economy, implementation will be costly and water costs will almost certainly go up. The additional cost will be justified and the program affordable if it results in a healthy Bay-Delta system that more successfully meets the demands that we place on it.

The Program has viewed financing from the standpoint that beneficiaries will pay their proportion of the cost of actions that yield benefits for them. Adherence to such a policy, with water users being asked to pay the full cost of any expensive new supplies, would change perspectives on the cost-effectiveness of other measures such as conservation, recycling, and water transfers. The price of obtaining water determines whether storage is economically justified, whether water users decide to transfer their water, which water efficiency measures are cost effective, as well as the level of demand for water from the Delta system.

The combination of these actions and their economic effects serves to reduce the mismatch between supply and demand for water from the Bay-Delta system. There is incentive to reduce demand due to higher costs of obtaining water. The demand reduction comes in the form of increased conservation and recycling, greater incentive to use alternative supplies, including those from outside the Delta system, and as forgoing some water use. Water transfers within the Bay-Delta system, perhaps augmented with supplies from new or expanded storage, help to complete the water supply reliability picture.

Putting it All Together

John Muir said that "When we try to pick anything out by itself, we find that it is hitched to everything else in the universe." This certainly applies to solving problems and reducing conflict in the Bay-Delta system. A few examples demonstrate the interrelationships:

- Modifications in Delta conveyance provide greater channel capacity in some areas, reducing the danger of winter flooding. The modified conveyance improves the flexibility to divert more at times when fish species are less likely to be drawn to Delta pumps, and curtail pumping at times when fish are at greater risk. At these times, water users in export areas can use groundwater in conjunction with surface supplies to assure a reliable supply. Demands in the export areas are lower than previously expected due to implementation of conservation and recycling measures, further reducing the mismatch between supply and demand.

- A local conservancy along a tributary to the Sacramento River helps ranchers to modify grazing practices and fence a riparian corridor along the creek. Over time, soil erosion is reduced, which improves the quality of spawning grounds in the tributaries, and the land holds water for longer periods. Grazing conditions improve. Peak winter flows are reduced slightly, and the creek has greater base flow through the summer. Water temperatures go down, and conditions are improved for salmon.

- Delta landowners incorporate habitat improvements into a levee rehabilitation project. Farms and wildlife habitat on the Delta island are better protected from floods. There is less risk to water quality in the Delta from levee failure, so the Delta provides a more reliable water supply. Along the water side of the improved levee, habitat conditions are better for Delta fish, bird, and plant species.

- A farmer in the Sacramento Valley conserves water by capturing tailwater that runs off his field and reusing it. In the process, he takes less irrigation water out of the river and releases less runoff back into it. Fewer fish are entrained by his pumps, and downstream water quality improves.

The CALFED Program proposes actions that will be implemented throughout the watershed and export areas. We can divide the actions into those that improve water supply reliability, improve water quality, restore ecosystem health, or improve Delta levees, but this classification of actions obscures the interrelationships. Take away any action, and it is harder to meet Program objectives in two, three, or even four resource areas. It is harder to reduce conflict. This is why a comprehensive Bay-Delta solution, although challenging in scope, holds the greatest promise to improve the system for all beneficial uses.

System Variability and the Time Value of Water

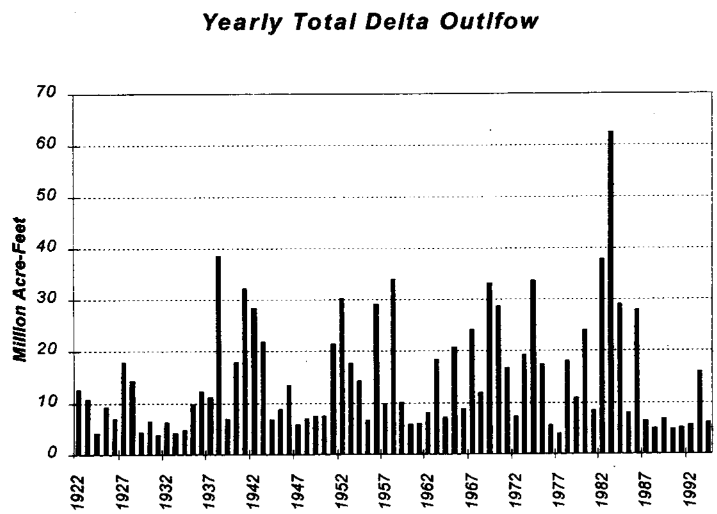
The watershed of the Bay-Delta system is subject to a highly variable rain and snowfall pattern. The total amount of precipitation and runoff in the watershed varies widely from month to month and from year to year. Year types are classified from wet to critically dry. Within any given year, whether wet or dry, most of the rain falls in the winter months, while snow pack typically melts in the late spring and early summer. In other months, water flow is typically much lower, leading to dramatically different flow levels for different months. Even within each month, flow can vary widely.

Some Examples of Flow Variation
Total Delta Inflow

- High Delta inflow: 69 MAF
- Low Delta inflow: 6 MAF
- Average Delta inflow: 24 MAF

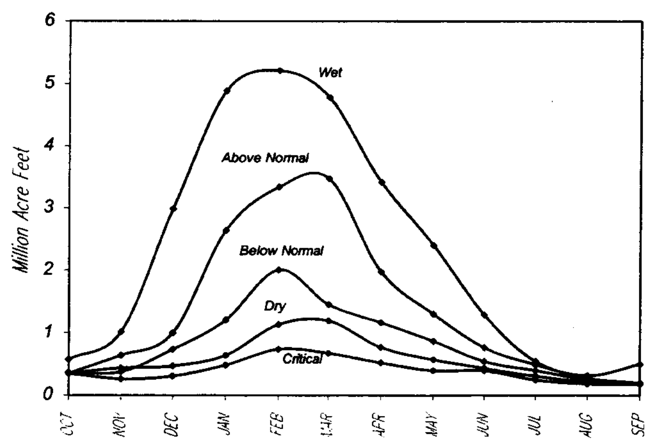
Planners often discuss water in terms of averages that describe overall system performance-- average Delta outflow, average water project deliveries -- but there is more conflict over water management in drier years than in average years. Furthermore, average values are often misleading because they mask the incredible variability in flows in the Bay-Delta system. An increase in average outflow may have a minor beneficial effect on the environmental health of the system, but if outflow can be increased during a dry year or during a critical period within a year, the benefits may be far greater. Similarly, an increase in water supplies for urban and agricultural users may be desirable during an average year, but critically important to local economies during a drought.

The figure below shows a simulated yearly total Delta outflow for the period from 1922 to 1994. The simulated Delta outflow is based on historical hydrology, but with existing storage and conveyance facilities in place and operating to meet 1995 level of demand. The graph reflects the average annual variability that occurs from year to year. Memorable extremes, such as the drought of 1976-77, are quite apparent. It is during drought periods such as this that competition between water diverters and in-stream water needs are felt most keenly.



The next figure, a plot of average monthly Delta outflow for each of five water year types, illustrates both the variability among years and the variation in flows throughout the year. Late summer flows are low in all year types, but there is great variation in the magnitude of outflow during the wet winter and spring months.

Average Monthly Delta Outflow

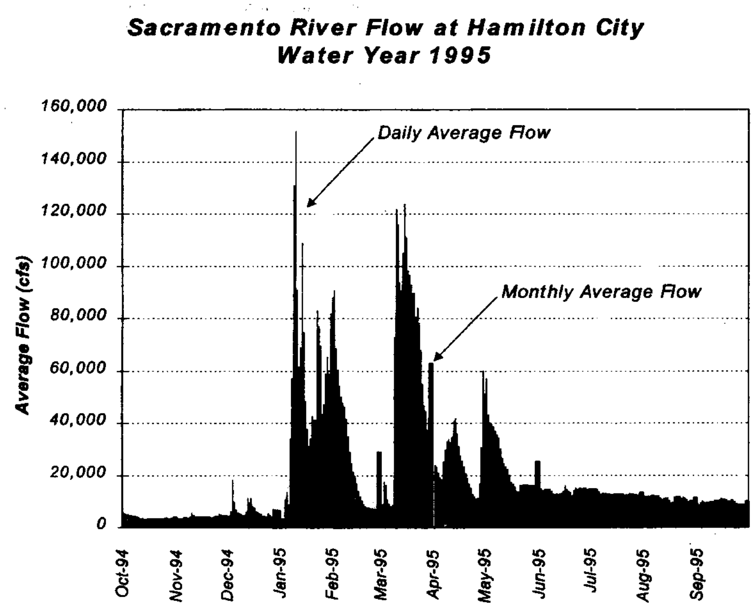


Demand for water also varies over time. Demands tend to be higher than average in dry years, because there is less natural soil moisture, and plants need more irrigation. Water demand also varies seasonally; the demand is highest in summer, when natural flows are lowest.

As these figures illustrate, while average flow data are useful for long-term water management planning, averages obscure the reasons for conflict over Delta flow and Bay-Delta water management. Conflict arises when water is scarce, and the averages do not illustrate the scarcity that occurs at the low flow levels within a given month or year. The conflicts that arise during times when water is in short supply create the need for a more effective water management strategy.

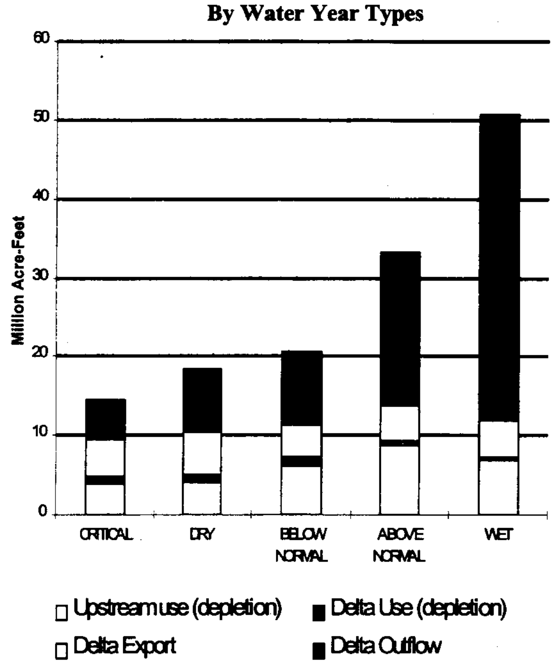
The water flow variability is most notable when daily flows are examined. The figure below presents a graph of daily flows throughout a water year. For comparison, average monthly flows are also shown (thicker black bars). The average monthly flows mask the much greater variation exhibited in daily flows that rise and fall with the passing of each major storm system. It is quite typical for winter and spring storms to produce periodic peaks in flow such as those shown in January, March, and May.

These peak flows are very important to ecosystem health; they cleanse and move gravel in riverbeds where salmon spawn, they give rivers the energy to meander and thereby sustain a host of ecological processes related to river banks and riparian vegetation, and they send behavioral cues to fish, inducing them to spawn or migrate.



In water years that are very dry, the natural peaks in flow may not be as high as in wetter years, or some of the typical peaks may not occur at all. Water is more valuable to all users in these dry years, so the peak flows may be further reduced through the operation of reservoirs in which scarce water is captured for use later in the year. Thus, the impact of water management activities on important peak flow events is greatest during years when natural flows may be most sensitive to disturbance. The adjacent figure, based on data contained in Department of Water Resources Bulletin 160-93, illustrates this point. During wet years, approximately 20 percent of the water is diverted from the system for other uses. In a critical year, approximately 70 percent of the water is diverted, and there is considerable conflict between fisheries and diversions. During years of low outflow, and especially during periods when peak flows might typically occur, water has its highest value for all beneficial uses.

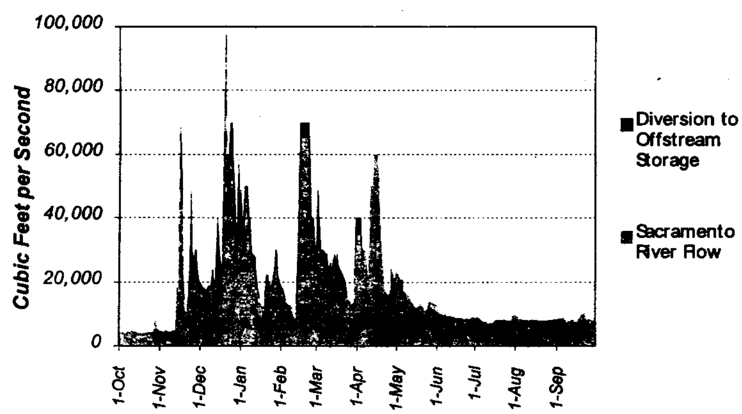
Bay-Delta System Water Use By Water Year Types



One of the greatest challenges for the Program is to reduce this conflict while simultaneously improving ecosystem quality and water supply reliability. This can be done by recognizing that the value of water varies according to its quantity and timing in the system. This recognition can be used to the advantage of both water diverters and the ecosystem. The importance of a unit of water in the system is not fixed; it varies according to the flow rate, the time of year, and the water year type. Thus, it is possible to increase the diversion and storage of water during some high flow periods (while preserving peak flows that serve important functions in the system) in order to provide water supply later for diverters and the ecosystem. Some of this stored water can be used to augment outflow peaks during dry years, when there is keen competition for water. At these times, water operations have their greatest impact on the ecosystem, and additional water is most needed by Bay-Delta species. In concept, water can be diverted from rivers upstream of the Delta into storage during high flow periods with relatively little impact on the system and can be released at other times to produce great benefit to the system. Of course, this type of diversion must be operated in a way that preserves most of the variability in the flow, ensuring that peak flows so important to ecosystem health still occur in the river.

The figures below show a hypothetical example to illustrate the concept. The first diagram shows a wet year, with the black area representing water that is diverted into storage. Runoff from upstream tributaries to the Delta usually occurs in large volumes over short periods of time in the winter and spring. New or reoperated existing storage upstream of the Delta could store a portion of these flows with relatively little impact on the ecosystem.

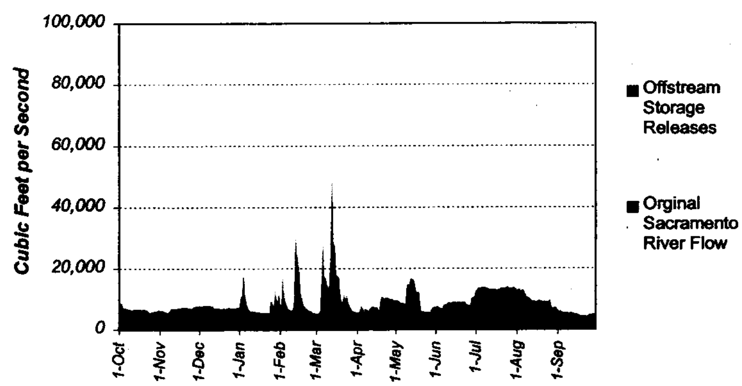
Sacramento River Diversions to Offstream Storage - Wet Years



Diversions would need to be made according to criteria ensuring that the environmental impacts of diversion during wet periods were less than the subsequent environmental benefits of releasing some of this water during critical periods. This is a more vital consideration associated with enlarged on-stream storage compared to off-stream storage; large amounts of water can quickly be detained in on-stream storage, while due to conveyance capacity constraints, only a minor percentage of large peak river flows can be diverted to off-stream storage. The construction and operation of any new or enlarged storage facility will require much additional study during the remainder of Phase II and during Phase III of the Program to determine whether storage projects are environmentally acceptable and/or economically feasible.

The figure below shows a hypothetical dry year, and the black areas represent releases of previously stored water to augment flows for fisheries and water supply. Water could be released to meet direct needs or to provide additional benefits through exchanges. For example, water could be released from off-stream storage in the Sacramento River basin directly to local water users, reducing existing diversions from the Sacramento River during periods critical to fisheries. Water released for environmental purposes could include pulse flows that act as behavioral cues or help transport fish through the Delta. Water could also be released to provide sustained flows for riverine and shallow water habitats and improve water quality in the Delta during drier years.

Offstream Storage Releases to the Sacramento River - Dry Years



The validity and appropriate role for "the time value of water" concept in California water management have not been fully discussed within the broader stakeholder and scientific communities. Additional work remains to identify and resolve controversy related to the concept, determine specific parameters (flow rates and timing), and scientifically evaluate the potential effects of this approach.

Adaptive Management

No long term plan for management of a system as complex as the Bay-Delta can predict exactly how the system will respond to Program efforts or foresee events such as earthquakes, climate change, or the introduction of new species to the system. Adaptive management, as an essential Program concept, acknowledges that we will need to constantly monitor the system and adapt the actions that we take to restore ecological health and improve water management. These adaptations will be necessary as conditions change and as we learn more about the system and how it responds to our efforts. The Program's objectives will remain fixed over time, but our actions may be adjusted to assure that the solution is durable.

The concept of adaptive management is an essential part of every CALFED Program element, as well. In every part of the Program, new or more intensive actions are proposed. Along with these proposed actions comes uncertainty. What actions work best to achieve Program objectives? How can these actions be modified to work better, cost less, or be simpler to implement? How should the emphasis among actions change over time? Are there new or different actions that should complement or replace those that are being implemented? An adaptive management approach helps to answer these questions.

The concept of adaptive management can be illustrated as applied to the Ecosystem Restoration Program element. A critical step of the ecosystem restoration element is to construct a comprehensive adaptive management framework that includes policy and management decision-making based on existing and newly developed scientific and technical information. To be effective, this process also needs to consider the ecological, economic, and social goals of communities, agencies, and interested parties and to incorporate these distinct values into the design of the adaptive management process.

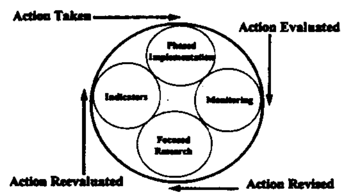
Adaptive management has a dual nature. First, adaptive management is a philosophical approach toward restoration that acknowledges we need to better understand the Bay-Delta watershed if we are to succeed in restoring ecosystem health. It acknowledges that we will proceed with restoration efforts using existing information while we gather the knowledge that we lack. Although we know much about the Bay-Delta system (its ecological processes, habitats, and species), we do not know everything we need to successfully restore ecosystem health. The adaptive management philosophy accommodates the status of knowledge and provides an avenue to obtain the necessary knowledge (and experience) through the duration of the implementation period.

Second, adaptive management is a structured decision-making process that includes important components to identify indicators of ecosystem health (indicators); a program for monitoring indicators of ecosystem health (monitoring); a program for implementing research to gather new or additional information (focused research); a process to optimize the implementation projects through time (staged implementation); a feedback process to integrate knowledge gained from monitoring and research; and the flexibility to change the program in response to new information.

Even within the area of adaptive management there are linkages among Program elements and opportunities for more effective action. This is especially true for the Ecosystem Restoration Program and the Water Quality Program. There is a lack of conclusive information about cause and effect relationships and how much restoration is needed for a "healthy" ecosystem and good water quality. An effective adaptive management program requires the continuous examination of monitoring data to measure progress and redirect activities where necessary. CALFED is currently identifying the monitoring, assessment, and research needs for CALFED-related projects, actions, and activities. A Comprehensive Monitoring, Assessment, and Research Program (CMARP) is a critical component of the CALFED adaptive management strategy. The CMARP has focused initially on ecosystem restoration but will be essential for successful implementation of other Program elements, as well.

The concept of adaptive management will be developed more fully for all program components as implementation plans are developed later in Phase II of the Program.

Adaptive Management



Adaptive Management and Assurances: A Delicate Balance

In developing its adaptive management program for different Program elements, CALFED must be aware of the potential conflict with the need for "assurances." The assurances package being developed is intended to assure that each component of the entire decades-long Program is actually implemented and operated as agreed. Although the adaptive management process must allow the Program the advantage of new information arising during the course of implementation, it cannot be so broadly flexible that agencies and stakeholders have no certainty that a Program element will be carried out effectively. To achieve a proper balance of these goals of certainty and adaptability, CALFED will need to make creative use of institutions, agreements, scientific review, and stakeholder processes.

Related Concepts

There are several other concepts that will figure prominently in any successful Bay-Delta solution, and issues that must be adequately resolved to move forward. This section provides an introduction to some of these important issues and concepts.

Common Delta Pool - The Delta is often referred to as a water supply hub. Many of the individuals and agencies that use water from the Bay-Delta system divert their water supplies directly from the Delta itself, including in-Delta agricultural users, some Bay area communities, and the state and federal water projects. This reliance by many users on a single source is sometimes called the common pool concept. Accompanying the use of a common pool is common interest: a shared interest in restoring, maintaining, and protecting Delta resources, including water supplies, water quality, levees, and natural habitat. Water users who currently have no alternative to Delta supplies and people who live and work in the Delta region believe that the maintenance of the common pool is their best guarantee of continued broad interest in maintaining and improving Delta conditions.

Under each alternative for the CALFED Program, all diverters would continue to take some or all of their water from Delta channels, maintaining the common Delta pool concept. Under any variation of Alternative 1 or 2, all Delta diverters would continue to be fully reliant on the Delta channels for water supplies they take from the system. Under Alternative 3, a dual conveyance system would allow some water users to take some of their Delta supplies from the Sacramento River upstream of the Delta. Facilities to do this would be sized so that even these diverters would continue to depend on the common pool for part of their water supplies.

Conjunctive Management Regional Concerns - Conjunctive management is the operation of a groundwater basin in combination with a surface water storage and conveyance system. Water is stored in the groundwater basin for later use in place of, or to supplement, surface supplies. Water is stored by natural recharge or by intentionally recharging the basin during years of above-average water supply. Residents of areas where conjunctive management may occur have concerns over development and operation of facilities by entities outside the region, due to potential impacts on existing groundwater resources. CALFED is evaluating the development of additional conjunctive management and groundwater banking opportunities as one potential way to help maximize the overall water supply and protect groundwater resources. However, as noted elsewhere, CALFED has not yet determined whether any additional storage will be part of the Program.

Currently, CALFED is pursuing an outreach program to local communities to determine in which areas interest exists in participating in a locally-controlled conjunctive use program. CALFED has developed guiding principles that are designed to protect resources, help address local concerns, and avoid potential impacts prior to implementing a conjunctive management operation. The draft principles developed to date include the following:

- Funding support will be provided for local assessment of groundwater resources.
- Conjunctive management programs will be voluntary.
- Groundwater will first be used to meet local water needs.
- Transfers outside the basin will involve appropriate compensation for the resource.
- Pilot programs, in addition to computer models, will be used to evaluate local conjunctive management potential and mitigation requirements.
- Conjunctive management projects will be overseen by local agencies in partnership with other entities to assure that concerns are addressed through interest-based negotiation.
- Groundwater withdrawals must be managed to avoid land subsidence and aquifer destruction.

Conjunctive management is, by definition, the operation of a groundwater basin in combination with a surface water storage and conveyance system for more effective management of the water supply. The CALFED alternatives assume that development of any groundwater system for conjunctive management cannot be effective without access to surface storage that enables water to be retained and released as needed.

Area-of-Origin/Water Rights - Area-of-origin statutes protect the rights to water in watersheds where the water originates from uses outside these watersheds. This is an important concept for communities in the area-of-origin watershed that will grow over time and will need more water than they are currently using. CALFED supports this concept and will develop its Program consistent with the laws and regulations protecting areas of origin. Phase II analysis examined potential programmatic impacts of the proposed alternatives on areas of origin.

Coordinated Permitting - To ensure timely and successful implementation of the CALFED Bay-Delta Program, a coordinated permit process will be established. The process needs to anticipate the numerous permit requirements for all actions approved as part of the Program. Coordinated permitting cannot result in relaxation of permitting requirements, but must include good information sharing among permit agencies to make the permitting process more efficient. In 1998, the conceptual framework for the process will be developed.

It is expected that the coordinated permit process and framework will include the following components: a permit assistance team to assist the project proponents in understanding and obtaining the required permits, and a regulatory permit review team dedicated to the CALFED projects. The regulatory team (comprised of agencies responsible for permitting) would be provide timely review of environmental documentation, close interagency coordination, and development of mitigation measures and monitoring requirements. The permit coordination framework would also be designed to address broad issues to improve the efficiency of permitting such as. general and regional permits and mitigation banks.

Initially, the coordinated permit framework will be applied to the near-term ecosystem restoration projects currently being funded. As other elements of the Program are approved, those projects and actions would also benefit from the framework.

Coordinated Flood Control and Flood Plain Management - The federal government and the State of California have recognized the need for a comprehensive approach to flood plain management as described in reports such as the 1997 Governor's Flood Emergency Action Team (FEAT) Report, Federal Public Law 87-874, and the 1998 Energy and Water Development Appropriations Bill.

The U.S. Army Corps of Engineers' Sacramento and San Joaquin River Basins Comprehensive Study is addressing the general objectives of flood damage reduction and ecosystem restoration. The study will ultimately have implementation plans for long-range management of both river systems. The study will include consideration of the full range of structural and non structural flood damage reduction measures, as well as the diverse, but interrelated, water and land management objectives. Downstream of these studies, the Sacramento-San Joaquin Delta Special study is investigating the potential for future Corps ecosystem restoration and flood protection projects within the Delta region itself. In addition, the Long-Term Management Strategy (LTMS) for handling and disposal of dredged materials from San Francisco Bay could lead to availability of dredge material for levee construction and habitat restoration. Corps flood protection studies will be fully coordinated and compatible with other related programs and will contribute directly towards meeting the goals of the CALFED Long-Term Levee Protection Plan and Ecosystem Restoration Plan.

North and South Delta Flood Improvements - The CALFED Long-Term Levee Protection Plan is focused on improving levee protection within the Delta. The plan includes 1) base-level funding to provide equitably distributed funding to participating local agencies in the Delta, 2) special improvement project funding with priorities funding for special habitat improvement and levee stabilization projects to augment the base-level funding, 3) Delta island subsidence control plan, 4) emergency management plan, and 5) seismic risk assessment. The Long-Term Levee Protection Plan addresses potential island flooding for all areas of the Delta, not just the north and south Delta.

San Joaquin Drainage - San Joaquin drainage problems have been evaluated in several studies over the past two decades. Complete resolution of the San Joaquin drainage problems is beyond the scope of the CALFED Bay-Delta Program. However, some CALFED actions can reduce the San Joaquin drainage problems. For example, improved water quality (reduced salinity) to the Delta Mendota Canal would result in improved San Joaquin drainage and improved quality water in the San Joaquin River. Therefore, the CALFED Water Quality and Water Use Efficiency Programs include actions which control agricultural surface and subsurface drainage to improve water quality in the San Joaquin River region. In addition, actions included in the Water Use Efficiency Program have been effective in reducing drainage problems while simultaneously improving agronomic viability.

Recreation - CALFED seeks to plan for recreation enhancement and, if necessary, to mitigate impacts to Delta recreation resulting from CALFED activities designed to restore other Delta resources. Construction of new facilities will provide for appropriate on-site recreation development. The responsibilities and procedures for recreation development at new storage and other facilities is clearly addressed in current law. Federal and state laws and local laws and plans govern recreation developments associated with water development projects in and near the Delta. The Draft Programmatic EIS/EIR and accompanying technical reports address general impacts that CALFED Program implementation could have on recreational resources and on how the recreational resources could impact the other parts of the Program.

Within the existing CALFED framework exists the need and opportunity for recreation planning. Such planning could identify and prioritize recreation enhancement and mitigation projects for implementation once a preferred program alternative is selected. Specific recreation mitigation and enhancement actions and projects could then be selected appropriate to need. The time line of such a process should be consistent with the Phase III documentation and implementation schedule, ensuring that recreation resources are appropriately considered as part of the Bay-Delta solution.

Climate Change/Sea Level Rise - CALFED is proposing significant investments to improve water quality, ecosystem quality, water supply reliability, and levee system integrity. The long-term durability of the Program could be adversely affected by future climate changes.

The geologic record shows evidence of past substantial changes in global and regional climates with the resultant marks from flooding and droughts. Sea level changes are directly related to extremes in climate change. For example, sea levels were 2 to 6 meters higher than present levels during the last interglacial period of 125,000 years ago and approximately 120 meters below present levels during the last Ice Age, 20,000 years ago. Considering this wide range of sea level fluctuation, the Delta has likely existed with current sea levels for only small portions of the geologic history.

Future sea level changes are difficult to estimate because not enough is known about how the ice sheets in Greenland and Antarctica will react to global warming, and how much global warming may occur. Warming may cause not only melting of ice sheets and land-based glaciers, but some thermal expansion of the sea water itself. If global warming causes increased precipitation at very high latitudes and resultant storage of water in the ice sheets, sea level could actually decrease.

Estimates of current sea level rise in the neighborhood of 1.5 millimeters per year is typical in the literature. One study estimates that global warming may cause further rise of about 18 centimeters (0.7 foot) by the year 2030. Also, if current trends in greenhouse gas emissions continue, the study estimates the rise could amount to 1 meter (3.3 feet) above current levels by 2100. A similar evaluation by the U.S. Environmental Protection Agency estimates that sea levels may rise globally approximately 20 inches (range of 6 to 38 inches) by year 2100 and average global temperatures could increase by 2 degrees Celsius (range of 1 to 3.5 degrees C).

Rising sea levels could have significant adverse impacts on the Delta system (including habitat, water supply, and Delta agriculture) if levees are overtopped or if substantial future investments are required to prevent overtopping. Higher sea levels would increase salinity levels throughout the Delta and for many miles inland. This would alter the effectiveness of Program habitat restoration projects and likely alter the entire ecosystem of the Delta. Water diversions dependent on taking water from the Delta channels would likely need to be abandoned and moved inland to areas of lowered salinity. While these changes are potentially significant over the long term (hundreds or thousands of years), they are unlikely to significantly alter Program facilities or operations within the foreseeable future (20 to 50 years).

The long-term change in temperatures could result in more variability in precipitation and runoff from year to year and season to season. Higher flooding could become more common at times, and drought periods could become more frequent, increasing competition for remaining scarce water supplies. Some estimates indicate that California will experience an increase in winter runoff and a decrease in spring and summer runoff, with a resultant decrease in water supply and reliability in the Central Valley Basin.

Agricultural Land Conversion in the Delta - Agricultural land conversion in the Delta resulting from the Program is limited to that needed for implementation of levee system improvements, ecosystem restoration, and other facilities. Possible land area in the Delta affected by Program implementation could range from approximately 140,000 to 200,000 acres, depending on the alternative. Some of this land is already owned by the government, and other possibilities such as the reclamation of Franks Tract will be considered prior to converting prime agricultural land. CALFED seeks to preserve as much prime and unique agricultural land as possible during Program implementation in Phase III. To offset Delta regional agricultural production losses, CALFED is investigating the concept of supporting efforts to preserve agricultural production on a regional or statewide basis.

Agricultural Land Conversion in Service Areas - Agricultural land conversion in the service areas (areas served water by the SWP and the CVP) is included in the CALFED alternatives as a potential measure to improve water quality by reducing discharges from drainage lands with selenium problems. The CALFED policy is not to convert land to reduce water demands. However, depending on water supply and water transfer opportunities available in the various alternatives, farmers may choose to change cropping patterns, temporarily fallow land, or permanently take land out of agricultural production. Program implementation will require some land conversion to accommodate new facilities or restoration activities. Possible land area in the service areas affected by Program implementation of facilities, ecosystem restoration and water quality could range from approximately 75,000 to 140,000 acres, depending on the alternative. Third party impacts of such actions will be carefully evaluated and taken into consideration.

Needs of San Francisco Bay - Several entities have expressed concern that CALFED is not directly focusing on promoting the health of San Francisco Bay, particularly the Central and South Bay areas. It is true that the Program has not included San Francisco Bay as part of its defined problem area (which includes the legally defined Delta, Suisun Bay extending to Carquinez Strait, and Suisun Marsh). Nevertheless, because the Bay-Delta system is part of a larger water and biological resource system, solutions to address the problems in the system will include a broader geographic scope extending both upstream and downstream. This solution scope includes San Pablo Bay, San Francisco Bay, and portions of the Pacific Ocean out to the Farallon Islands. In particular, the Program will address interactions between the Delta and San Francisco Bay, such as flow or sediment, by examining the "inputs" and "outputs" from the defined problem area. Using this approach, outputs such as flow or sediments that are needed to protect the rest of the Bay are considered within the scope of the Program. At the same time, however, problems which originate and are manifest outside of the Program's problem area, such as toxic discharges into the South Bay, are not within the scope of the Program.

Elements of CALFED's Ecosystem Restoration Program will benefit the health of San Francisco Bay. Ecosystem restoration actions would include provision of additional springtime Delta outflow, habitat improvements in the North Bay, watershed management actions surrounding the Bay, and control of exotic species throughout the ecosystem. In addition, improved water quality (through implementation of the Water Quality Program) and reduced sedimentation (due to greater sediment retention in wetland, riparian and floodplain habitats) in flows from the Delta would also contribute to a healthier Bay. Finally, Bay Area water districts that receive some of their water supply from the Delta would potentially be impacted by the Water Use Efficiency Program.

In addition, given CALFED's solution principle that solutions should have no significant redirected impacts, consideration needs to be given to how each alternative might negatively affect San Francisco Bay. The Draft Programmatic EIS/EIR evaluates impacts (both adverse and beneficial) of the CALFED alternatives on the San Francisco Bay region.

Relationship to the San Francisco Estuary Project and its Comprehensive Conservation and Management Plan - The San Francisco Estuary Project (SFEP), a cooperative federal-state partnership, was established in 1987 under the auspices of the U.S. Environmental Protection Agency's National Estuary Program, to protect and restore the San Francisco Bay-Delta Estuary, while protecting its many beneficial uses. In 1993, the SFEP completed its Comprehensive Conservation and Management Plan (CCMP) for the estuary, a consensus plan developed cooperatively by over 100 government, private and community interests. The CCMP includes goals, objectives and actions in nine program areas - aquatic resources, wildlife, wetlands, water use, pollution prevention and reduction, dredging and waterway modification, land use, public involvement and education, and research and monitoring. Establishment of the CALFED Bay-Delta Program has raised questions about its relationship to the SFEP and implementation of the CCMP. CALFED has incorporated many of the goals, objectives and actions from the CCMP. In addition, CALFED ecosystem restoration funding has been awarded to several projects that implement actions from the CCMP. Many of the interests involved in development of the CCMP are also active participants in the development of the CALFED solution.

Navigation - Not all of the Delta waterways follow natural channels. Some were constructed for navigation which is an important Delta function. In addition to periodic navigational work on many Delta waterways, the U.S. Army Corps of Engineers built and maintains two commercial shipping channels through the Delta. The ports of Stockton and Sacramento are served by the Stockton Deep Water Ship Channel, completed in 1933, and the Sacramento Deep Water Ship Channel, completed in 1963. Most of the length of these channels have since been deepened to 35 feet. It is possible that changes in flow patterns may result in changed operation and maintenance requirements of the channels.

Effects on Hydropower Generation - The CALFED Program has no specific objectives for hydropower generation. However, CALFED does seek to minimize negative impacts on other resources, such as hydropower generation, during and after implementation. The Program may result in temporary or long-term changes in river and reservoir operations, which may affect the quantity, timing and value of hydropower produced within the Bay-Delta system. Also, additional pumping may increase the amount of Project Energy Use, that is, power consumed by the CVP and the SWP to move water through the system. An increase in Project Energy Use can reduce the amount of surplus hydropower that might otherwise be available for sale from the CVP (necessary to repay Project debt), and may increase the amount of power that must be purchased from outside sources to meet SWP Project Energy Use. Replacement for reduced availability of renewable hydropower would likely come from fossil fuel or other thermal generation. CALFED is coordinating with the Western Area Power Administration to assure that issues are identified and properly framed, so consequences and options are clear to stakeholders, the public, and the CALFED decision-makers.

3. PROGRAM ALTERNATIVES

Phase II is focusing on evaluating variations to alternatives developed in Phase I and preparing a Programmatic EIS/EIR for twelve of these variations. These alternatives are programmatic in nature, intended to help agencies and the public make decisions on the broad methods to meet Program objectives. The alternatives are not intended to define the site specific actions that will ultimately need to be designed. For example, the alternatives are not intended to define the precise size and location for surface water storage. They are intended to provide the decision makers enough information on whether or not storage within a certain a size range is warranted, for example, in the Sacramento River watershed.

> Alternatives are intended to provide information on broad programmatic issues, not site specific issues.

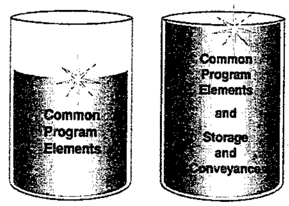
The alternatives are comprised of building blocks referred to as Program elements. The basic structure from Phase I contained **common** and **variable** Program elements which were used to build the Phase II alternatives and variations. Common Program elements included levee system integrity, water quality, ecosystem restoration, and water use efficiency and variable elements included storage and conveyance. During Phase II, it was recognized that two additional common Program elements (water transfers and watershed management) were needed because of their multi-objective impact. Using the six Program element descriptions more accurately characterizes the nature of the actions, even though all the actions in each of the programs were evaluated in the environmental analyses.

The common or foundational Program elements resulted from a realization during Phase I that some categories of actions were so basic in addressing Bay-Delta system problems that they should not be optional nor be made to arbitrarily vary in level of implementation. These common Program elements are also distinguished from the variable storage and conveyance elements in that each consists of hundreds of individual actions which can be implemented over a twenty to thirty year period. They will be guided by specific policy direction and an ongoing adaptive management framework and require local partnerships, coordination and cooperation. The storage and conveyance Program elements are different in that they generally require a more classic "yes" or "no" decision with respect to the need for new or modified facilities (e.g. off-stream storage or Delta conveyance facilities).

The six common Program elements provide the foundation for overall improvement in the Bay-Delta system. These Program elements represent a significant investment in and improvement (reduction) of the resource conflicts in the system. Each of the individual elements is a major program of its own. For example, the ecosystem Program element represents the largest, most complex restoration ever undertaken. The levee element in isolation will result in significantly improved system integrity by strengthening levees throughout the Delta. The water quality element will dramatically lower toxicants in the system. Water use efficiency is expected to avoid over 3 MAF of water demand annually by year 2020. A more effective and protective water transfer market will provide critical ecosystem flows without regulatory action and will result in a reduction of drought-induced economic damage. The watershed management strategy is a long-term effort to coordinate the planning and implementation of the CALFED Program with and among local watershed management organizations in order to achieve a more efficient, effective and integrated approach.

However, the performance of each common element is enhanced when developed together as part of the total Program. Additionally, the total performance is enhanced (or the risks reduced) by the range of modifications under consideration in the storage and conveyance Program elements.

A significant part of the overall performance of the CALFED Bay-Delta Program is attributable to the common Program elements. The variable Program elements further enhance performance, provide greater operational certainty and Program balance, and reduce potential redirected impacts.



This chapter first provides an overview of the common and variable program elements. Included in this overview are sidebar discussions of the principle issues that have been raised by agencies and stakeholders about the particular program elements. Further discussion of how CALFED intends to address these issues is included in Chapter 5, below.

The remainder of this chapter describes the 12 alternative variations built from these Program elements, and shows the process CALFED used to evaluate and revise these 12 alternative variations into three refined alternatives.

Common Program Elements

The alternatives for the CALFED solution are assembled from hundreds of programmatic actions. To help organize the discussion of alternatives, the actions are summarized below under each of the major Program elements introduced above. The common program elements remain relatively unchanged from one alternative to another:

- **Long-Term Levee Protection Plan** - Provides significant improvements in the reliability of the Delta levees to benefit all users of Delta water and land

- **Water Quality Program** - Makes significant reductions in point and non-point pollution for the benefit of all water uses and the Bay-Delta ecosystem

- **Ecosystem Restoration Program** - Provides significant improvements in habitat for the environment, restoration of some critical flows, and reduced conflict with other Delta system resources

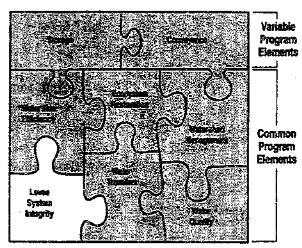
- **Water Use Efficiency Program** - Provides policies for efficient use of water in agricultural and urban settings and environmental purposes which is essential to using existing water supplies wisely and assuring efficient use of any new supplies developed through the Program

- **Water Transfer Policy** - Provides a policy framework to facilitate and encourage a properly regulated water market to move water between users, including environmental uses, on a voluntary and compensated basis

- **Watershed Management Coordination** - Encourages locally-led watershed management activities that benefit all Delta system resources

These Program elements remain relatively the same for all alternatives. They are supplemented with various Delta conveyance configurations and options for storage in assembling into alternatives.

Long-Term Levee Protection Plan



The Sacramento-San Joaquin Delta is an area of great regional and national importance, which provides a broad array of benefits including agriculture, water supply, transportation, navigation, recreation and fish and wildlife habitat. Delta levees are the most visible man-made features of this system. Historically, the levee system has been viewed as a means of protecting other resources. However, levees are an integral part of the Delta landscape and are key to preserving the Delta's physical characteristics and processes including definition of the Delta waterways and islands.

Given the numerous public benefits protected by Delta levees, the focus of the Long-Term Levee Protection Plan is to improve levee stability. There are five main parts to levee protection plan:

1. Base-Level Protection Plan - Base-level funding provides equitably distributed funding to participating local agencies in the Delta. One of the primary goals of the CALFED Program is to reconstruct all Delta levees to a particular standard. CALFED has tentatively selected the U.S. Army Corps of Engineers PL 84-99 standard. This standard provides criteria to reconstruct levees to 1.5 feet above the Federal Emergency Management Agency's (FEMA) 1986 Flood Hazard Mitigation Plan 100-year flood level and is a prerequisite for requesting post-flood disaster assistance. However, the selection of any levee standard must be compatible with available funding. If the selected levee standard is too low then many of the benefits the levees provide will be lost. If the levee standard is too high then reconstruction becomes too expensive for most local agencies and implementation is not uniform.

Long-Term Levee Protection Plan
Issues and Concerns

- There is concern that the cost of implementation may exceed the benefits; Program goals must be clear and alternative forms of risk management should be considered.
- Proper integration of the Levee, Water Quality, and Ecosystem program elements is essential and may require a specific management entity to assure integration. In particular, levee and ecosystem restoration objectives may be challenging to achieve simultaneously.
- Levee strengthening and the proposed design of setback levees results in the conversion of productive agricultural land. Government land acquisition and continued private land ownership must be evaluated.
- There is concern that support for the levee restoration program would wane if an isolated facility were built.
- There is concern that levee system integrity cannot be sustained if Delta land uses continue to cause subsidence; subsidence reversal should be a more prominent part of this program element.
- A major levee improvement program may require substantial dredging in the Delta and rivers, and this dredging may adversely affect water quality and sensitive fish and wildlife resources.
- The long term sustainability of levee maintenance and associated agricultural activities needs to be evaluated with particular emphasis on areas with peat soils and identification of financial and policy incentives and disincentives to maintain levees.

2. Special Improvement Projects - The special improvement project funding establishes a funding mechanism for special habitat improvement and levee stabilization projects to augment the base-level funding. Under the special improvement projects, flood protection would be enhanced for key islands that provide statewide benefits to the ecosystem, water supply, water quality, economics, and the infrastructure. Special improvement project funding is based on the <u>benefit</u> to the public , not solely on the <u>need</u> for improvement.

3. Delta Island Subsidence Control Plan - Interior island subsidence due to oxidation of Delta peat soils increases the effective height of the levees. As the island soils disappear, the levee needs additional fill material to hold back the same water level. This rebuilding is a substantial required maintenance cost. Continued subsidence can directly jeopardize the long-term viability of the Delta levee system. The plan focuses on reducing the risk to levee stability from subsidence by funding grant projects to develop best management practices.

4. Emergency Management Plan - The most recognizable threat to Delta islands and resources in the Delta is inundation due to winter flood events. In addition, other potential disasters can be caused by high tides and high winds, earthquakes, burrowing animals whose actions can cause levees to fail, toxic spills, failure of Delta levees during low flow periods, and fire. Approximately 20 islands have flooded since the 1960s, including repeated flooding of some islands. The emergency management plan will build upon existing state, federal, and local agency emergency management programs to improve protection of Delta resources in the event of a disaster.

5. Seismic Risk Assessment - Earthquakes can cause levees to fail by slumping or liquefaction of underlying soils. To date, there have been no known Delta island inundations as a result of seismic events. However, there are several active faults located sufficiently close to the Delta to present a threat to Delta levees. The seismic risk assessment will evaluate the potential performance of the existing levee system during seismic events.

<u>Long-Term Levee Protection Plan Facts and Figures</u>

- Helps protect land uses, water quality, and water supply reliability.
- Provides new opportunities for habitat.
- Remains relatively unchanged between alternatives.
- **Meets Program objectives for reducing vulnerability to the Delta system.** However, seismic risk is uncertain.
- Requires additional research on seismic vulnerability.
- Could exceed $ 1 billion over 20-30 years or more. However, an affordable annual investment rate a critical issue that will require prioritization given the extent of eligible areas (e.g. if only $1 billion is funded some standards for some areas may need to be relaxed). Annual investment rates may exceed $30 to $35 million.

The levee plan will remain relatively unchanged among the alternatives. Delta channel modifications for conveyance may require setback levees along the alignment or a different levee cross section depending on channel flow velocities. The levee cross sections in places may vary depending on locations selected for levee-associated habitat.

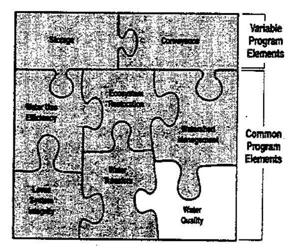
Overall potential benefits of the Delta Long-Term Levee Protection Plan include:

- Provides funding for

- continued maintenance of levees to protect Delta functions
- Ensures suitable funding, equipment and materials availability, and coordination to rapidly respond to levee failures
- Subsidence reduction helps long-term Delta system integrity
- Increased reliability for water supply needs from the Delta and in-Delta water quality
- Increased reliability for in-Delta land use
- Increased reliability for in-Delta aquatic and wildlife habitat

For more information see the *Long-Term Levee Protection Plan Appendix* to the Draft Programmatic EIS/EIR.

Water Quality Program



The draft Water Quality Program currently includes 25 programmatic actions to further the Program's goal of providing good water quality for environmental, agricultural, drinking water, industrial, and recreational beneficial uses of water. The majority of these actions rely on comprehensive monitoring and research to improve our understanding of effective water quality management and on the ultimate control of water quality problems at their sources.

Determining impairment to a water quality beneficial use is always a difficult and complicated matter. For some beneficial uses, such as drinking water use and agricultural water use, water quality impacts on use are generally well known. For other beneficial uses such as ecosystem use, water quality impacts on species are not understood as well. As a result, the program has relied on the technical expertise of a variety of stakeholders representing beneficial uses. The 25 water quality actions include a combination of research, pilot studies, and targeted activities. This approach allows actions to be taken on known water quality problems and sources of those problems, while allowing further research of potential problems and solutions. Actions will be adapted over time to ensure the most effective use of resources.

> **Further research is needed for some water quality problems.**
>
> For example, for some parameters of concern, such as mercury, not enough is understood about its sources, the bioavailability of mercury to various species, factors contributing to its bioavailability, and the load reductions needed to reduce fish tissue concentrations necessary for human consumption.

In summary, the draft Water Quality Program element includes the following broad categories of programmatic actions:

- **Mine drainage** - Reduce heavy metals, such as cadmium, copper, and zinc, by source control or treatment of mine drainage at inactive and abandoned mine sites.

- **Urban and Industrial Runoff** - Reduce heavy metals, pesticides, nutrients, and sediment and subsequent turbidity. Evaluate loadings of total organic carbon (TOC), salinity, and pathogens in urban runoff and assess the need for source control measures to reduce these parameters of concern to drinking water beneficial uses.

Water Quality Program
Issues and Concerns

- There are differing opinions regarding the most effective program approach: a regulatory framework to enforce the objectives versus an incentive-based or "safe harbor" approach to encourage voluntary partnerships to reduce non-point sources.
- This element needs to be better integrated with other parts of the Program, including ecosystem restoration and water use efficiency.
- There is concern that this program element is not sufficiently aggressive or adequately developed to accomplish more than current water quality efforts.
- There are differing views on the specific drinking water quality targets as well as on the means to achieve drinking water quality objectives (providing the highest quality source water versus relying upon treatment methods). A cost comparison is also needed.
- There is disagreement over whether the program should include dilution-oriented actions.

- **Wastewater and Industrial Discharge** - Reduce pathogens (from boat discharges), oxygen depleting substances, selenium, and ammonia. Evaluate the loadings of TOC, salinity, and pathogens from wastewater and industrial treatment plant discharges and assess the need for source control measures to reduce these parameters of concern to drinking water beneficial uses.

- **Agricultural Drainage and Runoff** - Reduce selenium (agricultural subsurface drainage), salinity, pesticides, sediment, TOC (discharges from Delta islands), nutrients and ammonia, and pathogens (controlling inputs from rangelands, dairies, and confined animal facilities).

- **Water Treatment** - Reduce formation of disinfection by-products by controlling TOC, pathogens, turbidity, and bromides.

- **Water Management** - Use water management techniques and improved outflow patterns and water circulation in the Delta region to control salinity levels.

- **Human Health** - Reduce impairment of recreational beneficial uses within the Delta due to human health concerns associated with consumption of fish and shellfish containing elevated levels of DDT, chlordane, toxophene, mercury, and PCBs and their derivatives by research/monitoring and source control.
- **Toxicity of Unknown Origin** - Through research/monitoring identify parameters of concern in the water and sediment within the Delta, Bay, Sacramento River and San Joaquin River regions and implement actions to reduce their toxicity to aquatic organisms.

The water quality program will remain relatively unchanged among the alternatives but its performance can vary significantly depending on the other Program elements. Storage can help timing for release of pollutants remaining after source control efforts. Improved conveyance to south Delta export pumps will improve water quality for those diversions but may decrease quality for in-Delta diversions. Water use efficiency measures can improve water quality entering the Delta by reducing some agricultural drain water containing pollutants.

Water Quality Program Facts and Figures

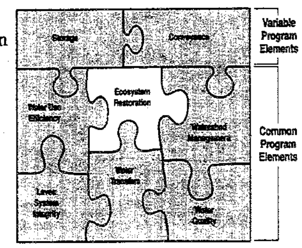
- Remains relatively unchanged between alternatives.
- Provides critically needed reduction of toxics for fisheries and an important reduction in organic carbon to improve drinking water.
- **Does not address health concerns associated with bromide without other Program elements.**
- Could exceed $0.75 billion over 20-30 years. May require annual investment exceeding $25 million.

Potential benefits of the water quality program include:

- Improves Delta water quality by reducing the volume of urban and agricultural runoff/drainage and concentration of pollutants entering the Delta
- Improves water quality for the ecosystem by reducing toxicants as a limiting factor
- Improves drinking water quality and public health benefits
- Reduces concentration of compounds contributing to trihalomethane formation potential and degradation of drinking water supplies

For more information see the *Water Quality Program Appendix* to the Draft Programmatic EIS/EIR.

Ecosystem Restoration Program



The draft Ecosystem Restoration Program (ERP) currently includes over 700 programmatic actions that, in combination with the Program elements for storage and conveyance and the other common Program elements, are expected to result in greatly improved ecological health for the Bay-Delta system. Adaptive management, scientific oversight, and program review will guide implementation of the ERP over the 20 to 30 year implementation period.

The ERP is designed to improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta to support sustainable populations of diverse and valuable plant and animal species. A foundation of this program element is the restoration of ecological processes associated with streamflow, stream channels, watersheds, and floodplains. These restored processes can create and maintain habitats essential to the life history of species dependent on the Delta and can help the system function in a more sustainable way.

The ERP also focuses on Delta species. Major elements of the ERP are directed at recovering endangered species, implementing ecosystem improvements to eliminate the need for additional species listings, and providing increased abundance of valuable sport and commercial fishes. In addition, the ERP will improve population abundance and the distribution of many other aquatic and terrestrial plants and animals within the entire Bay-Delta watershed.

Some of the actions that are important for ecosystem health are already being implemented at the local level. CALFED will support and work with local conservancies engaged in restoration projects and will foster collaborative programs with local watershed groups to protect and manage watersheds in the Bay-Delta system.

In summary, the draft ERP will include the following types of actions:

- Restore, protect, and manage important habitat types, including tidally influenced fresh and brackish water marsh habitat; seasonal, fresh emergent, and nontidal perennial aquatic habitat; perennial grasslands; agricultural lands managed using "wildlife friendly" techniques; stream meander corridor and riparian land along the Sacramento River; and riparian woodland and shaded riverine aquatic habitat.

- Restore critical instream flows and Delta outflow in key springtime periods (an average of about 100,000 to 300,000 acre-feet of increased flow depending on year type, ranging from almost zero to approximately 500,000 acre feet, depending on actual year). Flow augmentation could come from water developed from new storage or from water acquisitions from willing sellers (water purchases on this scale are unprecedented).

- Develop floodways along the lower Cosumnes and San Joaquin rivers.

Ecosystem Restoration Program
Issues and Concerns

- The implementation strategy for ecosystem restoration must integrate resource priorities, scientific oversight, and collaborative decision-making involving local entities.
- There is concern that adaptive management decision making is essential but creates unique and difficult assurance issues. Some stakeholders believe these issues may be addressed best by new institutional structures.
- Habitat restoration actions require significant agricultural land conversion, particularly in the Delta. Efforts to reduce and avoid impacts should be included at the program and, subsequently, the project level.
- There are differing views on the likely success of restoring habitat in leading to recovery of fish populations without significant reductions in diversion effects at the export facilities and the restoration of natural delta flow patterns.
- There are differing views on the extent to which restoration priorities should include the San Francisco Bay area.
- The relative importance of toxics as an ecosystem stressor must be better understood.
- Better understanding and validation of conceptual ecosystem models will be necessary for success of ecosystem restoration measures and adaptive management.
- There is disagreement over the need for, and availability of, water to meet ecosystem restoration flow objectives.
- Further assessment is needed of the flows required for ecosystem restoration, and the variety of options to obtain these flows (including new storage, reoperation of existing storage and changes in diversion patterns, transfers, and regulatory measures).

- Construct setback levees to increase floodplain interactions and provide seasonal aquatic and riparian habitats.
- Develop prevention and control programs for invasive species.
- Protect sediment sources that feed streams and rivers in the Bay-Delta system.
- Support local watershed planning and management programs.

- Install state-of-the-art fish screens.
- Implement or expand fish marking programs at hatcheries and fish production facilities in the Bay-Delta system.
- Modify barriers that temporarily impair fish passage.
- Evaluate and reduce adverse effects of contaminants (addressed by Water Quality Program).
- Implement a strong ecosystem monitoring program to evaluate short- and long-term trends in ecosystem health.
- Implement a well-funded research program to provide information needed for future solutions and decisions.

The ERP will remain relatively unchanged among the alternatives. However, its performance can vary with the other Program elements. Storage can improve the timing of instream flows and Delta outflows, and can allow modification of timing of diversions. Improved conveyance to the south Delta export pumps can improve timing of diversions to reduce impacts on fish. Modified conveyance can reduce adverse Delta flow circulation issues and can also reduce the entrainment effects on fisheries. Water quality improvements through source controls and timing of remaining pollutant releases improves water quality and reduces toxicity for the ecosystem. Improvements of levees and channels for improved system integrity can also incorporate new habitat features. Reduced diversions associated with water use efficiency measures helps reduce diversion effects on fisheries.

Ecosystem Restoration Program Facts and Figures

- Remains relatively unchanged between alternatives.
- Provides critically needed habitat and reduction of other stressors to the environment.
- Supports restoration of important ecological processes.
- **ERP alone may not provide for the recovery of listed species; recovery rates of listed species will also be influenced by the selected water storage and conveyance features..**
- Could exceed $1.5 billion over 20-30 years. Annual investments exceeding $50 million may be required.

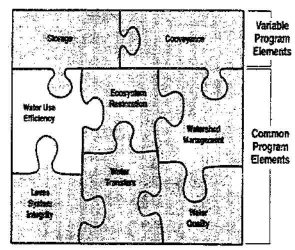
Potential benefits of the Ecosystem Restoration Program include:

- Reverses the decline in ecosystem health by reducing or eliminating factors that degrade habitat, impair ecological functions, or reduce the population size or health of species

- Supports a healthy Bay-Delta ecosystem that provides for the needs of plants, animals, and people using the system
- Supports sustainable production and survival of plant and wildlife species, including resident species and migrants such as the waterfowl that use the Pacific Flyway each winter
- Reduces the conflict between fisheries and water supply opportunities

For more information see the *Ecosystem Restoration Program Plan Appendix* to the Draft Programmatic EIS/EIR.

Water Use Efficiency Program



The CALFED Water Use Efficiency Program builds upon the fact that implementation of efficiency measures occurs mostly at the local and regional level. The CALFED policy toward water use efficiency is a reflection of the State of California legal requirements for reasonable and beneficial use of water: existing water supplies must be used efficiently; any new water supplies that are developed by the Program must be used efficiently as well.

The role of CALFED agencies in Water Use Efficiency will be twofold. First, they will offer support and incentives through expanded programs to provide planning, technical, and financial assistance. Second, the CALFED agencies will provide assurances that cost-effective efficiency measures are implemented. Some potential water use efficiency benefits, such as water quality improvements, may be regional or statewide rather than local. These are situations in which CALFED planning and cost-share support may be particularly effective.

Based on a more detailed analysis provided in the *Water Use Efficiency Program and Water Transfers Appendix* to the Draft Programmatic EIS/EIR, estimates of potential conservation and water recycling are summarized in the following table. Values represent water savings expected to occur for future conditions regardless of the outcome of a CALFED solution (termed no-action) as well as the incremental savings expected from a CALFED solution. Representative values shown in this summary table are all midpoints in value ranges contained in the *Water Use Efficiency Program and Water Transfers Appendix*.

	Net Water Savings [1] (1,000 acre-feet annually)		
	Urban Conservation	Agriculture Conservation	Urban Recycling
CALFED No Action (occur as future trends in absence of a Bay-Delta solution)	1,480	230	1,170
CALFED Program (result of CALFED Program actions)	740	160	300
Total	2,220	390	1,470
		Grand Total	4,080

1. "Net water savings" is water available for reallocation to other water supply uses. Reductions in applied water would be greater.

With respect to urban and agricultural conservation, CALFED proposes to rely largely on locally-directed processes to provide endorsement or certification of urban and agricultural water suppliers that are properly analyzing conservation measures and are implementing all measures that are cost-effective and feasible. Organizations composed of water suppliers and public interest or environmental groups already exist that may be able to serve this function. Endorsement or certification of water suppliers will enable CALFED agencies to target assistance programs and other measures to assure reasonable and beneficial use.

The draft Water Use Efficiency Program includes the following actions.

Conservation related actions include:

- Work with the California Urban Water Conservation Council and the Agricultural Water Management Council to identify appropriate urban and agricultural water conservation measures, set appropriate levels of effort, and certify or endorse water suppliers that are implementing cost-effective feasible measures.

- Expand state and federal programs to provide sharply increased levels of planning, technical, and financing assistance and develop new ways of providing assistance in the most effective manner.

- Help urban water suppliers comply with the Urban Water Management Planning Act.

- Help water suppliers and water users identify and implement water management measures that can yield multiple benefits including improved water quality and reduced ecosystem impacts.

- Identify and implement practices to improve water management on wildlife refuges.

Water Use Efficiency Program
Issues and Concerns

- The program does not include a strong component of direct demand management actions such as agricultural land conversion to reduce water diversions or reduce and delay the need for storage facilities. The analysis of alternatives should include varying ranges of demand management, including reclamation, conservation, pricing, and land retirement/fallowing.
- The program must expand conservation implementation to include measures that are cost-effective from a statewide perspective but not from the local perspective; an open and active water market will do this, but only in areas where conserved water may be transferred.
- There is some disagreement over the current program approach, which emphasizes incentives and markets more than a regulatory framework.
- Processes to demonstrate efficient use through certification or endorsement by stakeholder councils will need additional refinement, stakeholder consensus, and continuing CALFED financial assistance to succeed.
- There is concern that the Agricultural Water Management Council does not provide adequate assurance of efficient use because it lacks broad stakeholder support, and the process for endorsement of agricultural water management plans is untested.
- The program is considering two water management practices -- measurement of water deliveries and volumetric pricing -- as conditions of receiving new or transferred water made available through CALFED.
- There must be assurance of strong CALFED support for programs to provide assistance with planning, financing, and implementation of local water use efficiency measures.
- Analysis that shows greater potential for urban water conservation than agricultural water conservation is counterintuitive and should be supported by water balance studies.

Water recycling actions include:

- Help local and regional agencies comply with the water recycling provisions in the Urban Water Management Planning Act.
- Expand state and federal recycling programs in order to provide sharply increased levels of planning, technical, and financing assistance, and develop new ways of

providing assistance in the most effective manner.

- Provide regional planning assistance that can increase opportunities for use of recycled water.

Assurances will play a critical role in the Water Use Efficiency Program element. The assurance mechanisms are structured to ensure that urban and agricultural water users implement the appropriate efficiency measures. As a prerequisite to obtaining CALFED Program benefits (receiving "new" water, participating as a buyer or seller in a water transfer, receiving water from a drought water bank) water suppliers will have to show that they are in compliance with the applicable urban or agricultural council agreements and applicable State law. This requirement will result in serious analysis and implementation of conservation measures identified in those agreements. In addition, CALFED is considering a requirement that recipients of "new" or transferred water meet water measurement and volumetric pricing requirements developed under the Central Valley Project Improvement Act (CVPIA).

A high level of water use efficiency may also be assured through the concept of linked implementation. Widespread demonstration of efficient use by local water suppliers and irrigation districts could be a prerequisite to CALFED implementation of other Program actions for water supply reliability. This concept will be developed further as CALFED considers staging of Program actions.

Economic analyses are underway that will compare water use efficiency options (including conservation, recycling, and transfers) and new facilities and identify least-cost ways of meeting CALFED objectives. These analyses are expected to better define the mix of demand management options and water supplies from new facilities. CALFED will work with stakeholders on technical and implementation issues as these analyses proceed.

The draft Water Use Efficiency Program remains relatively unchanged among the alternatives. However, depending on the alternative, more or less implementation of water use efficiency measures may occur at the local level as water suppliers integrate efficiency measures into their integrated resources planning. The effectiveness of water use efficiency methods can be enhanced by storage of the saved water for later use. For example, the groundwater banking and conjunctive use programs in Delta export areas such as the San Joaquin Valley and the Tulare Lake Basin and in the Sacramento Valley could enable water users to bank conserved water for use in times of shortage. The extent of feasible water recycling is affected

Water Use Efficiency Program Facts and Figures

- Remains relatively unchanged between alternatives.
- Is an essential part of overall water management.
- Emphasis is on providing technical, planning, financing assistance.
- Could exceed $0.75 billion over 20-30 years. May require annual investment exceeding $25 million.

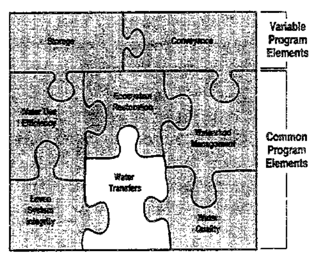
by efforts to maintain and improve water quality. Source water that is high in salinity may not be suitable for subsequent recycling.

Potential benefits of the water use efficiency program include:

- Reduces demand for Delta exports and reduces related entrainment effects on fisheries
- Can help in timing of diversions for reduced entrainment effects on fisheries
- Could make water available for transfers to water users and for environmental flows
- May improve overall Delta and tributary water quality
- Could reduce the total salt load to the San Joaquin Valley

For more information see the *Water Use Efficiency Program and Water Transfers Appendix* to the Draft Programmatic EIS/EIR.

Water Transfer Framework Policy



Water transfers are currently an important part of water management in California and offer the potential to play an even more significant role in the future. An open and active water transfers market will improve the economic efficiency of water use and will provide an incentive for water users to implement cost-effective conservation measures that yield transferable water. A viable transfers market will help ensure realistic evaluation of the cost-effectiveness of any new supply development, helping to avoid premature investment or over-investment in supply facilities, such as surface storage. The Program is addressing water transfers from both a technical and policy perspective. Technical considerations related to conveyance and storage are discussed later in this report. A water transfer policy framework is being established to resolve many of the issues that currently constrain transfers or raise concerns when transfers do occur.

The policy framework is expected to provide an effective means of moving water between users on a voluntary and compensated basis, as well as a means of providing incentives for water users to implement management practices that will improve water use efficiency. Transfers can also provide water for environmental purposes in addition to the minimum instream flow requirements if there is adequate accounting and tracking of instream transfers.

Water transfer policy must also provide a means of ensuring that water transfers do not merely improve short-term water supply reliability at the expense of local communities or groundwater resources. Reductions in groundwater can occur when users of surface water transfer this water to others and switch to groundwater instead. Local communities can be affected when agricultural land is taken out of production to transfer the water that would have been used for irrigation. All of those dependent on an agricultural economy -- from farm workers to farm equipment mechanics -- can be adversely affected. Strong mechanisms to avoid or mitigate water transfer impacts to third parties and groundwater resources will be essential elements of a CALFED water transfer policy.

There are many technical issues related to water transfers over which there is disagreement or insufficient resolution. Examples of these issues include the definition of transferable water and access to conveyance facilities. Resolution of each technical issue will allow an incremental increase in water market activity. CALFED is working to resolve these issues.

Water Transfer Framework Policy
Issues and Concerns

- In regions where conserved water may be transferred, the existence of an open and active water transfer market will provide a critical economic incentive for water conservation.
- The program must implement effective measures to protect rural economies and lifestyles from unintended transfer impacts, protect groundwater resources from transfer impacts, and facilitate and encourage instream flow transfers. This may be difficult but will be essential.
- An independent transfers clearinghouse may be necessary to provide adequate public review of transfers so they are properly regulated. There are varying opinions on the degree and type of restrictions that should be imposed on a water transfer market.
- Additional water transfers, including transfers across the Delta, may have many of the same environmental effects as existing water conveyance and diversion. Transfers policy should encourage transfers that are environmentally beneficial or benign and discourage others.
- There must be a process to examine and recommend resolution of the many technical and institutional issues currently limiting a water transfers market.

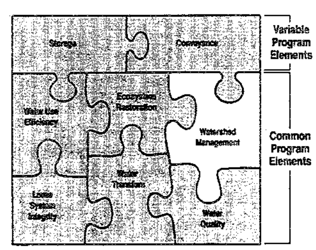
The CALFED water transfer element will propose a policy framework for water transfer rules, baseline data collection, public disclosure, and analysis and monitoring of water transfers, both short and long-term. The element, in its final form, may also identify areas where additional regulation or statutory changes are desirable. Such modifications to existing policy are expected to facilitate the water transfer market, although the annual volume of transfers will still be dependent on locally developed agreements and assurances.

Development and refinement of the water transfers policy framework will be guided by several criteria that form the basis of California transfers policy:

- Water transfers must be voluntary.
- These transactions must result in the transfer of water that truly increases supply, not the transfer of "paper water" such as water that a transferor has never used, or water that would have been available for downstream use even in the absence of the transfer.
- Water rights of sellers must not be impaired.
- Water transfers must not harm fish and wildlife resources and their habitats.
- Transfers must not cause overdraft or degradation of groundwater basins.
- Entities receiving transferred water should be required to show that they are making efficient use of existing water supplies.
- Water districts and agencies that hold water rights or contracts to transferred water must have a strong role in determining how transfers are conducted.
- The impact on the fiscal integrity of the districts and on the economy of small agricultural communities cannot be ignored.

For more information see the *Water Use Efficiency Program and Water Transfers Appendix* to the Draft Programmatic EIS/EIR.

Watershed Management Coordination Plan



Watershed management is a broad term used to describe diverse actions that maintain or improve environmental conditions and resource management throughout a watershed. There are many potential watershed management actions in the Bay-Delta system that are consistent with the CALFED mission and can contribute to meeting CALFED objectives for ecosystem quality, water quality, water supply reliability, and levee and channel system integrity.

CALFED's approach and level of involvement in watershed management actions will vary according to the location where these actions take place. The Bay-Delta watershed can be divided into two distinct areas that reflect differing physical characteristics of the watershed:

- The upper tributary watershed above reservoirs and major fish passage obstructions

- The lower watershed, generally below those major fish passage obstructions

In the lower watershed, CALFED proposes hundreds of programmatic actions that are included in the various Program elements. CALFED and the CALFED agencies will be actively involved in these actions. In the upper watershed, the Program proposes relatively few actions. CALFED will support the efforts of others in the upper watershed primarily by helping to coordinate these activities. Coordination is important throughout the upper and lower watershed because there are so many entities working on watershed management: individuals, local conservancies and other non-governmental organizations, and government agencies at the local, regional, state, and federal levels.

Watershed Management
Issues and Concerns

- There is concern that the Program's draft watershed management strategy is not adequately developed and does not define clear goals and objectives for CALFED.
- Watershed management efforts must emphasize partnerships among the public, local watershed organizations, and governments at all levels.
- There is concern that the program focuses too much on the lower watershed; efforts below and above the major dams must be integrated and there needs to be a long-term commitment to upper watershed investment.
- The watershed management strategy should be fully integrated with all program elements, especially those addressing water quality and ecosystem restoration.

The following are examples of watershed management projects that can make improvements in each CALFED resource area:

- Ecosystem Quality - Watershed projects that improve riparian habitat along streams, increase or improve fisheries habitat and passage, restore wetlands, or restore the natural stream morphology affecting downstream flows or species may benefit ecosystem quality.

- Water Quality - Watershed management activities may benefit water quality in the Delta by helping to identify and control nonpoint sources of pollution and identify and implement methods to control or treat contaminants. Watershed projects which reduce the pollutant loads in streams, lakes, or reservoirs could measurably improve downstream water quality.

- Water Supply Reliability - Meadows and riparian corridors in the upper watershed tend to slow the rate of runoff and allow more percolation of water into aquifers. When meadows erode and riparian corridors are degraded, runoff during storms can occur at higher rates. This makes flood management more difficult and reduces the opportunities to capture runoff in downstream reservoirs. Watershed management projects to restore meadows and riparian corridors can attenuate the peak flows that occur during storms and allow more of this water to be absorbed into aquifers of the upper watershed. This water can contribute to increased stream base flow later in the season which improves water supply reliability and provides environmental benefits for fish and wildlife.

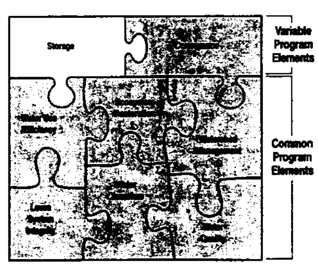
- Levee and Channel Integrity - Attenuation of flood flows coming from the upper watershed can provide benefits far downstream in the system. Delta levees are most vulnerable during high winter flows, so watershed management that reduces these flows can help maintain the integrity of Delta levees.

For more information see the *Watershed Management Coordination Appendix* to the Draft Programmatic EIS/EIR.

Variable Program Elements

In addition to the common program elements described above, some of the alternatives include provisions for new or expanded water storage. Each alternative includes modification of Delta conveyance. The variable program elements of storage and conveyance are described below.

Storage



Storage may or may not be included in the CALFED alternatives. Storage of water in surface reservoirs or groundwater basins can provide opportunities to improve the timing and availability of water for all uses. The benefits and impacts of surface and groundwater storage vary depending on the location, size, operational policies, and linkage to other Program elements. As described in more detail in Chapter 2, by storing during times of high flow and low environmental impact, more water is available for release for environmental and consumptive purposes during dry periods when conflicts over water supplies are critical. Properly managed, storage turns low value water into high value water for all uses.

Surface storage can often provide other important benefits including flood control, power generation and regulation, and recreational opportunities. However, construction of surface storage reservoirs can result in significant terrestrial and aquatic impacts and is generally very costly. Groundwater storage, in general, has fewer terrestrial and aquatic impacts and is less costly than surface storage, but is limited in flexibility due to slower rates of storage and withdrawal compared to surface storage. Other issues such as adverse effects on third parties and fish and wildlife, land subsidence, costs of electric power for pumping, and degradation of water quality in aquifers must be addressed before implementing any groundwater storage program.

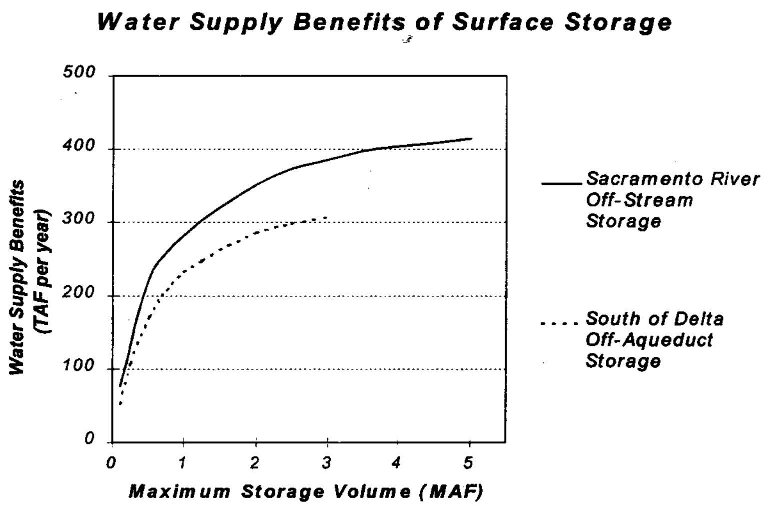
A significant amount of storage exists in the Sacramento – San Joaquin system today. Beginning in the 1920s, large reservoirs were built in Northern California for hydroelectric power, flood control, and to provide a more reliable source of water supply. There are now over 30 major reservoirs within the Sacramento – San Joaquin system with a combined gross capacity of over 25 MAF. Average annual unimpaired runoff (the amount of runoff that would occur in the absence of dams and diversions) in the two river basins is about 27 MAF.

Storage
Issues and Concerns

- Some stakeholders view surface storage as a physical assurance to avoid groundwater impacts of conjunctive management programs.
- There are concerns that storage must be financed on a strict "beneficiaries pay" basis because subsidizing the cost of water from storage would undermine a transfer market and limit implementation of water use efficiency measures.
- Some stakeholders believe that surface storage should only be considered as part of a staged alternative or in the context of linked implementation: storage would not be constructed until certain milestones had been achieved (such as in transfers and water use efficiency).
- Additional economic and environmental analysis must be completed to compare marginal costs and determine the appropriate balance among new storage, water use efficiency, and water transfers.
- Some stakeholders view new storage as essential to improving water supply reliability. Strong assurances must be developed for water suppliers due to the long lead time to develop new storage.
- Environmental or operational concerns have been raised about specific potential storage sites which may make these sites infeasible or cost-prohibitive.
- The "time value of water" concept for operating reservoirs to yield net environmental and water supply benefit must be analyzed carefully under different scenarios of operation and water year type to confirm feasibility.
- Some stakeholders believe the Program's water supply objectives should be quantified.

During Phase II, CALFED evaluated various types of new storage components for their potential to contribute to an overall approach to meeting Program objectives. Different types of storage components would provide different kinds of benefits. Storage upstream of the Delta would function differently than storage adjacent to export canals downstream of the Delta. Off-stream surface storage provides different benefits and generally fewer environmental impacts than on-stream surface storage. Groundwater banking and conjunctive use programs could enhance benefits provided by surface storage. Descriptions and examples of the various types of storage components evaluated during Phase II of the Bay-Delta Program are provided below.

A preliminary evaluation was performed early in Phase II to determine an appropriate range of storage to be examined at a programmatic level. A rough approximation of water supply benefits for various storage volumes was made for both Sacramento River off-stream storage and south of Delta off-aqueduct storage. Results of this evaluation are summarized in the following chart.



This preliminary evaluation indicates that most water supply benefits of Sacramento River off-stream storage are achieved with about 3 MAF of storage, while most water supply benefits of south of Delta off-aqueduct storage are attained with about 2 MAF of storage. Of course, the relationship of water supply benefits to storage volume is highly dependent on operating assumptions. Much more detailed information about specific locations of new storage, potential allocation of storage benefits, and operational goals and constraints would be necessary to determine an optimal volume of storage from a water supply perspective.

Other types of surface storage considered in Phase II include San Joaquin River tributary storage and in-Delta storage. Relatively smaller volumes of storage are practical for these types of storage facilities due to engineering considerations. Groundwater banking and conjunctive use in the Sacramento and San Joaquin Valleys was also considered in Phase II. The practical storage capacity available for groundwater storage in these areas will be determined only after detailed study of specific projects and full consideration of local concerns. For study purposes, groundwater storage volumes of 250 TAF in the Sacramento Valley and 500 TAF in the San Joaquin Valley were considered.

Based on this preliminary evaluation of potential water supply benefits and practical consideration of acceptable levels of impacts and total costs, the range of total new storage considered for evaluation in Phase II was from zero up to about 6 MAF. This amount of new storage was considered a reasonable range for study purposes; much more detailed study and significant interaction with stakeholders will be required before specific locations and sizes of new storage are proposed. For the purposes of the Phase II evaluation, an inventory of potential new storage projects was compiled. Those projects that appeared most feasible were evaluated to provide representative information on costs and benefits. A more complete screening process, taking into account potential environmental impacts, engineering feasibility, costs, and benefits, will proceed over the coming months.

A fundamental principle of the CALFED Program is that the costs of a program should be borne by those who benefit from the program. That principle is especially relevant in the decision about new storage facilities. In principle, public money will be used to finance storage projects only to the extent that the storage creates public benefits; user money should be used to finance the portion of storage that generates user benefits. This "user pays" principle is critical to the overall CALFED goal of increasing the efficiency of water utilization in California. CALFED is performing economic analyses evaluating new facilities and other approaches (such as conservation, recycling, and transfers) to identify cost-effective pathways to meeting CALFED objectives. These economic analyses will be especially useful in assisting all potential users of new storage to evaluate the relative costs and benefits of particular storage options.

Following are summaries of different types of storage being considered for the Program.

Upstream Surface Storage

Runoff from upstream tributaries to the Delta usually occurs in large volumes over short periods of time in the winter and spring. New storage upstream of the Delta could store a portion of these flows in excess of instream flow requirements and water supply needs. While detaining water in storage, care must be taken to maintain periodic peak flow events in rivers that provide for natural fluvial geomorphological processes, including the moving and cleansing of gravels, which are important to aquatic ecosystems. This is a more vital consideration associated with enlarged on-stream storage compared to off-stream storage; large amounts of water can quickly be detained in on-stream storage, while due to conveyance capacity constraints, only a minor percentage of large peak river flows can be diverted to off-stream storage.

Water could be released from upstream surface storage when needed to supplement instream flows and water supply. Water could be released to meet direct needs or to provide additional benefits through exchanges. For example, water could be released from off-stream storage in the Sacramento River basin directly to local water users, reducing existing diversions from the Sacramento River during periods critical to fisheries. Water released for environmental purposes could include pulse flows to help transport fish through the Delta. Water could also be released to provide sustained flows for riverine and shallow water habitats and improve water quality in the Delta during drier years. Examples of potential upstream surface storage include:

Enlargement of Shasta Reservoir. This additional on-stream storage on the Sacramento River could provide water for instream and consumptive use purposes, flood control, instream water temperature control, and hydropower.

Sites-Colusa Reservoir. Storage in this new off-stream storage reservoir in the Sacramento Valley would be limited by conveyance capacity from the Sacramento River to the reservoir. The reservoir could be filled during periods when diversions from the river would have low impacts on fisheries. Water stored in the reservoir could be used to supply Sacramento Valley agriculture, thereby reducing agricultural diversions from the river during times more critical to fisheries. Water from the reservoir could also be released back into the river, directly or through exchange, to increase flows at critical periods.

Enlargement of Millerton Reservoir. This additional storage on the San Joaquin River could be used to store supplies during high flow periods and provide some flood control benefits. Stored water could be released for increased environmental flows during drier periods, directly to water users, or to enhance groundwater conjunctive use operations in the San Joaquin Valley.

Montgomery Reservoir. Water stored in this facility could be used to increase environmental flows during drier periods, directly to water users, or to enhance groundwater conjunctive use operations in the San Joaquin Valley.

In-Delta Surface Storage

In-Delta surface storage could be developed by converting one or more Delta islands into reservoirs. Existing levees would be reconstructed and screened facilities for diverting water into the islands would be provided. In-Delta storage would be filled during high flow periods when potential harm to fisheries would be lowest. Water could be released directly into the Delta during drier periods for environmental, in-Delta water supply, or water quality needs. A direct connection to State Water Project (SWP) and Central Valley Project (CVP) export facilities might also be provided to allow stored water to be exported during periods when curtailing south Delta diversions could benefit fisheries.

Several concerns regarding in-Delta storage must be resolved. If the stored water is to be used for drinking water purposes, there may be a need to evaluate sealing or removing the naturally occurring peat soils from the islands to avoid the release of organic carbons (organic carbons in a drinking water source contribute to the formulation of undesirable byproducts when treated with chlorine). This could add significant expense to any in-Delta storage project. Foundation and slope stability concerns associated with Delta levees could limit the rate of water removal from in-Delta storage, thereby reducing operational flexibility and potential benefits.

Examples of potential in-Delta surface storage include:

Bacon, Woodward, and Victoria Islands. These Delta islands might be converted to in-Delta storage by reconstructing the surrounding levees, providing a screened inlet facility, and connecting the islands to one another and to Clifton Court Forebay with inverted siphons. Together, these three islands might provide about 200 thousand acre feet (TAF) of storage. Real-time monitoring might guide operations to determine when species of concern are not present and water may be diverted into storage and when to release water from storage and curtail south Delta CVP and SWP diversions.

An alternative to inundation of prime Delta agricultural acreage would be to develop storage facilities near the Delta (such as an expanded Los Vaqueros as described below) that would, like in-Delta storage, provide the ability to store water while enabling maximum flows during wet periods.

South of Delta Off-Aqueduct Storage

A version of off-stream storage, south of Delta off-aqueduct storage could be filled by diversions through the Delta Mendota Canal or the California Aqueduct. Examples of existing off-aqueduct storage include San Luis Reservoir and Castaic Lake. New or enlarged existing off-aqueduct storage would be filled by increasing Delta exports during periods of high flows and least potential harm to Delta fisheries. Water stored in new off-aqueduct storage could be released to meet export needs while curtailing export pumping from the Delta during times of heightened environmental sensitivity in the Delta. Filling of off-aqueduct storage is limited by the capacity of export facilities. However, water stored in off-aqueduct storage is of great value to export water users, since it can be delivered directly for use without Delta operational constraints.

Examples of south of Delta off-aqueduct storage include:

Enlarged Los Vaqueros Reservoir. This off-stream storage reservoir, currently under construction with a planned capacity of 100 TAF, could be expanded to store about 1 MAF of water supply. Because of its proximity to the Delta, Los Vaqueros could provide greater flexibility and water supply benefits than other south of Delta off-aqueduct reservoirs. While filling of other off-aqueduct reservoirs is limited by capacity in the California Aqueduct and Delta-Mendota Canal, a direct intake could be constructed from the Delta to Los Vaqueros. This would allow greater diversion capacity during high flow periods in the Delta.

Los Banos Grandes Reservoir. This reservoir would be filled with water exported through the California Aqueduct during periods of high flow, allowing water to be released for use while exports are curtailed from the Delta during times most sensitive to fisheries. Los Banos Grandes has received extensive study over the past two decades, including detailed surveys of biological resources. While the project appears to be among the most economical of prospective surface storage reservoirs, some CALFED agencies do not think environmentally significant impacts associated with the project can be mitigated.

Garzas Reservoir. Garzas Reservoir would also be filled with water exported through the California Aqueduct during times of high flow, allowing curtailment of exports from the Delta during times most sensitive to fisheries. The reservoir would be located on Garzas Creek in southwestern Stanislaus County, about 57 miles south of Clifton Court Forebay. The damsite is about three miles west of the California Aqueduct. Garzas Reservoir, with a potential capacity of about 340 TAF, was among a group of 13 alternative south of Delta off-stream reservoir sites studied by the Department of Water Resources in the 1980s.

Groundwater Storage

Groundwater storage can take the form of direct groundwater banking operations or groundwater conjunctive use operations. Under a groundwater banking program, water is stored in depleted groundwater aquifers through spreading grounds or direct injection and withdrawn from storage by pumping, similar in operation to a surface storage reservoir. Operations are limited by percolation or injection rates and pumping withdrawal rates, which are generally much slower than intake and outlet rates from surface storage reservoirs. For these reasons, groundwater banking programs can be enhanced if surface storage is available to store high flows more quickly and release them for groundwater storage at lower rates.

Under a groundwater conjunctive use operation, surface water is diverted for agricultural or urban use during wet years, allowing underlying groundwater aquifers to recharge naturally and from percolation of excess applied water. During dry years, water is pumped from groundwater storage to meet the identified agricultural or urban needs, allowing reduced diversion of surface water from rivers.

Groundwater banking and conjunctive use operations range in scope and formality. For decades growers in parts of the Central Valley have practiced informal conjunctive use operations by using surface water supplies when available and then turning to groundwater during dry periods. Recently, more formal programs such as the Semitropic Water Storage District's water banking agreement with Metropolitan Water District of Southern California have become more common place. While groundwater storage operations are an important water management tool, significant issues such as adverse effects on third parties and fish and wildlife, land subsidence, and degradation of water quality in aquifers must be addressed on a case by case basis before implementing any groundwater storage program. Guiding principles to address these issues were discussed in Chapter 2.

Examples of potential groundwater storage operations include:

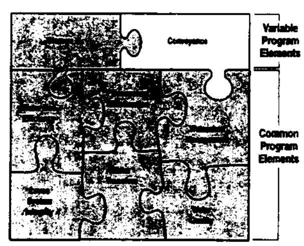
American Basin Conjunctive Use Project. This project, located in western Placer County and southwestern Sutter County, is currently under investigation by the California Department of Water Resources (DWR) in cooperation with a group of local agencies. State Water Project water would be delivered for agricultural use in this area in wet and above normal years, reducing groundwater pumping and providing "in-lieu" recharge during those years. In dry and critical years, these agricultural users would pump groundwater to meet local demands, foregoing diversion of surface water supplies that would be made available to the SWP.

Kern Water Bank. The Kern Water Bank was implemented by DWR during the 1990s. The Kern Water Bank consists of a Kern Fan Element and several conjunctive use elements operated in cooperation with local agencies. The Kern Fan Element, consisting of conveyance facilities, spreading grounds, and extraction wells, is currently operated by a local authority. Surplus flows from the Kern River are recharged when available, as well as SWP supplies delivered through the California Aqueduct in wet years. Additional recharge and extraction facilities could allow expansion of storage in the Kern Water Bank.

Madera Ranch Project. The proposed Madera Ranch project is located near the of the City of Madera. As currently envisioned, CVP water, CVP acquired (purchased) water, and any new CVP water (e.g. obtained rights to San Joaquin flood flows) would be diverted from the Mendota Pool on the San Joaquin River and pumped into an eight mile long canal for delivery into recharge areas that allow percolation of the water into the aquifer. Water would be extracted from the aquifer for delivery to the Mendota Pool to meet CVP related agricultural and wildlife refuge needs. The U. S. Bureau of Reclamation is currently evaluating the details of the proposal with the San Luis & Delta-Mendota Water Authority and the private land owner. Any project partners would provide their own "supply" for banking.

Conveyance

The Delta conveyance element of the Program describes the various configurations of Delta channels for moving water through the Delta and to the major export facilities in the southern Delta. While there are countless combinations of potential modifications to Delta channels, three primary categories of Delta configuration options, as described below, are being studied in Phase II of the Program. These Delta conveyance options were the primary distinguishing features among the three broad categories of alternatives studied in Phase II.



Conveyance
Issues and Concerns

- Objective consideration of a new Delta channel (or isolated facility) may not be possible due to the political stigma resulting from the peripheral canal debate in the early 1980s.
- Consideration of major conveyance modifications requires significant assurances.
- There is concern over potential deterioration of in-Delta water quality if an isolated facility is built. A more thorough evaluation of in-Delta water quality impairments of each conveyance configuration is needed. In particular, there are unknowns related to reduced inflows into the northern Delta.
- The analysis on the impacts of each conveyance configuration on fish entrainment, Delta flow circulation, and drinking water needs further refinement.
- There is concern that support for the levee restoration program would wane if an isolated facility were built.
- Some stakeholders believe that an isolated facility should only be considered as part of a staged alternative or in the context of linked implementation; the facility would not be constructed until certain milestones had been achieved (such as in transfers and water use efficiency).
- Some stakeholders view an isolated facility as essential to improving water supply reliability. Strong assurances must be developed for water suppliers due to the long lead time to develop new storage.

Additional exports are expected from the Delta in the future as statewide demands for water increase. Currently, the combined physical capacity of SWP and CVP export facilities in the southern Delta is approximately 15,000 cfs. However, a U.S. Corps of Engineers permit limits exports through the SWP export facility to 6,680 cfs, except during some winter months when marginal increases are allowed. The CVP has a capacity of 4,600 cfs.

Because of the potential impact on flow patterns and Delta water quality, the Delta conveyance configuration of an alternative can greatly affect the performance of other Bay-Delta Program elements. The three primary Delta conveyance configurations evaluated in Phase II of the program are:

> **Alternative 1: Existing System Conveyance.** The Delta channels would be maintained essentially in their current configuration. One significant variation would include some selected channel improvements in the southern Delta together with flow and stage barriers at selected locations to allow for increasing the permitted pumping rate at the SWP export facility to full existing physical capacity of 10,300 cfs. These physical

changes in the existing system include many of the features contained in the proposed Interim South Delta Project. Other variations that address the same needs are also being evaluated.

Alternative 2: Modified Through Delta Conveyance. Significant improvements to northern Delta channels would accompany the southern Delta improvements contemplated under the existing system conveyance alternative. Variations include a wide variety of channel configurations, designed to improve flow patterns to benefit fisheries throughout the Delta, provide flood control, and improve water quality in many parts of the Delta.

Some Delta flow Statistics

Flow patterns through the Delta channels are influenced by tidal actions and export operations. For the period of 1980 to 1991, average annual inflow to the Delta was 27,900 TAF, with the Sacramento River contributing about 62 percent and the San Joaquin River contributing about 16 percent. The remaining 22 percent came from other Delta tributaries. Of this total inflow, about 18 percent was exported at the SWP and CVP export facilities in the southern Delta, while about 76 percent went to outflow to the San Francisco Bay. Delta inflow, export, and net outflow rates are dwarfed by tidal flows in the Delta. During the 1980 to 1991 period, winter outflow in the Delta averaged about 32,000 cfs and summer outflow averaged about 6,000 cfs, compared to average tidal flow (ebb or flood) through the Golden Gate of 2,300,000 cfs and at Chipps Island in the western Delta of 170,000 cfs.

Alternative 3: Dual Delta Conveyance. The dual Delta conveyance alternative is formed around a combination of modified Delta channels and a new canal or pipeline connecting the Sacramento River in the northern Delta to the SWP and CVP export facilities in the southern Delta. Capacities for this new isolated conveyance facility in the range of 5,000 cfs to 15,000 cfs were evaluated in Phase II of the Program. The new facility would siphon under all major waterways to minimize aquatic impacts.

12 Alternative Variations

At the beginning of Phase II, 17 alternative variations (later reduced to 12) were developed around the three broad alternatives resulting from the Phase I work. These are described in detail in the *Phase II Alternative Descriptions* (May 1997) and are summarized below. They represented a reasonable range of different configurations of Delta conveyance and storage assembled with the common program elements for levee system integrity, water quality, ecosystem quality, water use efficiency, water transfers, and watershed management coordination.

Alternative 1A - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination without adding new storage and conveyance facilities to supplement the status quo.

Alternative 1B - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with select south Delta improvements. Alternative 1B builds upon Alternative 1A by adding fish screens at the Banks and Tracy pumping plants and an intertie between the Tracy pumping plant and Clifton Court Forebay. All common programs fit together as they did in Alternative 1A.

Alternative 1C - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with select south Delta improvements and storage. It builds on Alternative 1B by adding new conveyance to provide for increasing in the permitted south Delta pumping capacity to the full physical capacity. Alternative 1C is the same as Alternative 1B except that it includes new surface and groundwater storage facilities throughout the watershed.

Alternative 2A - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with north and south Delta channel modifications designed to improve water conveyance. Alternative 2A is the "minimal" alternative to achieve improved through Delta conveyance. It provides for more efficient water conveyance from the Sacramento River through Snodgrass Slough, North Fork Mokelumne River, and Old River near Clifton Court Forebay. It also includes new fish screens at the Tracy and Banks pumping plants, an intertie between the pumping plants, and operable barriers or equivalent in the south Delta. The alternative does not provide additional water storage.

Alternative 2B - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with north and south Delta channel modifications designed for water conveyance and new surface and groundwater storage. The alternative is the same as Alternative 2A except it adds new water storage facilities.

Alternative 2C - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with three new diversion locations for Tracy and Banks pumping plants. The new diversions could be use separately or in combination to provide increased operational flexibility. New in-Delta water storage would receive water from one of these new diversions. The alternative also includes new fish screens at the Tracy and Banks pumping plants, and an intertie between the pumping plants.

Alternative 2D - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with system modifications in the north and south Delta designed to improve water conveyance, to provide habitat restoration integrated with the conveyance improvements and new aqueduct storage south and downstream of the Delta. The alternative provides for more efficient water conveyance from the Sacramento River through Snodgrass Slough, South Fork Mokelumne River, and Old River near Clifton Court Forebay. It also includes new fish screens at the Tracy and Banks pumping plants, an intertie between the pumping plants, and an operable barrier or equivalent at the Head of Old River.

Alternative 2E - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with modifications in the north and south Delta designed to improve for water conveyance, to provide significant habitat restoration and additional surface and groundwater storage. The conveyance and habitat portions are the similar to those in Alternative 2D with the exception of the addition of conveyance and habitat on Tyler Island and the elimination of the 10,000 cfs intake at Hood.

Alternative 3A - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with north and south Delta channel modifications designed to improve water conveyance and a small (5,000 cfs) open channel isolated facility. This alternative is considered the "minimal" option for the dual Delta conveyance Alternative. It also includes new fish screens at the Tracy and Banks pumping plants, an intertie between the pumping plants, and operable barriers or equivalent in the south Delta. The alternative provides no new water storage.

Alternative 3B - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with north and south Delta channel modifications designed for water conveyance, a small (5,000 cfs) isolated facility constructed as an open channel, and surface and groundwater storage. The alternative is the same as Alternative 3A except for the new water storage.

Alternative 3C - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with north and south Delta channel modifications designed for water conveyance and a small (5,000 cfs) isolated facility constructed as a pipeline. It also includes new fish screens at the Tracy and Banks pumping plants, an intertie between the pumping plants, and operable barriers or equivalent in the south Delta. The alternative provides no new water storage. **This alternative is identical to Alternative 3A except for the facilities associated with the pipeline configuration.**

Alternative 3D - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination elements with north and south Delta channel modifications designed for water conveyance, a small (5,000 cfs) isolated facility constructed as a pipeline, and surface and groundwater storage. **This alternative is identical to Alternative 3B except for the facilities associated with the pipeline configuration.**

Alternative 3E - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with north Delta channel modifications designed to improve water conveyance, a large (15,000 cfs) isolated facility constructed as an open channel, and surface and groundwater storage. The alternative is similar to Alternative 3B except for the size of the isolated facility, and the elimination of Old River enlargement and barrier at Head of Old River.

Alternative 3F - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with a combined isolated storage and conveyance facility to transfer Sacramento River flow across the Delta to Clifton Court Forebay. A connected chain of up to 8 lakes, created by flooding Delta islands, would convey water via siphons and pumps beneath Delta channels.

Alternative 3G - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with north and south Delta channel modifications designed for water conveyance, a 5,000 cfs Deep Water Ship Cannel, a western Delta conveyance tunnel and channel, and surface and groundwater storage.

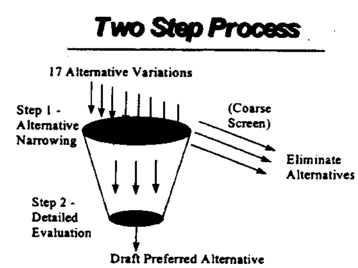
Alternative 3H - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with modified conveyance in the north and south Delta designed for water conveyance and significant habitat restoration, a small (5,000 cfs) isolated facility constructed as an open channel, and surface and groundwater storage.

Alternative 3I - Combines and integrates the Program elements for levee system integrity, water quality, ecosystem restoration, water use efficiency, water transfers, and watershed management coordination with three new diversion locations for Tracy and Banks pumping plants and surface and groundwater storage. The new diversions could be use separately or in combination to provide increased operational flexibility. One new in-Delta water storage would receive water from one of these new diversions. The alternative also includes new fish screens at the Tracy and Banks pumping plants, and an intertie between the pumping plants. This Alternative is similar to Alternative 2C, with one diversion extended to Hood and new surface and groundwater storage.

The first activities undertaken by CALFED to refine these alternatives were to modify or eliminate the ones that had technical problems, and to reduce the number of alternatives that achieved the same Delta conveyance function. The following activities were followed during this narrowing of the number of alternatives (depicted as "Step 1" in the adjacent figure):

Identify and eliminate technical problems (technical problems not evident when the alternatives were formulated and which severely limit an alternative's success):

- Identify alternatives with engineering/technical problems that must be resolved for the alternative to proceed.
- Modify each alternative, if possible, to remove the technical problems.
- If modifications to the alternative cannot solve the problem, the alternative is not practicable and will be eliminated.



Reduce the number of alternatives (that achieve the same Delta conveyance function):

- Identify alternatives that meet program objectives approximately the same and achieve the same Delta conveyance function.
- Use engineering/technical and cost evaluations to compare Delta conveyance. Consider adverse impacts of each alternative. If one alternative has significantly higher costs for conveyance and/or greater adverse impacts, it is not practicable and will be eliminated from further consideration.

Five alternative variations were eliminated during this alternative narrowing process. These were:

- **Alternative 2C** - The intent of the alternative is to provide operational flexibility by permitting multiple points of intake to enable pumping to be discontinued at locations where sensitive species are present in significant numbers, in order to avoid entrainment. Analysis of the alternative indicated similar operational flexibility could be achieved through other alternatives at less cost. The multiple intake concept was still represented in Alternative 3I.

- **Alternative 3C** -Alternative 3A and 3C differ only in that the isolated facility would be an open channel with alternative 3A and a pipeline in 3C. The pipeline has potential advantages in the degree of protection against toxic spills and other advantages, but is much more expensive. CALFED decided to analyze a pipeline as a potential minor variation of 3A, as opposed to a stand-alone alternative.

- **Alternative 3D** -Alternative 3B and 3D differ only in that the isolated facility would be an open channel with alternative 3B and a pipeline in 3D. The pipeline has potential advantages in the degree of protection against toxic spills and other advantages, but is much more expensive. CALFED decided to analyze a pipeline as a potential minor variation of 3B, as opposed to a stand-alone alternative.

- **Alternative 3F** -Under this alternative, six major Delta islands would be converted to reservoirs connected with siphons and pumps to act as a conduit of water supply through the Delta. This alternative would result in large scale loss of prime agricultural lands, would have significant potential for degrading the quality of export water supplies, and would be very expensive, compared to other alternatives for transporting water through the Delta with fewer water quality risks and with reduced impact on prime agricultural acreage.

- **Alternative 3G** -This isolated facility alternative would take water from the Sacramento River in West Sacramento, use the existing ship channel to its southern terminus, then connect with a pipeline conveying water to Clifton Court. This alternative would require facilities to enable ship passage through the water supply conduit, and would require a tunnel under the Sacramento River. The alternative was rejected because the biological and functional characteristics of this alternative are similar to other alternatives, the cost of this facility would be much higher than for other alternatives, and its engineering feasibility with respect to tunneling under the Sacramento River is untested.

The twelve remaining alternative variations are shown in summary form on the following page. The twelve cover the broad range of potential solutions surrounding the three alternatives. The Draft Programmatic EIS/EIR focuses on the potential consequences of the three alternatives (with the twelve variations). See the main document of the Draft Programmatic EIS/EIR for discussion of these consequences.

		Programs						Storage						Conveyance												
														South Delta					North Delta					Isolated Facilities		
		Water Quality	Water Use Efficiency	Ecosystem Restoration	Levee System Integrity	Water Transfers	Watershed Coordination	surface storage on Sac R. tributaries (in MAF)	surface storage on San Joaquin R. (in TAF)	groundwater storage in Sac Valley (in TAF)	groundwater storage in San Joaquin Valley (in TAF)	surface storage off-aqueduct (in MAF)	In-Delta storage (in TAF)	Tracy/CCF intertie and new fish facility	new CCF intake structure	operable Old R. barrier (or equivalent)	flow & stage control measures installed (or equivalent)	channel enlargement along Old R.	screened intake at Hood	North Delta Channel Modifications	Mokelumne River Floodway (East)	Mokelumne R. Floodway (West) and Tyler Island Aquatic Habitat	East Delta Habitat	3 isolated conveyance channels	5,000 cfs open channel/pipeline from Hood to CCF	15,000 cfs open channel from Hood to CCF
Existing Through Delta Channels	Alt 1 A	X	X	X	X	X	X																			
	B	X	X	X	X	X	X							X		X	X									
	C	X	X	X	X	X	X	3		250	500	1		X	X	X	X	X								
Modified Through Delta	Alt 2 A	X	X	X	X	X	X							X	X	X	X	X	X	X						
	B	X	X	X	X	X	X	3	500	250	500	2		X	X	X	X	X	X	X						
	D	X	X	X	X	X	X					2		X	X	X		X	X		X		X			
	E	X	X	X	X	X	X	3	500	250	500	2		X	X	X		X				X	X			
Dual System	Alt 3 A	X	X	X	X	X	X							X	X	X	X	X	X	X					X	
	B	X	X	X	X	X	X	3	500	250	500	2	200	X	X	X	X	X	X	X					X	
	E	X	X	X	X	X	X	3	500	250	500	2	200	X	X	X			X	X						X
	H	X	X	X	X	X	X	3	500	250	500	2		X	X	X		X	X			X	X		X	
	I	X	X	X	X	X	X	3	500	250	500	2	100	X	X				X	X				X		X

The 18 Distinguishing Characteristics

Looking simultaneously at all the information on how well the alternatives meet the objectives and how well they satisfy the solution principles would be nearly impossible due to the large amount of information. Furthermore, many aspects of the alternatives do not vary from one alternative to another. They all include common program elements that make significant progress toward meeting program objectives and reducing conflict in the system.

On the other hand, there are aspects that do differ among the alternatives and it is these aspects, or distinguishing characteristics, that guided the evaluation. These characteristics are important when assessing the performance, impacts and overall merits of each alternative. Following are the 18 identified distinguishing characteristics:

- **In-Delta Water Quality** - provides a measure of **salinity** and **flow circulation** for four areas of the Delta. The measure focuses on water quality for in-Delta agricultural uses.

- **Export Water Quality** - provides a measure of **salinity, bromide,** and **total organic carbon** for four export diversion location from the Delta. The measure focuses on municipal/industrial uses for the North Bay Aqueduct and Contra Costa Intake and for agricultural and municipal/industrial uses for the SWP and CVP export pumps.

- **Diversion Effects on Fisheries** - intended to include only the **direct effects on fisheries due to the export diversion intake and associated fish facilities**. These will vary depending on diversion location, size, type, method of handling bypassed fish, and annual volume of water diverted. The effects on flow patterns in the Delta as a result of the diversion are addressed in the distinguishing characteristic for "Delta Flow Circulation". The loss of fish due to diversion to another route is covered in this effect.

- **Delta Flow Circulation** - is intended to include the **direct and indirect effects of water flow circulation on fisheries due to the export diversions and changes in cross-Delta water conveyance facilities.** These will vary depending on diversion location, size, type, and operation of conveyance facilities, and annual volume of water diverted.

- **Storage and Release of Water** - provides a measure of the environmental benefit or adverse effects of storing water in a new Program storage facilities and releasing that water at a later time of need. Storing the water will generally result in some degradation of environmental conditions and releasing that water, for whatever use, will generally result in some environmental benefits.

- **Water Supply Opportunities** - is a measure of the change provided by the alternatives for water supply for the environment and for agricultural and urban uses.

- **Water Transfer Opportunities** - is an estimate of how well each alternative can carry water that may be generated through market sales or trades at different locations in the system.

- **Operational Flexibility** - provides an indication of how well each alternative can shift operations as needed from time to time to provide the greatest benefits to the ecosystem, water quality, and water supply reliability.

- **South Delta Access to Water** - is a measure of how the alternatives affect local access to water due to changes in water levels in the channels.

- **Risk to Export Water Supplies** - is intended to provide a measure of which alternatives best reduce the risk to export water supplies from a catastrophic earthquake.

- **Total Cost** - will include the initial capital costs for the Program as well as annual costs. Initial costs will include study, design, permitting, construction, mitigation, acquisition, and other first costs of the Program. Annual costs will include operation and maintenance, monitoring, reoccurring annual purchases, and other annual costs.

- **Assurances Difficulty** - is an estimate on how hard an assurance package will be to formulate and get consensus among agencies and stakeholders. It is not an assessment on the perceived effectiveness of the assurance package.

- **Habitat Impacts** - is an assessment of the adverse habitat impacts due to implementation of the storage and conveyance facilities.

- **Land Use Changes** - is a measure primarily of the amount of agricultural land that would change to other uses by implementation of the Program.

- **Socio-Economic Impacts** - include adverse and beneficial impacts such as commercial and recreational fishing, farm workers, power production, and other third party impacts.

- **Consistency with Solution Principles** - provides a qualitative measure of how well the alternatives meet the Program solution principles. Alternatives which violate the solution principles are not likely to be practicable or implementable.

The solution principles provide insight in considering tradeoffs among the other distinguishing characteristics in a balanced manner.

- **Ability to Phase Facilities** - provides an indication on how easy it will be to phase (stage) implementation of storage and conveyance facilities over time.

- **Brackish Water Habitat** - In the Bay-Delta system there is a salinity gradient between fresh and salt water. The western Delta is an area of important aquatic habitat with salinity levels of approximately 2 parts per thousand. The location of this salt concentration, known as X2, is an indicator of changes in brackish water habitat among the alternatives.

Moving Toward a Preferred Program Alternative

The twelve alternative variations addressed in the Programmatic EIS/EIR cover the broad range of potential consequences of implementing a CALFED solution. CALFED will continue evaluation of the alternatives, with the help of the public, and will select a preferred program alternative prior to the Final Programmatic EIS/EIR in late 1998.

As a tool in moving towards a preferred program alternative, CALFED sought to develop the best alternative for each of the three main categories:

- **Alternative 1** (existing system conveyance)
- **Alternative 2** (modified through Delta conveyance)
- **Alternative 3** (dual Delta conveyance)

The process began by examining how each of the twelve alternative variations performed for the preliminary evaluations of the distinguishing characteristics. This assessment provided information on where alternatives performed particularly well and where there were significant deficiencies. CALFED then looked for modifications, including operational changes, that would resolve the major deficiencies and enhance the overall performance of alternatives in each of the three categories.

Considerations for the Fisheries and Diversion Conflict

One of the primary problems presently encountered in the Delta is the conflict between the need to maintain water deliveries and the sensitive fish species in the Delta which are drawn into the pumps of the State Water Project, Central Valley Project and, to a lesser extent, the Contra Costa Water District intakes in the southern and western-central Delta. Currently, there are requirements for pumping activities to be curtailed during periods when sensitive species are present in the Delta. Future evaluations may indicate the need for further restrictions. This is the most important factor causing conflict presently and, left uncorrected, is likely to produce greater conflict in the future. This conflict can be reduced in four basic ways:

- By utilizing best available technology to construct improved fish screening facilities to physically avoid fish entrainment in an operating export facility;
- By providing storage in or near the Delta or off-aqueduct storage south of the Delta to enable export deliveries to be continued while pumping is curtailed when sensitive species are present;
- By relocating intakes and/or developing multiple intakes to enable pumping to occur from alternate locations in the Delta. This approach would provide flexibility for enabling pumping to continue from one location while a pumping restriction exists on another location because of the presence of sensitive species; or,
- By reducing demand. For example, depending on water supply and water transfer opportunities, farmers may choose to change cropping patterns, temporarily fallow land, or permanently take land out of agricultural production. Also, urban conservation and recycling in export service areas could substitute for some demands for Bay-Delta supplies.

Combinations of these approaches can be applied to achieve more benefit than would be achieved by any measure by itself. CALFED made the following considerations to help move towards the "best" Alternatives 1, 2 and 3.

Considerations on Screening - CALFED formed an Interagency Fish Facilities Technical Team composed of experts on the subject. This group has concluded that construction of advanced screen facilities were feasible to at least 15,000 cfs, although no facilities of comparable size exist. Like the current screens, the new screen designs will still be unable to successfully screen eggs and larvae of all species.

All life stages of salmon and steelhead that occur in the lower Sacramento River, lower San Joaquin River and Delta can be successfully screened with currently available positive barrier fish screen technology. Survival rates at existing state-of-art screens for salmon and steelhead, including facilities in the Central Valley, approach 100 percent. All fish screen facilities at a tidally-influenced location will require fish collection (salvage) and hauling (trucking) to an off-site, downstream location. Within the 3 CALFED alternatives under consideration, the only non-tidally influenced fish screen facility is the Hood diversion site in Alternatives 2 and 3.

In considering the option of upgrading SWP and CVP intake screen facilities in the south Delta separately or as a single project, technical team and engineering experts agree there are advantages to developing a combined screen facility at the head of Clifton Court to support both projects, including potential cost savings. Another advantage of a combined screen facility is that it utilizes an intertie between the SWP and CVP conveyance channels. This intertie is generally recognized as a desirable feature to increase operational flexibility, and is included in all three alternatives.

As envisioned, screen facilities in the south Delta would include low lift pumps on the downstream side of the screens. This feature allows the use of fish screens over the complete tidal cycle and reduces velocities and scour rates in the supply channels. However, such pumping during low tidal heights may exacerbate problems with water elevations in the channels supplying Delta agricultural users. Thus, the use of such screens will require tidal gates, or other measures to protect Delta agricultural water supplies.

Considerations on Relocating Intakes and Multiple Intakes - Having a choice of Delta export locations offers the potential to avoid peaks in fish abundance near one intake while continuing operation of the water projects at another intake. In general, the more widely the points of intake are separated, the more likely sensitive species can be avoided while exports are continued. However, relocating intake points and developing multiple points of intake are generally expensive, and in the case of alternatives that would require significant disruption of Delta lands, will have significant environmental impacts.

An intake on the Sacramento River would differ from an intake in the south Delta in three significant ways:

- Fewer species reside year-round in the area of the upstream diversion and therefore are much less exposed to entrainment there.

- The Sacramento River would provide sufficient bypass flows at the Hood diversion point to keep screened fish moving downstream in the river. This would eliminate the need for a fish salvage and trucking operation: fish salvage and trucking operations pose additional source of stress that can result in injury, predation, or mortality.

- Migratory fish of the Sacramento Valley will all be exposed to screens at Hood, whereas some proportion of these fish are not directly exposed to the export facilities in the south Delta. For some species, particularly striped bass, the new screens cannot screen the vulnerable life stage and will therefore represent a relocation of screening mortality from the south Delta to the Sacramento River stock of these species. However, operational modifications can minimize the losses of the most vulnerable life stages.

The San Joaquin River (near Stockton) has been proposed as a potential point of intake. This possibility was evaluated with the result that water yield and water quality associated with this point of intake would be inadequate in relation to the cost ($450 million) of constructing an intake on the San Joaquin River.

Avoidance of Disrupted Delta Flow Patterns - In the absence of export pumping, the Sacramento and San Joaquin Rivers would normally flow downstream through the Delta towards the ocean. Some observers believe that a major problem currently affecting fishery resources and general aquatic productivity in the Bay-Delta estuary is net reversal of normal flows in the Delta caused by export operations in the southern Delta. Such flow disruptions cause damage to fishery resources by complicating or confusing fish movement which ultimately results in reduced reproductive success in sensitive species. The alternatives being evaluated vary significantly in their effectiveness in addressing this problem.

Use of Storage to Enable Export Curtailments - Storage in the Delta, near the Delta, or off-aqueduct south of the Delta (including groundwater storage) offer the potential to maintain water deliveries while diversions from the Delta are curtailed. This can also be facilitated with upstream of Delta storage.

In-Delta storage (created by reinforcing levees on one or more islands and converting them into reservoirs) and near-Delta storage (created in a location near the Delta, such as the Los Vaqueros reservoir site) would be functionally equivalent with respect to the capability to respond very quickly to changing flow requirements needed to reduce fishery impacts at critical times. The two are different in the respect that in-Delta storage would take prime agricultural lands out of production producing shallow reservoir facilities with a lengthy perimeter that would have to be maintained. Also, in-Delta storage could present significant water quality problems because of the peat soils present at central and southern Delta locations. Near-Delta storage could be made deeper and with a higher volume for the same acreage, as compared to storage within the Delta, but cost will be an important factor. Both forms of storage would have higher yield than off-aqueduct storage south of the Delta, because this storage could be filled directly from the Delta without using aqueduct capacity needed to fill other reservoirs during wet periods. Water quality, environmental impact, and redirected impact considerations, along with cost information will determine the choice between these approaches.

Off-aqueduct storage south of the Delta could be used to temporarily curtail south Delta pumping without interrupting deliveries. A range of facility sizes would be possible, but the yield of such facilities would be lower. Off-aqueduct storage would have to be filled from the existing aqueduct capacity.

Based on these considerations and the need to reduce the fishery/diversion conflict, CALFED identified the following features of the twelve alternative variations that are undesirable and should be modified to improve performance:

Existing Screens at Existing Banks and Tracy Pumping Plants - Fish entrainment in the water project intakes, along with predation that occurs in Clifton Court, are major sources of fish losses in the system.

New Screens at Existing Clifton Court Location - Currently, predation in Clifton Court is believed responsible for major fish losses. While an improved screen at the existing location (which is inside the forebay just before the canal leading to Banks Pumping Plant) would significantly reduce entrainment, it would not affect predation in Clifton Court. The effectiveness and cost of constructing screens at the current location would not provide nearly the ecological benefit as other alternatives. One proposed solution to this problem is to construct a new intake facility at the head of Clifton Court and to construct screens at that location, largely eliminating fish from Clifton Court, and thereby eliminating predation there.

Shallow Channel Integrated with Snodgrass Slough - The ecology of Snodgrass Slough could be significantly affected by channel modifications. Construction of a separate intake channel would avoid these impacts and is, therefore, the preferred approach.

Tyler Island Aquatic habitat and Andrus Island Levee Setback - This feature would involve removing a major Delta island from agricultural production, and would create a major change in the Delta hydraulic system. However, the physical and biological consequences of this action are uncertain and would be known only after years of operating and evaluating the system. Thus, the value of this investment would be subject to considerable risk. Similar water conveyance and flood control benefits can be obtained through other, better understood alternatives, with reduced impacts on Delta agriculture.

Mokelumne River Floodway and Conversion of Bouldin Island to Habitat - This feature would involve removing a major Delta island from agricultural production, and would create a major change in the Delta hydraulic system, having unknown physical and biological consequences. Similar water conveyance and flood control benefits can be obtained through other, better understood conveyance configurations, with reduced impacts on Delta agriculture.

Unscreened intakes on San Joaquin River, East Delta, and West Delta - The benefits to fisheries associated with the flexibility of intake location that would be provided by multiple unscreened intakes are thought by CALFED fishery experts to be minimal as compared to the in-Delta construction impacts and costs that would be associated with this option. Other alternatives exist to accomplish similar operational objectives.

Alternatives 1A, 1B, 2D, 2E, 3H and 3I contain one or more of the less desirable features described above. Alternatives 2A, 2B, and 2D contained the feature of an intake channel from the Sacramento River integrated with Snodgrass Slough. Modification of the plan to isolate the intake channel from Snodgrass Slough in Alternative 2 would eliminate the environmental impact that would be caused to Snodgrass Slough and would make the alternatives viable from that perspective.

The following alternatives were then subjected to additional analysis:

Alternative 1 - Version C - With and without additional storage

Alternative 2 - Version A without additional storage, and Version B with additional storage.

Alternative 3 - Version A - 5000 cfs isolated facility, without additional storage
Version B - 5000 cfs isolated facility, with additional storage
Version E - 15,000 cfs isolated facility, with and without additional storage

Following these evaluations, CALFED included storage in each alternative for planning purposes. Storage from zero up to 6 MAF (including groundwater storage) was considered a reasonable range for planning purposes for each of the three alternatives. This figure of 6 MAF additional storage represented a maximum volume for planning purposes, not a storage target. CALFED also evaluated these alternatives with zero additional storage.

CALFED also considered potential staging of the alternatives. It may be possible to sequence the development of storage to assure an appropriate amount is implemented.

Description of the Three Alternatives

Based on the analyses described above, CALFED developed the three alternatives to help move towards a preferred program alternative. They represent the "best" alternatives for each of the three main categories. Each alternative includes the six common Program elements plus storage and conveyance. The three alternatives fall within the range of the twelve alternative variations evaluated in the Programmatic EIS/EIR.

The operation of storage and conveyance facilities in the Bay-Delta system has a significant effect on all CALFED Bay-Delta Program resource categories, including water supply reliability, ecosystem health, water quality, and levee system vulnerability. These existing facilities include numerous reservoirs upstream of the Delta, diversion facilities for local and export water use on the Sacramento and San Joaquin River systems, the Delta Cross-Channel, and the Delta export facilities of the SWP and CVP.

The following brief overview of operating criteria considerations applies to each of the three alternatives. Each alternative description later in this chapter includes information on operating criteria used in the analyses.

Operating Criteria

A variety of protective measures, implemented under authorities such as the State Water Resources Control Board Bay-Delta Water Quality Control Plan and the federal Endangered Species Act Biological Opinions for Winter-Run Salmon and Delta Smelt, govern operation of storage and conveyance facilities that affect the Bay-Delta system. Together, these protective measures are known as the Bay-Delta standards.

Bay-Delta standards are not static -- as the health of the Bay-Delta has declined over the past several decades and the demand for water supplies from the Bay-Delta system has grown, progressively more protective standards have been implemented. Existing Bay-Delta standards were developed to provide environmental and water quality protection with today's levels of demand for Bay-Delta water supplies in mind. The expected increases in demand for water over the next twenty to thirty years will undoubtedly trigger changes in standards to maintain adequate protections. If new storage and conveyance facilities were constructed as a component of the CALFED Bay-Delta Program, new protective measures would be implemented to address their operation.

Many factors could affect future conditions in the Delta, including population growth and land use changes, technological developments affecting water use and water treatment, advancements in scientific understanding of biological processes, introduction and incursion of exotic species in the Bay-Delta system, and ocean conditions for anadromous fish. All of these factors could affect the ultimate performance or the time required to achieve a high level of success of the integrated Bay-Delta Program elements under any alternative. Ultimately, the health of the Bay-Delta will drive changes in Bay-Delta standards.

CALFED recognizes the critical role of the regulatory framework in the overall "assurances" package associated with this program. Given the importance of the regulatory regime to parties on all sides, it is important to clarify that CALFED is not proposing changes to Bay-Delta standards. Assumptions for operating new storage and conveyance facilities considered in the Program alternatives were made only to aid in the evaluation of the alternatives – no specific changes in Bay-Delta standards are proposed or endorsed by CALFED agencies through this evaluation. As information is developed during the course of implementing the Program, this information will be provided to regulatory agencies for appropriate consideration. Changes in Bay-Delta standards will be made, if at all, by the appropriate agencies in accordance with applicable laws and consistent with any agreements in the CALFED assurances package.

In modeling the three alternatives described below, CALFED first evaluated operations using existing regulations, modified only to account for operations of the new storage and conveyance facilities considered in each alternative. Specific assumptions regarding operating criteria are included in the following descriptions of the Program alternatives. For analytical purposes only, and in recognition of the potential for changes in Bay-Delta standards over the term of the Program, CALFED performed a "sensitivity analysis" of the three alternatives with respect to hypothetical changes in the regulatory regime. This was not a formal "sensitivity analysis" in a technical sense, but was simply a rough consideration of how the modeled water supply results changed when applicable standards changed. These hypothetical changes were chosen in part for modeling simplicity, and are not intended to represent a consensus as to whether or how standards could be strengthened or relaxed in the future. For purposes of this sensitivity analysis, CALFED evaluated changes in two Bay-Delta standards that are generally recognized as the major regulatory "controls" on the operations of Delta export facilities – the "Export-Inflow Ratio" requirement and the Delta "X2" outflow requirement. Discussion of this sensitivity analysis, as it pertains to different aspects of alternative performance, is included as a sidebar in Chapter 4.

Additional details on operating assumptions *Modeling Assumptions and Results Appendix* to the Draft Programmatic EIS/EIR.

Existing System Conveyance Alternative (Alt. 1)

Ecosystem Restoration - The Ecosystem Restoration Program Plan, as discussed earlier, would be implemented with the following refinements:

- Changes in environmental water flows would be met through purchase of existing water from willing sellers and use of the new storage allocated to environmental water supplies.
- Aquatic habitat restoration identified for the south Delta area would be relocated to the northern and western Delta. This change would provide for intensive habitat restoration to be located prudently distant from the south Delta pumping facilities.
- Incorporate a portion of identified south Delta wildlife habitat with the setback levees along Old River.

Water Quality - The Water Quality Program, discussed earlier, would be implemented with the following refinements:

- Increased emphasis on control of Delta Island drainage will be necessary to achieve improvements in organic carbon concentrations in export water treated for drinking. Potential approaches include treatment and rerouting drainage.

Levee System Integrity - The Long-Term Levee Protection Plan would be implemented as described earlier.

Water Use Efficiency - The Water Use Efficiency Program would be implemented as described earlier.

Water Transfers Policy Framework - The Water Transfer Policy Framework would be implemented as described earlier.

Watershed Management Coordination - Watershed Management Coordination would be implemented as described earlier.

Storage Facilities - The ranges of storage included in Alternative 1 are as follows:

Sacramento Valley
- 0 to 3.0 MAF Surface Storage
- 0 to 250 TAF Groundwater Storage

San Joaquin Valley
- 0 to 500 TAF Surface Storage

- 0 to 500 TAF Groundwater Storage

In-Delta, Near-Delta, or off-aqueduct south of Delta
- 0 to 2.0 MAF Surface Storage

An option for extension of the Tehama-Colusa Canal could provide multiple benefits to the Program by providing conveyance to potential off-stream reservoir sites and serving water to areas currently supplied by the North Bay Aqueduct. This would allow elimination of the North Bay Aqueduct diversions in an area of sensitive habitat and providing the service area superior water quality compared to that from the current diversion. As with the extension of the Tehama-Colusa Canal, relocation of the North Bay Aqueduct diversion to another point on the Sacramento River provide ecosystem and water quality benefits. Relocation would allow elimination of the current North Bay Aqueduct diversions in an area of sensitive habitat and providing the service area superior water quality compared to that from the current diversion. These will be evaluated in Phase III of the Program.

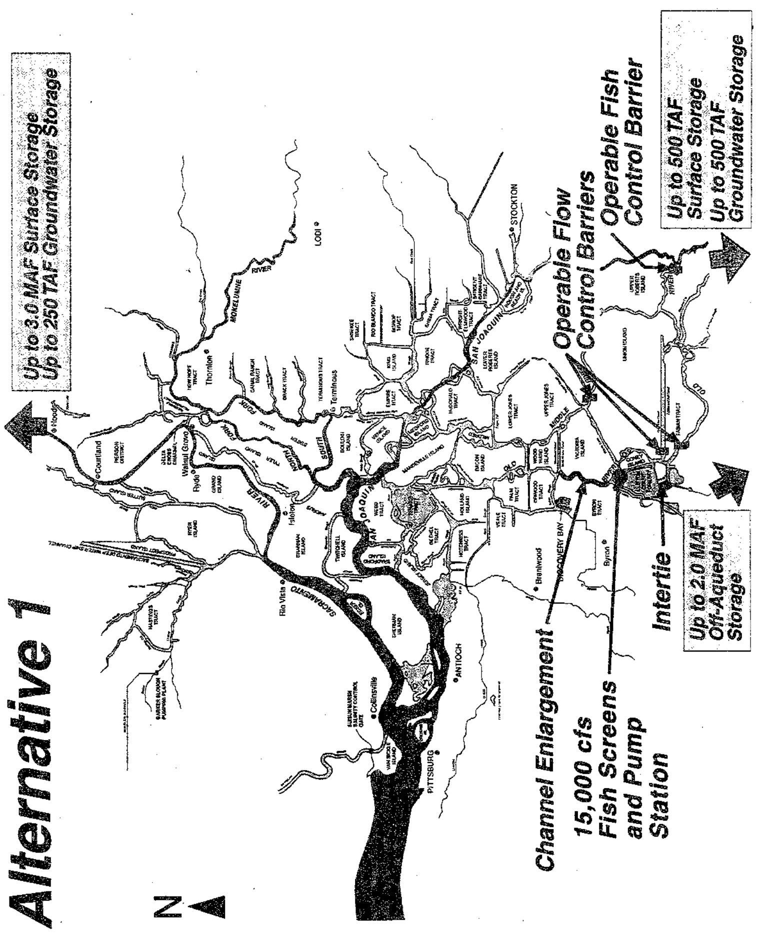
Delta Conveyance - Delta channels would remain in their existing configuration except that Old River would be enlarged in the reach north of Clifton Court to reduce channel velocities and associated scouring. These improved hydraulic conditions could enable the fish screen facility to operate more effectively.

South Delta Intake Facilities - A new 15,000 cfs screened intake with low lift pumps would be constructed at the head of Clifton Court and the SWP and CVP would be connected (intertied) to consolidate these intakes through a single screen facility.

Fish Protection and Flow Control Barriers - To overcome problems with misdirection of San Joaquin River fish, an operable fish control barrier would be constructed at the head of Old River, and operable flow control barriers or their equivalent would be constructed in south Delta channels to alleviate the problem with reduced water levels that would be caused by the fish control barrier and export operations. An alternative to barriers might be to develop overland supply to south Delta islands that were affected by water levels or water quality problems. Another might be a combination of barriers and overland supplies.

Operating Criteria - Existing Bay-Delta standards were used as a starting point to evaluate the performance of Alternative 1. Some additional assumptions were necessary to account for new facilities, as described below:

- Improvements in south Delta channels and the SWP and CVP export facilities would result in allowable use of full capacity of the SWP Delta export facility, Banks Pumping Plant, when all Bay-Delta standards are met.
- SWP export facilities may be used to deliver water to CVP users.
- Delta Cross-Channel gates are closed except for the months of July through October.



Alternative 1
N
Up to 3.0 MAF Surface Storage
Up to 250 TAF Groundwater Storage
Operable Flow Control Barriers
Operable Fish Control Barrier
Up to 500 TAF Surface Storage
Up to 500 TAF Groundwater Storage
Intertie
Up to 2.0 MAF Off-Aqueduct Storage
Channel Enlargement
15,000 cfs Fish Screens and Pump Station
STOCKTON
LODI
Thornton
Terminous
Courtland
Walnut Grove
Ryde
Isleton
Rio Vista
Collinsville
PITTSBURG
ANTIOCH
Brentwood
Byron
SACRAMENTO
RIVER
SAN JOAQUIN
MOKELUMNE
RIVER

Modified Though Delta Conveyance Alternative (Alt. 2)

Ecosystem Restoration -The Ecosystem Restoration Program Plan would be implemented with the following refinements:

- Changes in environmental water flows would be met through purchase of existing water from willing sellers and use of the new storage allocated to environmental water supplies.
- The modification of the Mokelumne River Floodway with setback levees, conversion of Bouldin Island to aquatic habitat, and construction of the East Delta Wetlands Habitat will create about 5,000 to 10,000 acres more habitat than identified in the ERPP.
- Incorporate a portion of identified south Delta wildlife habitat with the setback levees along Old River.

Water Quality - The Water Quality Program, discussed earlier, would be implemented with the following refinements:

- Evaluate relocating the water supply intake for North Bay Aqueduct to avoid salts and organic carbon that reduce the ability to recycle water, complicate disinfection, and are sources of disinfection byproducts. Alternative 2 would not, overall, result in improvement of North Bay Aqueduct export water quality, and a change of intake location would be necessary for North Bay Aqueduct water users to benefit from the Delta solution.
- Relocate Delta island drainage discharges away to channels other than those identified for conveyance modifications.

Levee System Integrity - The Long-Term Levee Protection Plan would be implemented as described earlier.

Water Use Efficiency -The Water Use Efficiency Program would be implemented as described earlier.

Water Transfers - The Water Transfer Policy Framework would be implemented as described earlier.

Watershed Management Coordination - Watershed Management Coordination would be implemented as described earlier.

Storage Facilities - Construction of storage facilities would be authorized on the Sacramento and San Joaquin River systems, in or near the Delta and off-aqueduct storage south of the Delta would be provided through this alternative. Storage would include both surface water impoundments and groundwater conjunctive use.

The ranges of storage included in Alternative 2 are as follows:

Sacramento Valley
- 0 to 3.0 MAF Surface Storage
- 0 to 250 TAF Groundwater Storage

San Joaquin Valley
- 0 to 500 TAF Surface Storage
- 0 to 500 TAF Groundwater Storage

In-Delta, Near-Delta, or off-aqueduct south of the Delta
- 0 to 2.0 MAF Surface Storage

As described for Alternative 1, an option for extension of the Tehama-Colusa Canal and/or relocation of the North Bay Aqueduct diversion to another point on the Sacramento River will be evaluated in Phase III of the Program.

Delta Conveyance Facilities - Draft Alternative 2 is based on Alternative 2B. Its major structural features include a screened intake on the Sacramento River near Hood. The capacity of this new diversion facility would be on the order of 10,000 cfs.

With this alternative, a new isolated channel would be constructed from Hood to McCormack Williamson Tract to preserve the existing warm water fishery habitat in Snodgrass Slough. A fish ladder or equivalent would be constructed to convey fish upstream past the pumps and screens to the Sacramento River. Consideration would be given to including turnouts to provide flow for Stone Lake Refuge and a Sacramento County groundwater conjunctive use operation. The McCormack Williamson Tract levee would be breached and the island flooded to provide shallow water habitat and improve water conveyance.

The Mokelumne River channel would be widened to improve water conveyance and flood control in the northern Delta. A 600-foot-wide alignment would be purchased along the Mokelumne River from I-5 to the San Joaquin River. Existing levees on one side of the existing channel would be replaced with new setback levees approximately 500 feet back from the existing channel. Existing levees would be removed where they obstruct the new channel with the remaining portions converted to channel islands. Existing improvements would be relocated or replaced where displaced by the widened channel. The new setback levees would be constructed in stages over several years. When the foundations of the new levees consolidate (over a 5+ year period), existing levees would be breached.

A new 15,000 cfs capacity screened intake with pumps would be constructed at the head of Clifton Court, and an interconnection of the CVP and SWP at Clifton Court would consolidate the project intakes through a single screen facility.

Old River would be enlarged in the reach north of Clifton Court to reduce channel velocities and associated scouring, and to enable the fish screen facility to operate more effectively.

An operable barrier would be provided at the head of Old River to maintain a positive flow down the San Joaquin River and keep San Joaquin River fish in the river channel. If needed, flow and stage control measures would be included on Middle River, Grant Line Canal, and Old River. Alternatives to these barriers will also be explored.

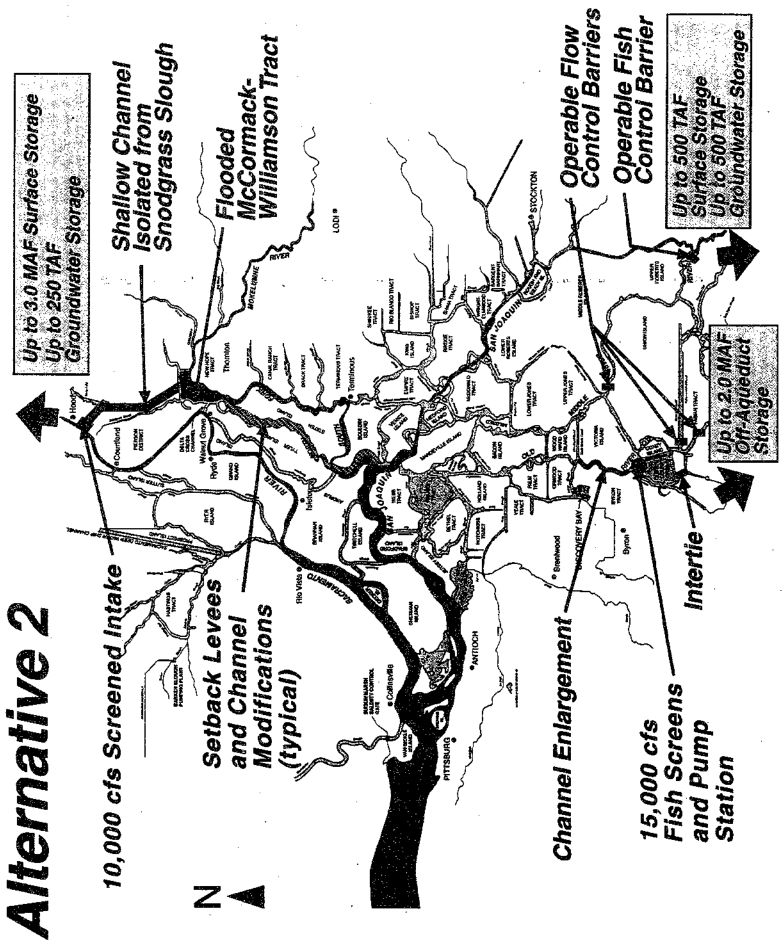
Discussion of Phase II Conveyance Options

The primary decision in refining a through-Delta alternative centers on the choice of which Mokelumne River channel to widen and use as the primary water conduit. As currently conceived, the North Fork would be the main conduit; however, it has also been suggested that the South Fork be used. Proponents of the South Fork option suggest that this choice would improve water quality and the ability to repel salinity intrusion from the Bay and ocean. The current concept of using the North Fork is based on the belief that the South Fork has important habitat value that would be lost if the channel was enlarged. This region of the Delta supports Swainson's Hawk, wintering waterfowl, greater sandhill cranes, and migrating shorebirds, which all rely on the region's large open expanses of rich agricultural lands for resting and foraging. Also, the South Fork would provide important opportunities for habitat enhancement as an element of the Ecosystem Restoration Program element. A final decision on this option will be made after further study during Phase III of the program, if Alternative 2 should become the preferred program alternative.

Operating Criteria - Existing Bay-Delta standards were used as a starting point to evaluate the performance of Alternative 2. Some additional assumptions were necessary to account for new facilities, as described below:

- Improvements in south Delta channels and the SWP and CVP export facilities would result in allowable use of full capacity of the SWP Delta export facility, Banks Pumping Plant, when all Bay-Delta standards are met.

- SWP export facilities may be used to deliver water to CVP users.
- Delta Cross-Channel gates are closed except for the months of July through October.


Alternative 2
N
10,000 cfs Screened Intake
Setback Levees and Channel Modifications (typical)
Channel Enlargement
15,000 cfs Fish Screens and Pump Station
Intertie
Up to 3.0 MAF Surface Storage
Up to 250 TAF Groundwater Storage
Shallow Channel Isolated from Snodgrass Slough
Flooded McCormack-Williamson Tract
Operable Flow Control Barriers
Operable Fish Control Barrier
Up to 500 TAF Surface Storage
Up to 500 TAF Groundwater Storage
Up to 2.0 MAF Off-Aqueduct Storage

Dual Delta Conveyance Alternative (Alt. 3)

Ecosystem Restoration -The Ecosystem Restoration Program Plan would be implemented with the following refinements:

- Changes in environmental water flows would be met through purchase of existing water from willing sellers and use of the new storage allocated to environmental water supplies.
- Habitat improvements along the North Fork Mokelumne River would be limited to establishing a riparian tree corridor associated with levees possibly set back for modified channel conveyance.
- Shallow water habitat identified for the Delta would be located in the eastern Delta by breaching select portions of the east levee along the South Fork Mokelumne River and protecting interior levee slopes.

Water Quality -The Water Quality Program, discussed earlier, would be implemented with the following refinements:

- Evaluate relocating water supply intakes (such as North Bay Aqueduct, Tracy, and Contra Costa Water District intakes) to avoid salts and organic carbon that reduce the ability to recycle water and that complicate disinfection and are sources of disinfection byproducts.
- Actions to reduce contributions of organic carbon from Delta islands through treatment or drainage rerouting may be unnecessary.

Levee System Integrity - The Long-Term Levee Protection Plan would be implemented as described earlier.

Water Use Efficiency -The Water Use Efficiency Program would be implemented as described earlier.

Water Transfers - The Water Transfer Policy Framework would be implemented as described earlier.

Watershed Management Coordination -Watershed Management Coordination would be implemented as described earlier.

Storage Facilities - The ranges of storage included in Alternative 3 are as follows:

Sacramento Valley
- 0 to 3.0 MAF Surface Storage
- 0 to 250 TAF Groundwater Storage

San Joaquin Valley
- 0 to 500 TAF Surface Storage
- 0 to 500 TAF Groundwater Storage

In-Delta, Near-Delta, or off-Aqueduct south of Delta
- 0 to 2.0 MAF Surface Storage

Delta Conveyance Facilities - Under this alternative, an isolated facility of 10,000 ± 2,000 cfs capacity would be constructed. An open channel is recommended over a pipeline because the two appear to have similar degrees of environmental impacts and a pipeline will not significantly improve insurance against future increases in diversion capacity. Though a pipeline would effectively prevent accidental contamination over the reach of the pipeline, its cost would be much higher. (Note: A pipeline was originally considered for a 5,000 cfs conveyance; a pipeline for a 10,000 ± 2,000 cfs capacity is considered impractical from a construction and cost viewpoint.)

The intake to the isolated facility would be in the Freeport-Hood vicinity, and may include dual points of intake. The intake(s) would be screened. The isolated facility would be placed along the eastern side of the Delta and connected to Clifton Court.

Operation of an isolated facility can be expected to cause salinity of the central and south Delta waters to increase. Accordingly potential connection of south Delta islands could eliminate the need for the south Delta flow and stage barriers and would significantly improve water quality. Potential connection of Contra Costa and Tracy would significantly improve water quality. Potential connection of portions of San Joaquin County to the new canal would provide a new source of high quality water and significantly improve water supply reliability to this area of current groundwater overdraft. The feasibility of including these options will be evaluated during Phase III of Program.

A new 5,000 ± 2,000 cfs screened intake with pumps would be constructed at the head of Clifton Court, its size determined by the size of the isolated facility and the manner in which the dual facilities would be operated. Enlargement of Old River north of Clifton Court or enlargement of other channels may or may not be needed, depending on the amount of flow to be exported through the south Delta. The same is true of the fish and flow control barriers.

COMPARISON OF OPEN CHANNEL AND PIPELINE OPTIONS FOR ISOLATED FACILITY

Conveyance Types and Environmental Impacts - The 44-mile canal would generally consist of a trapezoidal section with gentle side slopes and a top width of around 600 feet and a depth 27 feet. The pipeline facility would consist of side-by-side buried concrete pipelines. The total distance of the pipeline route disturbed acreage is approximately the same as the canal alignment. The construction activities to bury the pipeline would disturb similar acreage as the canal. However, the buried pipelines would allow easier terrestrial access from one side of the alignment to the other.

Pumping Plants - Pumping plants would lift up to 10,000 ± 2,000 cfs into the conveyance facility. An open channel would utilize a single low operating head (10 feet) pumping plant and the pipeline would require a pumping plant with operating head of 150 feet. The increased operating lift would substantially increase operating and energy cost from around $2 million per year for the canal option to around $24 million per year (based on a power rate of 40 mills) for the pipeline option. Given that the site acreage for the two pumping plants are about the same there would little differences in environmental impacts between the two plants.

Water Crossings - In order to convey water across rivers and sloughs, the open canal would require 11 inverted siphons. The siphons would cross under four major rivers and seven sloughs. The pressurize buried pipeline would cross under the same waterways. The environmental impacts of these crossings would be similar for both alternatives.

Bridge and Utility Relocations - For the open canal, bridges would be constructed over the canal for all county roads, state highways, and railroad crossings. The pipeline will cross under the same facilities. The construction impacts of the two methods would be similar; however, the elevated bridges across the canal would have more visual impact than the buried pipeline.

Water Quality Protection - The buried pipeline is less vulnerable than an open canal to introduction of pollutants, such as those introduced by spills, storm water and agricultural runoff, and sabotage. Given that there is many miles of open water above the intake and miles of open water from the pipelines exit into Clifton Court Forebay to the point of use, the added benefit of this protection appears minor.

Safety - Both facilities would be designed to current safety standards and the safety components included in the project cost. There would be substantially less safety measures needed along the route of the buried pipeline than the open canal.

Seepage Protection - There would be insignificant, if any, seepage from the pipeline. Monitoring wells along the route of the canal would be installed to identify areas that may have excess and facilities such as seepage interception wells would be installed to protect adjacent lands from seepage problems.

Seismic - Both the canal and the pipeline would be designed to the California design code for seismicity. The cost for design and construction for seismicity are included in the cost estimate.

Right-of-Way - The right-of-way width for both conveyance methods is similar.

Costs Comparison - Preliminary capital cost for the canal conveyance is around $1.4 Billion. The pipeline conveyance would be about $2.4 Billion. In addition, the pipeline energy requirement is $22 Million more per year that the canal.

Comparing the 1982 Peripheral Canal and CALFED Alternative 3

CALFED Alternative 3 includes dual Delta conveyance, using modified Delta channels and an isolated facility to convey water from the Sacramento River to the SWP and CVP pumping plants in the south Delta. How does this alternative compare to the 1982 proposal for a peripheral canal? Both include a new facility to move water around the eastern edge of the Delta, but that's where the similarity ends. The main differences include the scope of the programs, conveyance capacity and method, strategy to maintain in-Delta water quality, and impacts on local resources.

A big difference between the old peripheral canal and any of the CALFED alternatives is their scope. Each of the CALFED alternatives offers a comprehensive program to solve problems in the Bay-Delta system related to water supply reliability, water quality, ecosystem quality, and levee system integrity, with flood control improvements integrated with ecosystem restoration in both the north and south Delta. The peripheral canal was primarily intended to increase water project exports and reduce fish entrainment caused by these exports.

The old peripheral canal had a proposed capacity of 23,000 cfs. Among the variations of Alternative 3, only 3e approaches this magnitude of isolated conveyance with a 15,000 cfs diversion on the Sacramento River. The main benefits of the isolated facility in Alternative 3 are improvement in export water quality and a reduction in fish entrainment caused by Delta exports, rather than an increase in export water supply.

The CALFED alternatives would improve water quality with a broad range of actions that emphasize point and non-point source control. The through-Delta conveyance included in Alternative 3 would help maintain in-Delta water quality, although salinity levels would increase in some areas. The peripheral canal included a feature to discharge Sacramento River water from the canal into Delta channels to improve in-Delta water quality. This feature is not included in Alternative 3 because these releases could cause anadromous fish to stray from the Sacramento River into the Delta, a very serious environmental impact.

A final difference between CALFED's Alternative 3 and the old peripheral canal is the impact on local resources related to the way any new canal would cross existing Delta streams and channels. Construction of the peripheral canal would have blocked several existing waterways in the eastern Delta. This could have caused local drainage problems during high flows, and would have separated valuable habitat in the eastern Delta from the rest of the Delta ecosystem. Alternative 3 would prevent local drainage problems and maintain the connection of the aquatic ecosystem by using siphons to carry water in the isolated facility underneath existing Delta channels.

Fish Protection and Flow Control Barriers - Operable barriers would be installed if necessary at the head of Old River and elsewhere in the southern Delta to improve fish migration pathways and to reduce the salinity of south Delta water and raise water levels. Whether these barriers will prove necessary depends on how much and when export pumping is continued from the south Delta. During Phase III of the process, studies would be conducted to determine the need to supply good quality water to south Delta islands to mitigate any adverse effects resulting from implementing this alternative. Studies must also be conducted to determine the necessity of relocating the points of diversion to Contra Costa County to mitigate any negative water quality effects of implementing this alternative on that agency.

Operating Criteria - Existing Bay-Delta standards were used as a starting point to evaluate the performance of Alternative 3. Some additional assumptions were necessary to account for new facilities, as described below:

- Improvements in south Delta channels and the SWP and CVP export facilities would result in allowable use of full capacity of the SWP Delta export facility, Banks Pumping Plant, when all Bay-Delta standards are met.

- SWP export facilities may be used to deliver water to CVP users.

- Delta Cross-Channel gates are closed except for the months of July and August October.

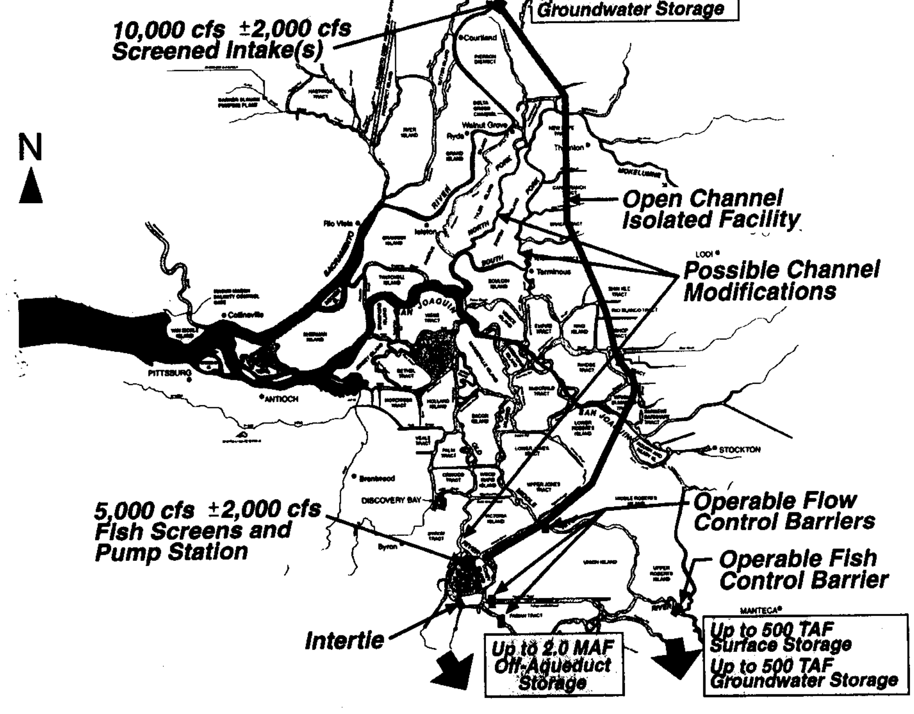
- SWP and CVP diversions through the isolated conveyance facility are not subject to E-I ratio restrictions, but total project exports, including isolated conveyance facility diversions, are limited to 5,000 cfs in May.

- A minimum export of 1,000 cfs is required from south Delta SWP and CVP facilities during July through March to provide for in-Delta water quality, while no diversions from south Delta facilities are allowed April through June to protect fisheries.

- After minimum south Delta diversions are met (1,000 cfs July through March, zero cfs April through June), diversions through the isolated conveyance facility must be maximized before any additional exports are made from south Delta facilities.

- The minimum flow requirement for the Sacramento River at Rio Vista for July and August is 3,000 cfs.

Alternative 3



4. ALTERNATIVES EVALUATION

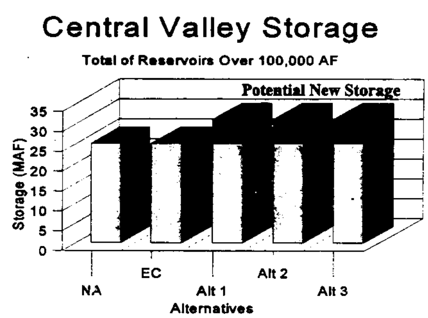
The evaluations in this chapter focus exclusively on the characteristics that vary between alternatives. For that reason, the potential beneficial effects of the common program elements (the ecosystem restoration program, water quality program, water use efficiency program, levee protection plan, water transfer policy framework, and watershed management coordination) are not reflected in this discussion. Although this focus is probably unavoidable given the need to contrast the variable aspects of the alternatives, the reader should bear in mind that a significant part of the overall performance of the CALFED Bay-Delta Program is attributable to the common program elements.

Applying the distinguishing characteristics to the alternatives required a significant amount of analytical work. Details of the modeling work are provided in the *Summary of Modeling Assumptions and Results Appendix* to the Draft Programmatic EIS/EIR.

Significance of Distinguishing Characteristics

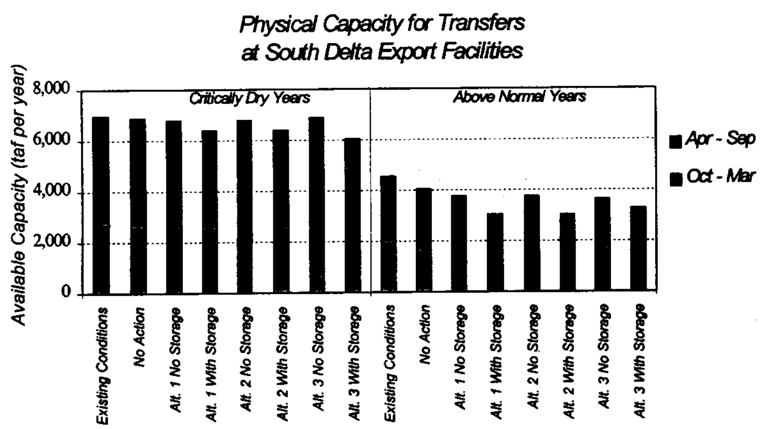
Of the 18 characteristics originally identified as distinguishing among the alternatives, some were found not to vary greatly between the alternatives. These included:

Storage and Release of Water - Storage of water in Program facilities will take place during the winter periods of high river flows when potential adverse effects on the environment are at a minimum. Release of the water for environmental uses will take place during lower flows when they provide the most benefit. Release of water for other uses will generally take place during lower flow periods when the additional flows can provide some indirect benefits to instream flows. The amount of water stored and released through any potential Program storage facilities is relatively small compared with other ongoing flow. In addition, proposed storage ranges from zero to 6 MAF in all three alternatives. Accordingly, the overall effects of the storage and release is very similar between the alternatives.



Water Transfer Opportunities

Preliminary evaluations indicate that under each alternative, physical capacity exists in SWP and CVP export facilities to accommodate well over 2 MAF of water transfers in all year types. As the following figure illustrates, much more available capacity exists in these facilities in drier years than in wetter years, since less project water is generally moved through these facilities in drier years. The figure also shows that more capacity for transfers exists in alternatives without new storage compared to alternatives with new storage. This results from an assumption that new storage would provide additional water to SWP and CVP water users, and that this water would receive higher priority of use of available conveyance capacity. Institutional arrangements could be implemented to change the priority of use of export facilities to increase conveyance capacity available for transfer water.



The chart shows physical capacity for transfers for two periods of the year.

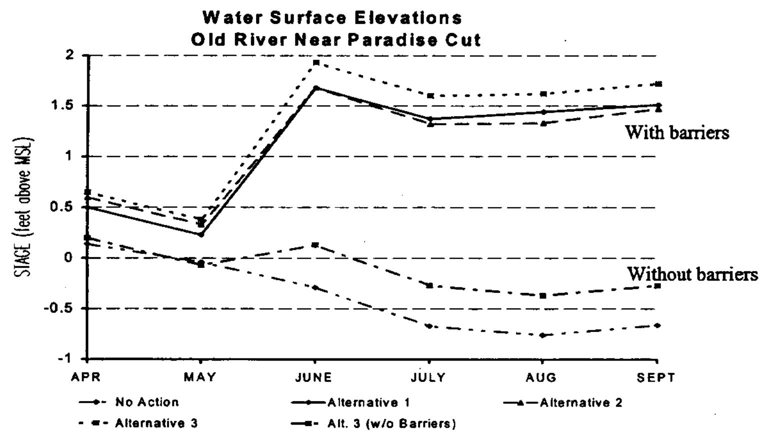
Physical capacity of the export facilities can only be used when exports are allowable under Bay-Delta standards. Preliminary evaluations indicate that under operating criteria based on existing standards (described previously), the ability to export transfer water does not vary significantly between the alternatives. Under these operating criteria, at least 600 TAF per year of transfer water could be exported from the Delta during critically dry years under each alternative.

Transfer Opportunities Vary with Operational Criteria

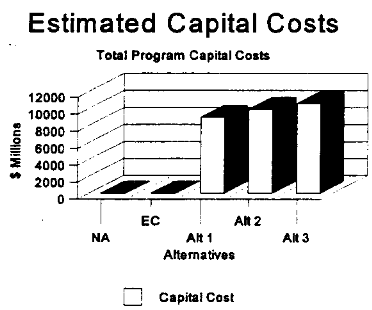
A sensitivity analysis on export-inflow ratio requirements (described later under Water Supply Opportunities) indicates that if more protective E-I ratios are necessary to provide adequate protection to fisheries, the flexibility to export transfer water from the Delta would be significantly diminished under Alternatives 1 and 2.

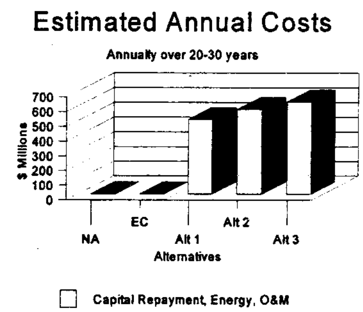
It must be kept in mind that there are many other policy and technical considerations that will affect water transfer opportunities. In particular, water transfer policy must include strong mechanisms to avoid or mitigate impacts to third parties and groundwater resources. These essential aspects of a CALFED water transfer policy will place similar limitations on water transfer opportunities for all the alternatives.

South Delta Access to Water - Delta Simulation Modeling indicated that in-Delta flow barriers or functional equivalent would be effective in raising south Delta water levels, essentially independent of the selection of an alternative. The chart below shows that Alternative 3 (with or without the barriers) results in slightly higher stages than the other alternatives.

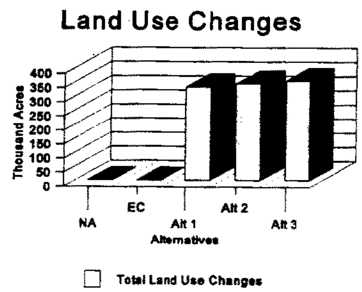


Total Cost - There are relatively minor differences in cost among the alternatives. The total cost differential among the alternatives is on the order of $1.5 billion, whereas total program cost will be on the order of $10 billion including the upper range (6 MAF) of storage analyzed. The left chart below shows that total Program capital costs range from about $9 billion to $10.5 billion including the common program elements, storage, and conveyance. Approximately $4 billion of this cost is for the common program elements. Approximately $5 billion of this cost is for storage if included. Annual investment is a critical issue for each alternative. The right chart below shows annual costs including capital repayment, energy and operation and maintenance of about $500 to $600 million.





Habitat Impacts - Alternative 1 would have lower construction impacts than would Alternatives 2 and 3 because, except for storage, only minimal construction would occur. The construction impacts of Alternatives 2 and 3 would be dwarfed by land conversions for habitat improvement that would be constructed as part of the common programs in all alternatives. For example, channel modifications and setback levees could be constructed to provide significant additional channel island habitat composed of old levees, and shallow water habitat over and above that included in the ERP. The impacts on habitat will probably be similar overall for the three alternatives. Also, considering that the magnitude of land use changes (see the next distinguishing characteristic) are basically the same for each alternative, habitat impacts would also be similar between the alternatives.



Land Use Changes - There are relatively minor differences in the acres of land use changes required among the alternatives. Ecosystem restoration will require up to 200,000 acres of change in each alternative. Some of this is already in government ownership but most is agricultural land in private ownership. Levee changes could require up to 35,000 acres in each alternative. Water quality actions could affect approximately 40,000 acres. Storage could affect approximately 60,000 acres in each alternative. Conveyance could impact approximately 5,000 acres more land in Alternative 3 than Alternatives 1 and 2. Land use change is not, therefore, a major distinguishing characteristic between the alternatives.

Socio-Economic Impacts - The choice among alternatives will not significantly change socio-economic impacts. Most such impacts will be a result of economic displacement from land and water use changes from water transfers, water conservation, water reclamation, land retirement for water quality improvement, and land use change for habitat enhancements. These features are included in all three alternatives.

Ability to Phase Facilities - Each alternative includes hundreds of programmatic actions that could be implemented over 20 to 30 years. Alternative 3 has more physical features than Alternative 2 which, in turn, has more features than Alternative 1. Therefore, Alternatives 2 and 3 could have more complex phasing (staging) plans than for Alternative 1. However, each alternative provides ample opportunity for staging over the implementation period.

Brackish Water Habitat - This characteristic refers to the capability of the alternatives to control salinity intrusion into the Delta from the Bay and ocean and, thereby, to maintain important brackish water habitat in the Western Delta and Suisun Bay. An indicator of the location of this brackish water habitat is the location of 2,000 parts per million total dissolved solids or X2 (measured in kilometers upstream from the Golden Gate Bridge). Hence, X2 is currently used as the primary indicator in managing Delta outflows.

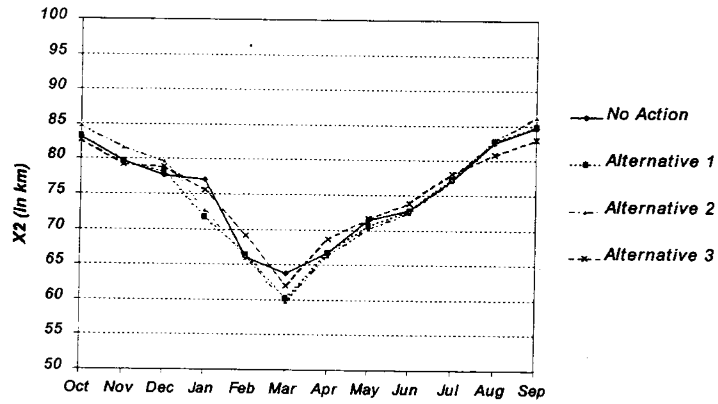
The X2 indicator is used to reflect a variety of biological consequences related to the magnitude of fresh water flowing downstream through the estuary and the upstream flow of salt water in the lower portion of the estuary. The outflow that determines the location of X2 also affects both the downstream transport of organisms such as delta smelt and striped bass, and the upstream transport of others such as bay shrimp and Dungeness crabs. The abundance of some species is positively related to the magnitude of downstream flow during the late winter and spring. These include bay shrimp, longfin smelt and starry flounder. The evidence of such relationships led to the existing standards concerning X2. Many people believe that this evidence indicates that reduced freshwater flows in the estuary resulting from consumption of water in the basin and exports from the basin have degraded habitat quality for aquatic resources.

Existing Bay-Delta standards set minimum Delta outflow by requiring X2 to be maintained at set locations for set time periods during the months of February through June. Delta simulation modeling for the 1975 through 1991 period indicates the average difference in location of X2 for November through June between no-action and Alternative 3 with new storage (the Program alternative with the greatest effect on X2 position) is about 1.1 km. For dry and critical years during the 1975 through 1991 period, the average difference in location of X2 for November through June between no-action and Alternative 3 with storage is about 2.4 km. The charts on the following page show the average monthly X2 position for no-action and the three Program alternatives with storage for both the full 1975 through 1991 period and the dry and critical years of the same period.

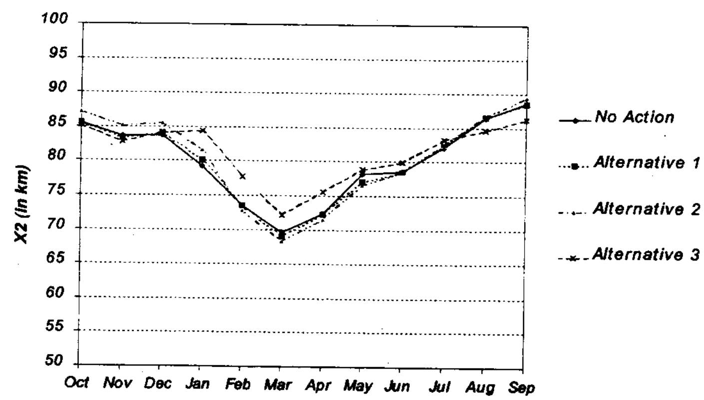
Comparing Alternative 3 to no-action, average X2 increases by as much as 5.1 km during the month of January and decreases by about 2.5 km in the month of September. This result is due to operating assumptions and modeling simplifications associated with the isolated conveyance facility. Changes in operating assumptions could shift exports under Alternative 3 from winter and spring months to summer and fall months and maintain compliance with assumed operating rules, if that type of operation was deemed more favorable for achieving Program objectives. This change in operation would result in X2 positions similar to those displayed for Alternatives 1 and 2.

Given this potential for changes in operating assumptions under Alternative 3, the expected variation in the salinity gradient among the Program alternatives would be so small that any biological consequences are expected to be minimal.

Average X2 Position under Program Alternatives
Water Years 1975-91 (All Years)



Average X2 Position under Program Alternatives
Water Years 1975-91 (Dry and Critical Years Only)



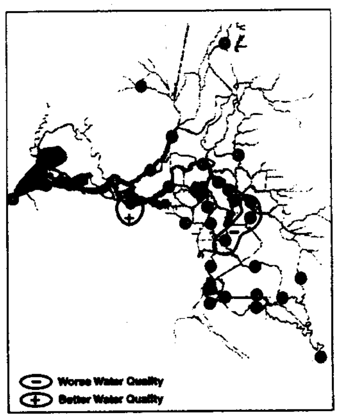
Most Significant Distinguishing Characteristics

The remaining characteristics were found to distinguish the alternatives:

In-Delta Water Quality

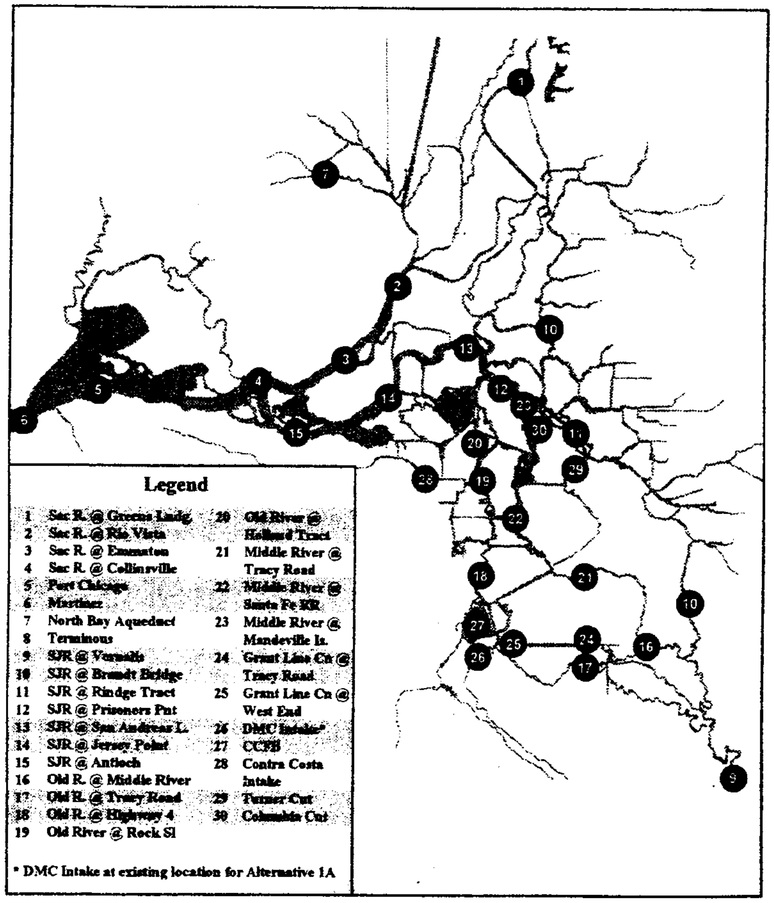
The Delta Simulation Model provides estimates of salinity at many locations throughout the Delta (see following page for locations). Changes in salinity for the alternatives are shown on the following charts as changes in electrical conductivity (EC). Areas with improved water quality (reduced salinity) are shown with a "+" symbol and areas with reduced water quality (increased salinity) are shown with "-" symbol. These EC estimates are based on an average of estimates for the years 1975 through 1991. For this evaluation, the upper end of the range of new storage facilities described in Chapter 3 was included in the simulated operations for each Program alternative.

Alternative 1- Changes in Salinity from No Action Alternative

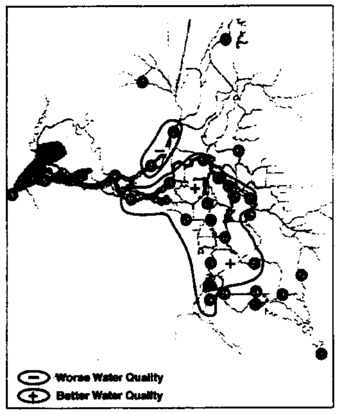


Note: In these figures "+" means better water quality and reduced salinity measured by electrical conductivity (EC); "-" means worse water quality.

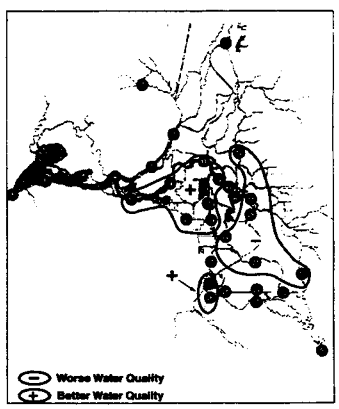
Model Output Locations for Monthly Average Electrical Conductivity



Alternative 2- Changes in Salinity from No Action Alternative

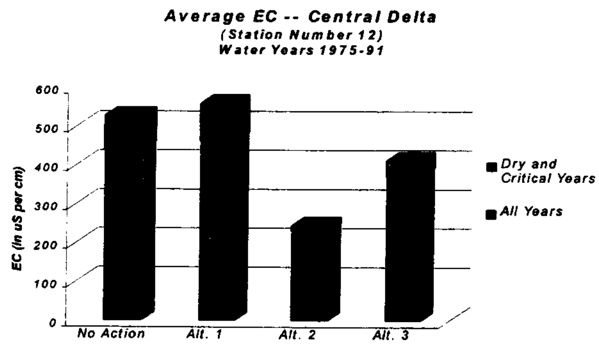


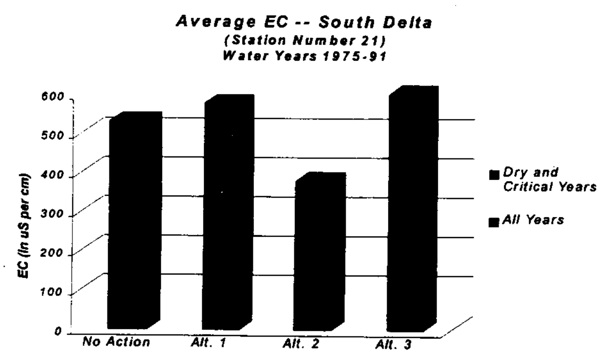
Alternative 3 - Changes in Salinity from No Action Alternative

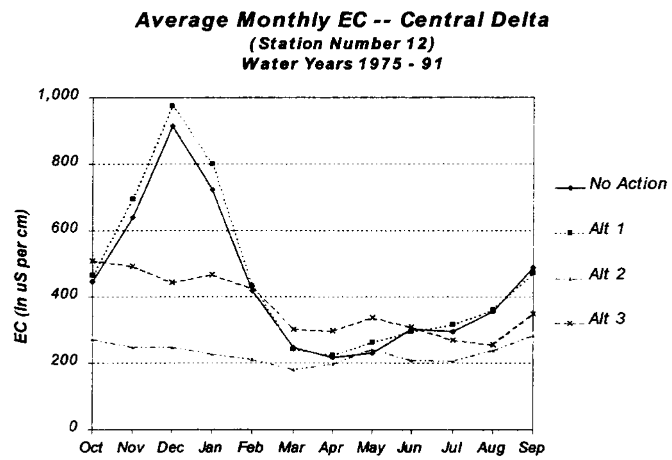


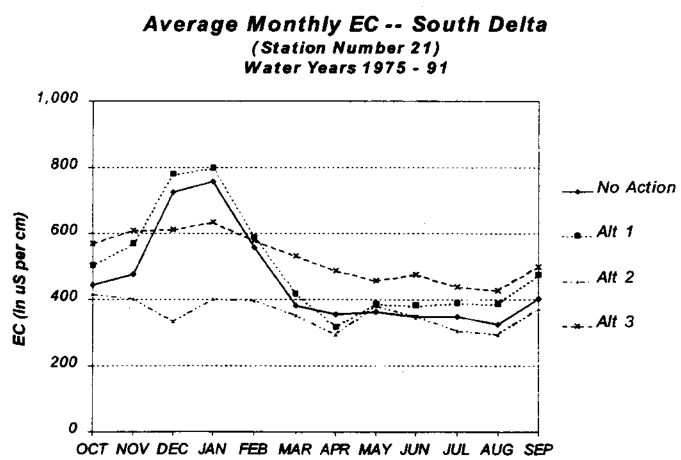
The preceding figures depict the in-Delta salinity consequences of implementing the alternatives, based on model studies. The modeling results indicate implementation of Alternative 1 would have minimal effects on in-Delta salinity. Alternative 2 would improve (reduce) salinity by up to about 45% at some locations in the north and central Delta, while Alternative 3 would result in better conditions in the central Delta, but would reduce quality (increase salinity) by up to 80% percent in the eastern Delta.

The following bar graphs show average EC at two Delta locations. Monthly variations of EC are shown in the graphs located below the average bar graphs. Alternative 2 generally provides better in-Delta water quality.





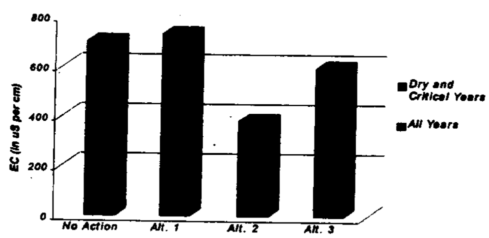

Average Monthly EC -- Central Delta
(Station Number 12)
Water Years 1975 - 91
1,000
800
600
400
200
0
EC (In uS per cm)
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
No Action
Alt 1
Alt 2
Alt 3


Average Monthly EC -- South Delta
(Station Number 21)
Water Years 1975 - 91
1,000
800
600
400
200
0
EC (In uS per cm)
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP
No Action
Alt 1
Alt 2
Alt 3

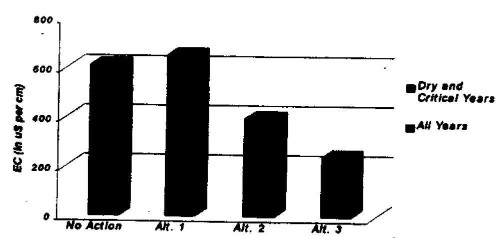
Export Water Quality

Salinity of waters diverted from the Delta would not significantly change if Alternative 1 were implemented. Alternative 2 would reduce salinity (electrical conductivity) by about 40 percent for Contra Costa Water District, while reducing salinity of State Water Project and Central Valley Project exports by about 30 and 35 percent, respectively. Alternative 3 would reduce salinity at the Contra Costa intake by about 10 percent, and would reduce salinity of SWP and CVP exports by about 55 and 60 percent, respectively.

Average EC -- Contra Costa Intake
Water Years 1975-91



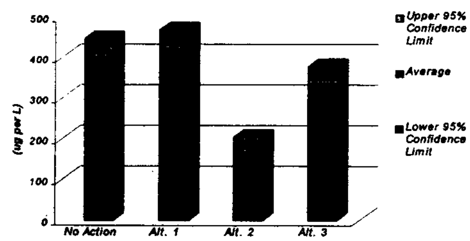
Average EC -- Clifton Court
Water Years 1975-91



Two important characteristics of drinking water supplies taken from the Delta are organic carbon and bromide. Organic carbon in the system comes primarily from decomposition of plant materials, a major source of which is discharge from organically rich peat soils on Delta islands. Bromide in Delta waters comes primarily from the ocean due to salinity intrusion. Organic carbon and bromide form unwanted and potentially harmful chemicals when water is disinfected with chlorine during drinking water treatment.

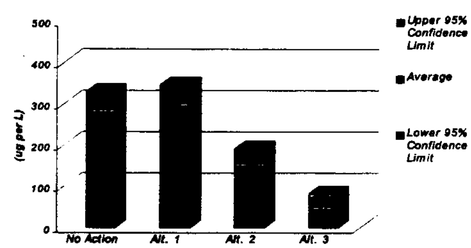
No reliable quantitative estimates have been made of the effect of the alternatives on organic carbon concentrations in export waters, although modeling efforts are underway. For programmatic planning purposes, it may be appropriate to assume organic carbon concentrations will be proportional to salinity concentrations in exports, reflecting varying influence of Sacramento River water which is lower both in salinity and organic carbon than are waters of the Delta and of the San Joaquin River.

Predicted Bromide at Rock Slough



Bromide concentrations at the Contra Costa intake with Alternative 1 would not change significantly as compared to the No Action Alternative. Alternatives 2 and 3 would reduce average bromide concentrations at that location by about 60 percent and 15 percent, respectively. Bromide concentrations at the combined south Delta point of intake to the SWP and CVP facilities would not change significantly for Alternative 1. Alternatives 2 and 3 would decrease bromide by an average of about 45 percent and 85 percent, respectively. There are substantial technical uncertainties about the implications of organic carbon and bromide for drinking water supplies taken from the Delta. These are addressed in more detail in Chapter 5.

Predicted Bromide at Clifton Court



Diversion Effects on Fisheries

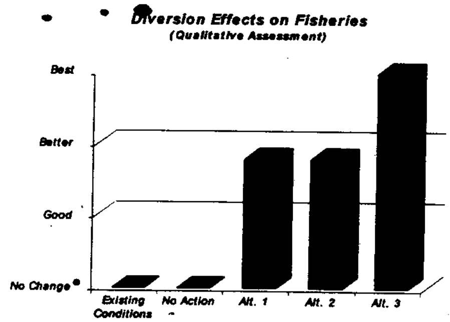
Currently, diversions at the CVP and SWP export pumps in the south Delta capture and destroy many fish. Also, adverse flow patterns induced by the diversions have the capacity to disrupt fish movement and affect reproductive success of Delta fishes. Fish mortality from the current system is high due in large measure to predation and to a lesser extent to the need to capture, sort, and transport fish from the fish screens at project pumps to elsewhere in the Delta.

> **Alternative 1** would continue diversions in the south Delta similar to existing conditions. However, it would tend to increase existing adverse entrainment effects of the SWP and CVP, due to an increase in exports over No Action and existing conditions.
>
> **Alternative 2** would improve Delta flow patterns, and new fish screens at Hood on the Sacramento River could reduce the numbers of fish moved into the central Delta. However, Alternative 2 requires diversions to be continued from the south Delta at the same level as Alternative 1, with associated capture and trucking. Net flows in the lower Sacramento River below the diversion would be reduced. In addition net flows west of the Mokelumne River limit the exposure of the young of fishes such as delta smelt and striped bass to the south Delta diversions and from opening the Delta Cross Channel less frequently. Once chinook salmon smolts migrating out of the San Joaquin system reach the Mokelumne, they would receive some benefit from improved net flows. An overriding consideration for them would be that water flowing out of the San Joaquin would continue going to the SWP/CVP export pumps under most circumstances, unless continued or greater export curtailments were implemented to provide some degree of protection. The benefits of Alternative 2 would be offset by the risks associated with the upstream passage of adult fish through the channel from Hood to the Mokelumne River . While CALFED believes measures can be found to provide adequate passage, difficulties have occurred elsewhere in providing adequate upstream passage for multiple species.
>
> **Alternative 3** would improve south and central Delta flow patterns, and new fish screens at Hood on the Sacramento River will reduce the numbers of fish moved into the central Delta. However, effects to northern Delta areas are unknown. Net flows in the lower Sacramento River below the point of diversion would be reduced. Like Alternative 2, bypass flows will exist in the river, so the screened fish will not have to be handled and trucked to another location for release. Fish using the Delta as a spawning and nursery area will not be exposed to the diversion. Like the other alternatives, Alternative 3 would include some negative consequences associated with the increase in exports in relation to No Action conditions and existing conditions, but would include a large benefit associated with the 80% reduction in exports from the south Delta. While the remaining 20% of exports from the south Delta would continue some adverse impacts, major reductions in conflicts between water exports and the protection of fishes would be expected. Major beneficiaries are those fisheries using the San Joaquin Delta as a spawning and nursery area and chinook salmon smolts migrating from the San Joaquin

River. The species residing in the San Joaquin Delta and receiving major benefit include delta smelt, splittail, striped bass and white catfish.

The three CALFED alternatives would affect diversion losses for Sacramento River salmon. Presently, salmon smolts diverted from the Sacramento River into the San Joaquin Delta through either the Delta Cross Channel or Georgiana Slough survive at a rate only 1/3 to 1/2 of those remaining in the Sacramento River. A substantial amount of this negative impact is presently avoided by keeping the Delta Cross Channel closed during salmon migrations, except when negative water quality consequences in the San Joaquin are too great and require opening the Cross Channel. However, the greater exports under Alternative 1 would increase conflicts with San Joaquin water quality and likely result in the Cross Channel being open more frequently.

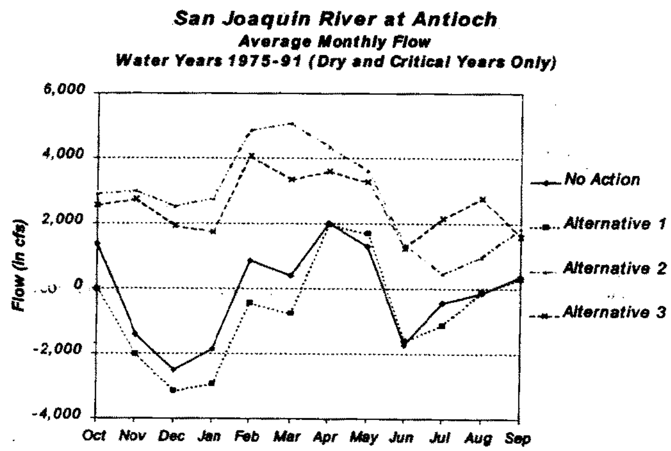
Many fishery experts agree that Alternative 3 will have more positive effect on fisheries than Alternatives 1 and 2. The judgement of the experts is that there is little overall difference between Alternatives 1 and 2. There is considerable disagreement about the effects of diversions on population abundance. The implication of diversion effects is addressed in more detail in Chapter 5.

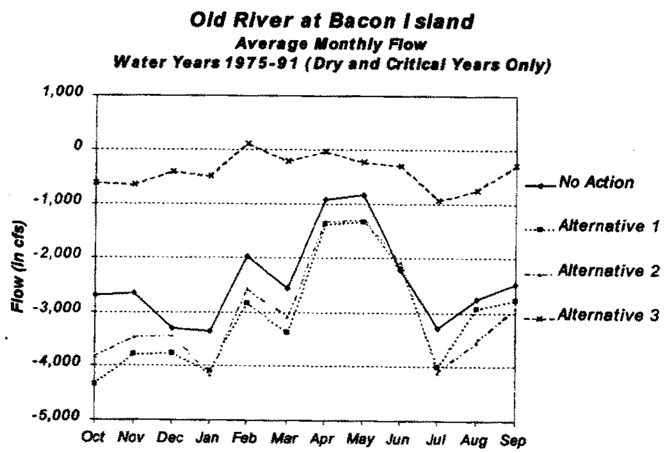


Delta Flow Circulation

In the Delta, the normal ecological flow conditions have been changed primarily by the SWP/CVP pumps being located in the south Delta and the majority of water exported by them coming from the Sacramento River. The result is that the magnitude of flood tides often exceed the magnitude of ebb tides causing a net upstream flow throughout much of the Delta. The result is that many fish and aquatic invertebrates do not have the flow conditions they have evolved to rely on and suffer various adverse consequences.

The following figures compare average monthly flows for the dry and critical years of the period of 1975 through 1991 for each alternative. Flows at two Delta locations are displayed, San Joaquin River at Antioch in the west Delta and Old River at Bacon Island in the southwest Delta. In both locations, the average monthly flows under Alternative 1 are more negative than under no action and Alternatives 2 and 3 for most months. Both Alternatives 2 and 3 have positive average flow conditions throughout the year in the San Joaquin River at Antioch. Only Alternative 3 has near-positive flow conditions in Old River at Bacon Island.


San Joaquin River at Antioch
Average Monthly Flow
Water Years 1975-91 (Dry and Critical Years Only)
6,000
4,000
2,000
0
-2,000
-4,000
Flow (in cfs)
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
No Action
Alternative 1
Alternative 2
Alternative 3

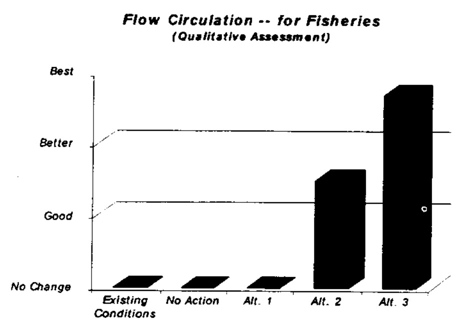

Old River at Bacon Island
Average Monthly Flow
Water Years 1975-91 (Dry and Critical Years Only)
1,000
0
-1,000
-2,000
-3,000
-4,000
-5,000
Flow (in cfs)
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep
No Action
Alternative 1
Alternative 2
Alternative 3

Under **Alternative 1**, the existing pattern of upstream net flows will continue, accentuated a little by the increase in exports. Some of the species specific consequences will be:

- Young delta smelt and striped bass spawned in the San Joaquin Delta or transported into it through the Delta Cross Channel or Georgiana Slough will have difficulty getting to their primary nursery area in Suisun Bay.
- Young salmon migrating out of the San Joaquin system will have difficulty finding their way through the San Joaquin Delta.
- Adult salmon migrating to the San Joaquin system in the fall will find little or no home stream water to guide them until they reach the reach the eastern Delta.
- Adult salmon migrating to the Sacramento system will more frequently migrate via the San Joaquin Delta.

Under **Alternative 2**, considerably better conditions will exist, as normal net downstream conditions will be restored downstream of the Mokelumne River in the San Joaquin River, although of a magnitude typically less than that which occurred historically. The principal beneficiaries will be delta smelt and striped bass. This benefit will be achieved at some environmental cost, due to reduced flows in the Sacramento River below Hood. Such reduced flows will likely reduce the survival of young chinook salmon and striped bass traveling down the river. Maintenance of minimum flows at Rio Vista should avoid significant adverse consequences. As in Alternative 1, outmigrating San Joaquin salmon smolts will still have difficulty finding their way through the southern Delta, and adult salmon migrating to the San Joaquin system in the fall will find little home stream water to guide them until they reach the eastern Delta.

Under **Alternative 3**, net downstream flows will be restored throughout most of the Delta. The concern over reduced flows in the Sacramento River below Hood will be identical to Alternative 2, as the magnitude of the diversion at Hood will be similar. Continuing exports from the south Delta may cause some reverse flows, but effects should be small in relation to the present situation. Each of the adverse species specific effects enumerated for Alternative 1 should be alleviated.



The overall qualitative assessment of fishery experts is that Alternative 3 performs better than Alternatives 1 and 2. However, there are many unknowns that influence the technical analysis:

- Use of monthly time steps in modeling does not reflect the Delta condition
- There is no way to assess the effects of in-Delta diversions
- There is influence by both tide and fresh water inflows

These issues will be considered in adaptive management strategies.

Water Supply Opportunities

To evaluate water supply opportunities, CALFED used the system operation model, DWRSIM. Using this model, the operation of existing and proposed storage and conveyance facilities is simulated using a hydrologic record from the years 1922 through 1994. DWRSIM may be used to project the effects of adding new facilities or changing operating criteria on Central Valley stream flows and water supplies. For this evaluation of water supply opportunities, CALFED used the model to project water deliveries to south of Delta SWP and CVP water users. Because specific beneficiaries of any potential increased water supply resulting from implementing a CALFED solution will not be identified until later stages of the Program, these SWP and CVP water users were used as a surrogate for all potential water supply beneficiaries.

CALFED estimated south of Delta SWP and CVP water deliveries for existing conditions, No Action, and the three Program alternatives. Each Program alternative was evaluated with and without new surface and groundwater storage components. As discussed in more detail in Chapter 3, none of the Program alternatives includes a set volume or configuration of storage facilities. Instead, CALFED has identified a range of zero to 6 MAF of new storage in each of the three alternatives. Future decisions about the actual amount of storage for any Program alternative will be determined by issues such as cost and site-specific concerns, rather than by a programmatic-level optimization process. More detailed study and significant interaction with stakeholders will be required before specific locations and sizes of new storage are proposed.

To provide an evaluation of this range of storage, CALFED modeled one scenario with no additional storage for each alternative, and a second scenario with approximately 6 MAF of new storage for each alternative. In modeling the upper end (6 MAF), CALFED assumed that additional in-stream flows included in the draft Ecosystem Restoration Program (ERP) would be provided by a portion of the new storage to the extent possible. The remaining new storage, 4.75 to 4.95 MAF depending on the alternative, was assumed to be available for agricultural and urban water supply. Accordingly, the table below, showing the general locations and volumes of new storage considered in this modeling of SWP and CVP operations, indicates an upper limit for storage of 4.75 to 4.95 MAF. These limits are artifacts of the assumptions used in modeling the water supply opportunities of the zero to 6 MAF range of storage, and are not intended as a conclusion about the "optimal" amount of storage.

Storage Components Considered in the Evaluation of Water Supply Opportunities

Storage Component	Range of Storage Capacities Alternative 1	Alternative 2	Alternative 3
Sacramento River Tributary Surface Storage	0 to 2 maf	0 to 2 maf	0 to 2 maf
Sacramento Valley Groundwater Storage	0 to 250 taf	0 to 250 taf	0 to 250 taf
In-Delta Storage	-	-	0 to 200 taf
South of Delta Off-Aqueduct Surface Storage	0 to 2 maf	0 to 2 maf	0 to 2 maf
San Joaquin Valley Groundwater Storage	0 to 500 taf	0 to 500 taf	0 to 500 taf
Total	**0 to 4.75 maf**	**0 to 4.75 maf**	**0 to 4.95 maf**

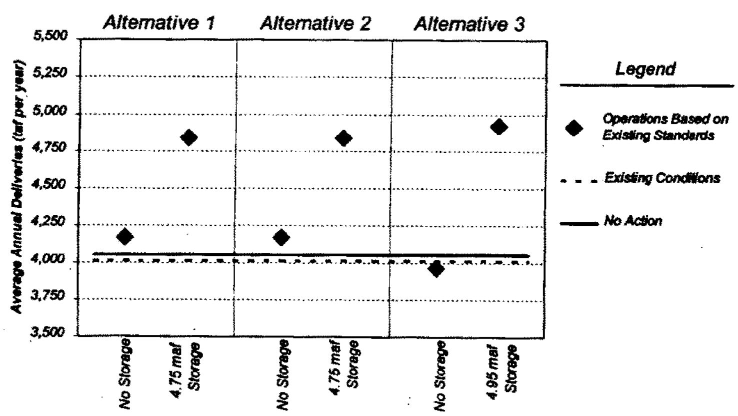
To evaluate water supply opportunities, CALFED developed a set of operating criteria for each Program alternative based on existing Bay-Delta standards. As described in Chapter 3, CALFED made some additional assumptions to address the operation of new storage and conveyance facilities considered in the Program alternatives. It is important to note that these assumptions were made only to aid in the evaluation of the alternatives – no specific changes in Bay-Delta standards are proposed or endorsed by CALFED through this evaluation. As information is developed during the course of implementing the Program, this information will be provided to regulatory agencies for appropriate consideration. Changes in Bay-Delta standards will be made, if at all, by the appropriate agencies in accordance with applicable laws and consistent with any agreements in the CALFED assurances package.

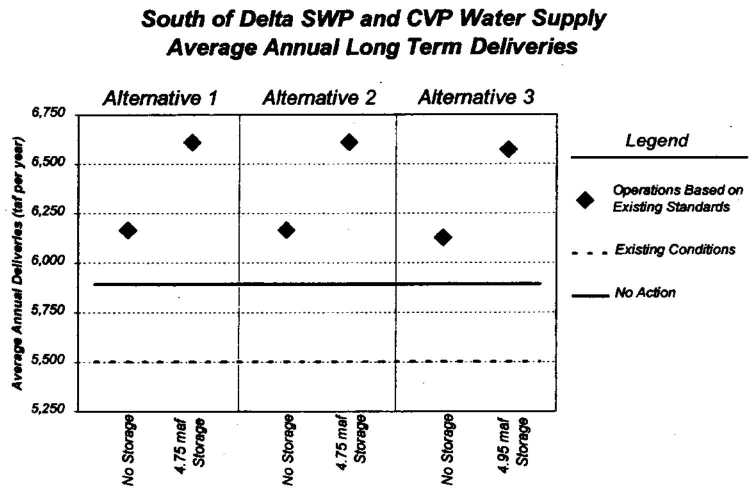
Average annual south of Delta SWP and CVP water deliveries, as simulated using hydrologic records for the May 1928 through October 1934 critically dry period and for the long term period of 1922 through 1994, are displayed in the following figures. Each alternative is represented with and without the quantity of storage shown in the previous table. Projected water deliveries under operating criteria based on existing Bay-Delta standards are represented by diamonds in these figures. For comparative purposes, the figures also include lines representing estimated average annual south of Delta SWP and CVP water deliveries under existing conditions and No Action, respectively.

At least two general conclusions are suggested by this evaluation. First, significant increases in water supply opportunities are only provided if new storage is included under all Program alternatives. Compared to No Action, from 750 to 900 TAF of average annual critical period supply could be developed with the previously described new storage included in the Program alternatives, under the operating criteria assumed by CALFED. Without new storage, average annual critical period supply ranges from an increase of about 100 TAF under Alternatives 1 and 2 to a decrease of about 100 TAF under Alternative 3, all compared to No Action. It should be noted that the small relative decrease in water supply under Alternative 3 is primarily due to CALFED's assumption that, whenever possible, exports would be diverted through the isolated conveyance facility as opposed to south Delta channels to maximize fishery protection and export water quality benefits. This assumed priority for location of diversions results in a need for additional Delta outflow to maintain adequate flow in the lower Sacramento River, and a small decrease in SWP and CVP water supply.

Second, under the operating criteria for each alternative assumed by CALFED, each of the alternatives would provide roughly similar water supply opportunities. However, under these assumed operating criteria other Program benefits are not equivalent. For example, CALFED expects that diversion effects on fisheries under these operating criteria would be reduced under Alternative 3, compared to Alternatives 1 and 2. A variation of the operating criteria for Alternative 3 could allow a greater portion of exports to be diverted from south Delta channels instead of through the isolated conveyance facility. This type of operating criteria would provide some additional water supply benefits, but reduce fisheries protection to a level more equivalent to Alternatives 1 and 2.

South of Delta SWP and CVP Water Supply
Average Annual Critical Period Deliveries




South of Delta SWP and CVP Water Supply
Average Annual Long Term Deliveries
Alternative 1
Alternative 2
Alternative 3
Average Annual Deliveries (taf per year)
6,750
6,500
6,250
6,000
5,750
5,500
5,250
No Storage
4.75 maf Storage
No Storage
4.75 maf Storage
No Storage
4.95 maf Storage
Legend
Operations Based on Existing Standards
Existing Conditions
No Action

Water Supply Opportunities: What if Standards Change?

As highlighted in the previous chapter, Bay-Delta standards are not static. Over the many decades of the implementation of the Program, conditions in the Bay-Delta will most likely change dramatically, both as a result of this program and because of other factors influencing the estuary. Although changes in regulatory standards over this long time period are virtually certain, it is difficult now to predict exactly what those changes will be.

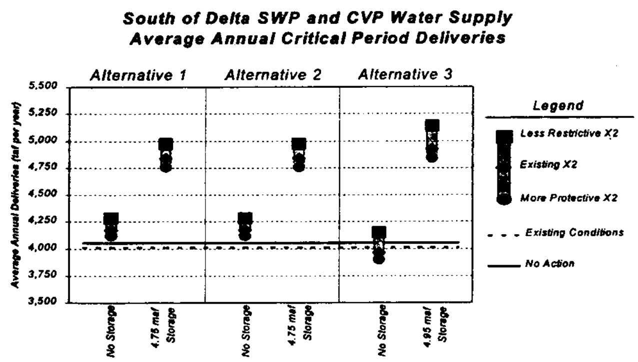
In order to provide decision-makers and the interested public some idea of how the different alternatives might respond to changes in standards, CALFED is including two simplified "sensitivity analyses" of how the water supply opportunities associated with each of the alternatives might respond to changes in the major regulatory standards. The first of these sensitivity analyses looks at the minimum Delta outflow requirements contained in the salinity criteria generally referred to as the "X2" standards. The X2 requirement sets the required position of the salinity gradient in the estuary so that a salt concentration of two parts per thousand is positioned where it may be more beneficial to aquatic life. Freshwater releases from upstream reservoirs or reduction in Delta exports may be required to maintain the salinity gradient at set locations for designated periods of time during the months of February through June.

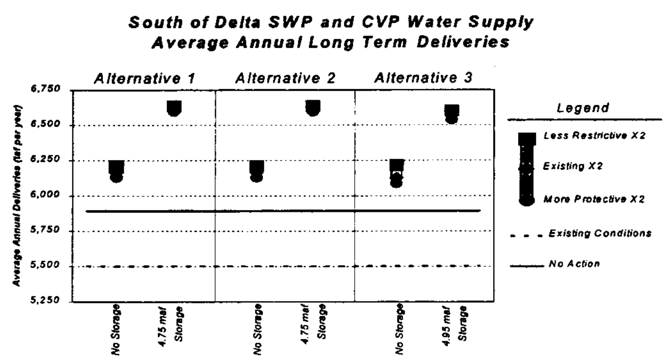
The length of time X2 must be positioned at these set locations in the estuary in each month is determined by a formula that considers the previous month's inflow to the Delta and a "Level of Development" factor, denoted by a particular year. The X2 requirements included in the existing Bay-Delta standards use a Level of Development factor of mid-1971. To get a rough idea of how the water supply opportunities might respond to changes in the X2 requirements, CALFED modeled a more protective X2 Level of Development (1962) and a less restrictive X2 Level of Development (1983).

The charts on the following page show how each of the three alternatives respond to these changes in the X2 standard. These charts portray the average annual south of Delta SWP and CVP water deliveries, as simulated using hydrologic records for the May 1928 through October 1934 critically dry period and also for the long term period of 1922 through 1994. Each alternative is represented with and without additional storage.

These charts suggest the following broad conclusion: Based on the assumptions used in modeling the hypothetical changes in the X2 standard there appears to be only a small effect on water supply opportunities caused by more protective or less restrictive Delta outflow standards within the range examined. Moving to the more protective X2 standard produces virtually no difference in average annual water deliveries as compared to the existing X2 standard, in either the 1928-34 critically dry period or the 1922-94 long term period. Relaxing the X2 standard produces a small improvement of 100 to 200 TAF in average annual deliveries in the critical period, but does not have a significant effect on long term average deliveries. Moreover, the changes caused by a relaxation in the X2 standard are similar in all three alternatives, although slightly higher benefits are produced in Alternative 3.

Sensitivity Analysis of Delta Outflow Requirements Results





Water Supply Opportunities: What if Standards Change? (Con't)

CALFED also considered changes in a second major regulatory criteria -- the "Export-Inflow Ratio" (E-I ratio) requirement. This requirement presently limits Delta exports by the State and federal water projects to a percentage of Delta inflow. During February through June, months most critical to fisheries, the allowable E-I ratio is reduced to help diminish reverse flows and the resulting entrainment of fish caused by south Delta export operations.

In this sensitivity analysis, CALFED compared water supply opportunities under a hypothetical set of more protective E-I ratios during the months of November through June to E-I ratios under existing Bay-Delta standards. A comparison of the monthly ratios used in this evaluation is shown in the following chart.

Sensitivity Analysis of Export-Inflow Ratios

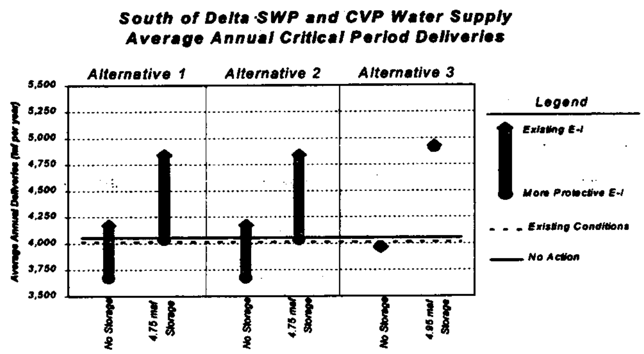
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Existing E-I Ratios												
E/I Ratio	65%	35%-45%	35% of Delta Inflow				65% of Delta Inflow					
More Protective E-I Ratios												
E/I Ratio	50%	25%	25% of Delta Inflow				65% of Delta Inflow				50%	

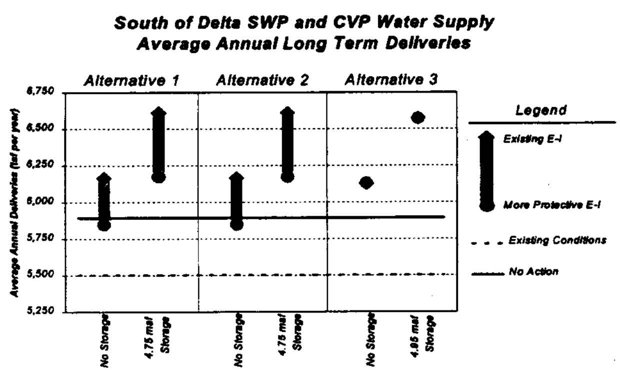
As before, CALFED evaluated the effects of these changes in E-I ratios on water supply opportunities for both the 1928-34 critically dry period and the 1922-94 long term period. The modeled south of Delta CVP and SWP water deliveries under these hypothetical changes in E-I ratios are shown in the charts below.

This evaluation suggests that for Alternative 1 and 2, more protective E-I ratios can have significant water supply impacts in both the critical period and the longer average period. For example, without new storage, average annual critical period supply decreases by about 400 TAF under Alternatives 1 and 2 with the more protective E-I ratios in place compared to No Action. For Alternative 3, however, since CALFED assumed that exports diverted through the isolated conveyance facility are excluded from E-I ratio requirements for this evaluation, the more protective E-I ratio has virtually no impact on water supplies in either the critical or long term average period. CALFED expects that the improvements to Delta flow patterns and the resulting reduction in entrainment of fish that are possible under Alternative 3 would provide at least an equal level of protection for fisheries as compared with Alternatives 1 and 2 with the more protective E-I ratios in place.

Based on this evaluation, the more protective E-I ratios also result in a reduction in the effectiveness of new storage in providing water supply benefits under Alternatives 1 and 2. For example, the net average annual critical period supply benefit of the new storage with the more protective E-I ratios in place is only about 350 TAF, compared to a net benefit of about 650 TAF with existing E-I ratios in place.

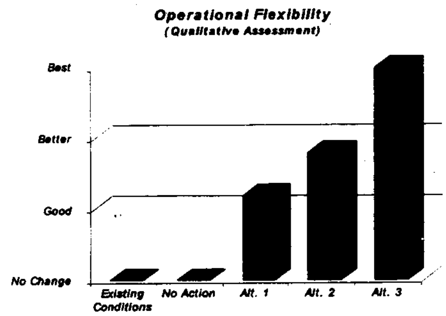
Sensitivity Analysis of Export-Inflow Ratio Requirements Results





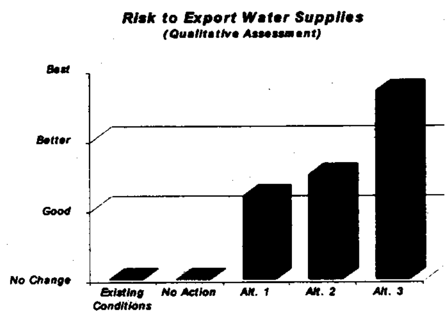
Operational Flexibility

Water storage is the one most significant features that contributes to the operational flexibility of an alternative. Storage allows shifting diversion timing to respond to real time needs of the ecosystem, water quality, and water supply. The potential for adding storage was retained for further analyses for each alternative. In addition, improvements in conveyance also improve operational flexibility. The Alternative 3 conveyance includes two distinct diversion points which provides added flexibility. Therefore, Alternative 2 generally has more flexibility than Alternative 1, and Alternative 3 generally has more flexibility than Alternative 2.



Risk To Export Water Supplies

Alternative 1 would improve the physical integrity of the Delta by strengthening Delta levees. Widening of Delta channels associated with Alternative 2 would provide a degree of additional protection from flooding. Both alternatives would, however, leave the export water supplies relatively vulnerable to seismic failure and sea water intrusion which could accompany catastrophic levee failures. Alternative 3 would provide the best physical security for export water supplies since it provides a new canal around the eastern edge of the Delta where it would not be impacted by major levee failures.



Assurances

Assurances are mechanisms intended to increase participants confidence that an alternative will be implemented and operated as agreed. Although some people believe it impossible to assure appropriate operation of any isolated conveyance channel, others believe that a moderately sized facility can be operated as agreed. Consequently, additional detailed analyses and discussion of assurances must occur before they can be used to distinguish one alternative from the other. Assurances are described in more detail in Chapter 5.

Consistency with Solution Principles

The alternatives are probably not identical in their abilities to meet the solution principles. However, a more thorough analysis and discussion must occur before the solution principles can be used to distinguish one alternative from another.

Comparison of Alternatives

The previous section discussed the major differences between the alternatives on key technical distinguishing characteristics. The discussions reflected information obtained from the technical evaluations of the characteristics performed thus far. Based on the assumptions made in the technical evaluations, Alternative 3 appears to have the potential to provide greater performance on these particular characteristics. The following table provides a general comparison of the alternatives according to these eight distinguishing characteristics. Qualitative rankings of high (H), medium (M), and low (L) were used to summarize the three alternatives. For example, in-Delta water quality ranked best for Alternative 2 and the lowest for Alternative 3. The results of this analysis do not indicate the selection of a preferred program alternative. Indeed, although Alternative 3 has on balance ranked higher than the others on these characteristics, there are significant additional issues that affect selection of a preferred program alternative (including, especially, the issues of assurances and implementability). The evaluation of these issues will continue as CALFED develops a preferred program alternative.

The evaluation depicted graphically here treats each of the key distinguishing characteristics as if they were of equal importance. It is important to understand, however, that it is unlikely that all of the key distinguishing characteristics are of equal importance, and different weighting of these factors could affect the outcome of the analysis. In addition, the above table does not attempt to "standardize" the scales for each characteristic. That is, the relative difference between an "L" and an "M" on one characteristic may be totally different than the difference between an "L" and an "M" on another characteristic. Finally, this ranking is based on the assumptions and technical evaluation methods used in our evaluation, and CALFED is explicitly soliciting public comment on the validity of its evaluation process during the comment peiod. Interested parties, the public, and CALFED agencies must collectively determine the importance of each distinguishing characteristic in the overall evaluation of alternatives leading to selection of the preferred program alternative.

The ranking of the water supply opportunities characteristic in the chart above requires special explanation. Based on the assumptions used in evaluating this issue, the analysis indicates that all three alternatives perform similarly under operating criteria based on existing standards. At the same time, all three alternatives perform significantly better under the "6 MAF of new storage" scenario than under the "no new storage scenario". In addition, again based on the assumptions used (and described in detail in the preceding chapter), the analysis indicates that all three alternatives are roughly equivalent in terms of responsiveness to possible changes in the Delta outflow requirements. This analysis also suggests that Alternative 3 provides a higher level of performance on the "water supply opportunities" characteristic under a scenario of stricter export-inflow (E-I) ratio requirements. As stated above, CALFED is not proposing or endorsing any particular changes to the existing regulatory regime affecting the Bay-Delta. Nevertheless, after consulting with CALFED water project operators and regulatory agencies, CALFED is reflecting this information in the chart above by ranking Alternative 3 somewhat higher than Alternatives 1 and 2 on the "water supply opportunities" characteristic.

Summary Evaluation of Most Significant Technical Distinguishing Characteristics

	In-Delta Water Quality	Export Water Quality (South Delta)	Export Water Quality (Contra Costa)	Minimize Diversion Effects on Fisheries	Delta Flow Circulation	Water Supply Opportunities	Operational Flexibility	Minimize Risk to Export Water Supplies
Alternative 1	M	L	L	L	L	L	L	L
Alternative 2	M+	M	M+	L	M	L	M	M
Alternative 3	L	H	L	M+	M+	M	H	H

Two key distinguishing characteristics seem to be particularly important in making a decision on how well the alternatives perform. Export Water Quality and Diversion Effects on Fisheries, are highly dependent on the alternative selected. Therefore, irrespective of whether these two characteristics are the <u>most important</u> to selection of the preferred program alternative, they are the characteristics <u>most dependent</u> on that decision. The implications of these characteristics are discussed in some detail in Chapter 5 to enable the reader to understand their potential importance to a decision. Plans for further evaluation of these characteristics are described as well.

The following chapter identifies some of the additional issues and concern, and describes how the CALFED process will reach selection of a preferred program alternative.

5. ISSUES TO BE RESOLVED PRIOR TO SELECTION OF A PREFERRED PROGRAM ALTERNATIVE

This Phase II Report has identified several significant issues that need to be resolved before the CALFED Program can move forward. Some of the issues are very specific to evaluating the merits of the three alternatives, so that CALFED can identify a preferred program alternative. Other issues, equally important, have been raised as we refine and complete the common program elements. CALFED's task over the next several months will be to set up a process for resolving each of these issues. In this chapter, the major issues are summarized and a process is proposed for agencies and stakeholders to use in moving towards resolution.

The different types of issues to be addressed are:

- Major technical and policy issues
- Refinement and consensus on Program elements
- Assurances package (including financial)
- Other issues relating to ongoing Program refinement (Ongoing work efforts in Chapter 6)

Issues to be Addresses

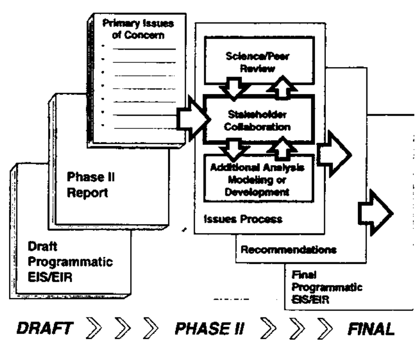
Drinking Water Quality

Diversion Effects on Fisheries

Program Element Refinement
- Water Quality Program
- Ecosystem Restoration Program
- Levee Protection Plan
- Water Use Efficiency
- Watershed Management
- Water Transfers
- Storage
- Conveyance

Assurances and Financial Plan

Additional Concerns
- Agricultural Land Impacts
- Etc.



CALFED is identifying four sets of issues that need substantial agency and stakeholder review as we move towards identifying a preferred program alternative and developing a final CALFED program.

Two of these issues are considered in detail below: the role of bromide levels in source water as a factor in assuring safe drinking water, and the role of diversion effects as a factor affecting fisheries recovery. Both of these issues are important in reaching a decision about the preferred program alternatives.

Two additional broad issues must be resolved before the CALFED can present a complete program package for adoption and implementation. First, the many issues raised earlier in this Phase II Report about the Program elements must be addressed and those programs must be finalized. Second, CALFED and stakeholders must develop a consensus on an adequate assurances package.

Implications of the Delta Conveyance Decision on Export Water Quality

Most Californians (about two-thirds of the population) get their drinking water supplies from the Sacramento-San Joaquin Delta. The protection of public health by reducing unsafe levels of contaminants in drinking water supplies is therefore an important part of a comprehensive solution. All of the alternatives result in improved drinking water supplies largely through implementation of Water Quality Program element actions such as urban, agricultural, and industrial runoff reduction. However some water quality parameters are less affected by source control strategies. For this reason, the choice of a Delta conveyance alternative may have important implications for drinking water quality.

One of the greatest public health advancements of the past 100 years was the advent of water supply disinfection. Disinfectants, such as chlorine, are added to most drinking water supplies to reduce or eliminate microbial contamination (bacteria, parasites, etc.). The desire to increase the safety of drinking water has resulted in federal and state legislation requiring higher treatment efficiency, including greater disinfection. An unfortunate side effect of disinfection is formation of unwanted chemical byproducts, some of which may have adverse health effects. A challenge, therefore, is to provide greater protection against microbial contamination of drinking water while minimizing unwanted byproducts.

Two features of Delta water quality complicate attainment of the optimum balance of effective disinfection and byproduct suppression. Bromide, a salt of sea water origin, is present in Delta water supplies because of intrusion of sea water into the Delta. The soils of Delta islands are important sources of organic carbon resulting from natural decomposition of plant materials. Bromide and organic carbon react with disinfectant chemicals to produce a broad range and high concentrations of unwanted chemical disinfection byproducts.

Treatment methodologies exist for economically removing organic to some degree. Therefore, in general, organic carbon is considered to be a lesser problem for drinking water than bromide, for which removal from drinking water supplies is not now economically practical. While the level of total organic carbon in Delta supplies used for drinking water is at roughly the national median level for community water systems using surface water, the level of bromide in drinking water supplies diverted from the south Delta is more than six times the national average. As a result, public water systems relying on the Delta as a drinking water supply may face some distinctive challenges in continuing to produce safe drinking water due to the higher bromide levels.

Despite these concerns, Delta water quality is adequate for effective and affordable treatment to meet all current and proposed drinking water standards -- including more stringent standards for disinfection byproducts and microbial contaminants that EPA will promulgate in November 1998. However, the key questions are, will potential requirements from more stringent standards for higher levels of treatment to protect public health result in Delta water bromide levels being a significant and, perhaps, limiting factor? And, are the predicted bromide levels associated with the conveyance alternatives a significant consideration for future drinking water quality?

Although the long-term answers to these questions are fundamentally scientific -- how significant are bromide by-products, how effective and affordable are the treatment technologies, and how significant are the bromide level differences between alternatives -- within the 1998 time frame for the CALFED EIR/EIS, policy judgments must be made within the constraints of continuing scientific uncertainty.

The U.S. Environmental Protection Agency in collaboration with a wide variety of stakeholders has initiated a $200 million effort of research, data collection and analysis on the health effects, occurrence, and potential treatments for a wide range of disinfection byproducts (including bromide byproducts) and microbial contaminants. This massive effort is deemed by all participants to be essential to establish a "good science" basis for any future standards and treatment measures for these contaminants.

Current health effects research and treatment technology information from this effort simply do not now provide an adequate scientific basis from which to project what the water quality parameters for drinking water standards, or the treatment options to meet those standards, are likely to be over the next five to ten years. As such, the specific importance of bromide levels as a "distinguishing characteristic" for the CALFED alternatives is unclear. In order to properly deal with this uncertainty CALFED will convene an expert review panel to work with CALFED staff and agencies to help frame the proper policy approach to be taken and specifically to:

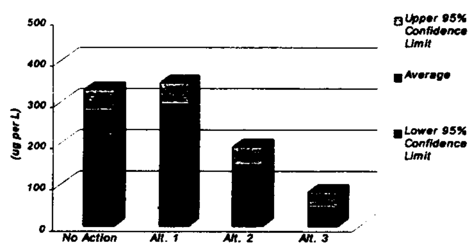
- Help ensure that CALFED is characterizing the issues and tradeoffs fully;
- Develop observations and questions regarding Delta water quality which may be

useful to the EPA national review process; and

- Ensure that the decision-making process neither overstates the potential for bromides to be a significant decision factor, nor eliminates opportunities to respond effectively to potential for future drinking water standards and protect public health.

In evaluating these issues, CALFED will also consult with stakeholders. Prior to selection of a preferred programmatic alternative this issue and a basic policy approach must be more fully integrated into an overall staged implementation strategy.

Predicted Bromide at Clifton Court



Implications of the Delta Decision on Diversion Effects on Fisheries Recovery

Direct and indirect effects of the existing State and federal water projects are thought to be important, perhaps critical, factors in the decline and endangerment of some fish species. Aspects of the current problem include:

- Predation in Clifton Court Forebay; entrainment of fish, eggs, and larvae at the SWP and CVP export pumps (partly due to inadequate fish screen facilities)
- Mortality associated with the need to capture, sort and transport fish to Delta channels away from the screens
- Adverse flow patterns induced by the transport of Sacramento River water across the Delta for diversion, which affects the migration and spawning of fish species.
- Reductions in habitat quality and availability induced by changes in flow conditions in the system caused by project operations and the north-to-south transport of water across the Delta to the export facilities

There is a fair degree of agreement on the relative magnitude of fish losses due to diversion effects that would occur under the various alternatives. However, there is much less agreement on the role of diversion mortality in controlling population abundance when compared to other stressors such as habitat loss. Hence the following analysis makes only limited attempts at such integration.

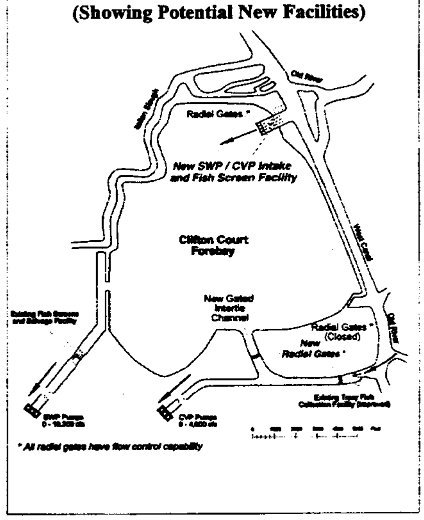
The focus for diversion effects on fisheries is on particular estuarine and migratory fish: chinook salmon, delta smelt, splittail, striped bass, steelhead and white catfish. Observations over the last half century indicate that these species are quite vulnerable to having their behavior disrupted by the transport of water from the Sacramento River to the export pumps in the south Delta. For other fish species, diversion effects do not appear to be a major stressor. Delta resident fish such as tule perch and several members of the sunfish family appear relatively invulnerable to being drawn to the export pumps. Fish such as starry flounder and longfin smelt, and other organisms such as bay shrimp, live primarily downstream of the Delta. Although they are potentially affected by changes in the amount of water flowing from the Delta through San Francisco Bay to the ocean, they appear to have little vulnerability to diversion effects of the export pumps.

Diversion effects on fisheries recovery include direct mortality due to water diversion intakes and associated facilities as well as indirect effects. The indirect effects include: altered flow patterns, disturbed migratory cues, migratory delays and increased predation on migrating fish that can occur when migration is altered or delayed.

Reduction of the direct effects of diversions from the Delta by the SWP and CVP are part of all alternatives being considered by the Program. In each alternative, SWP and CVP intakes are consolidated at the Clifton Court Forebay and are screened with the best feasible technology.

Even with upgraded screens at the South Delta Diversion Facility, some direct mortality would continue. The lack of bypass flows at the screens would require salvage operations: handling and trucking of salvaged fish. Mortalities during salvage operation vary by species, the size or age of the fish and water temperature. Steelhead, which migrate through the Delta at a large size during cool seasons, suffer little mortality. Mortality of chinook salmon smolts during handling is less than ten percent. For delta smelt, experimental data suggest that mortalities during salvage exceed 90 percent, even for adults.

Clifton Court Forebay
(Showing Potential New Facilities)



The proposed improvements will most likely increase the effectiveness of screening smaller or younger fish. Unfortunately, small or young fish suffer the highest mortality during screening salvage operations. The overall reduction in direct mortality may not be sufficient to remove this stress on fisheries recovery. Accordingly, alternatives which include the proposed consolidated, screened facility in the south Delta would continue to impose direct effects on fish mortality as a function of diversion amounts and timing.

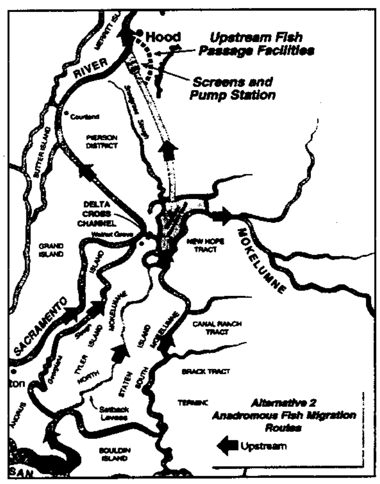
Alternatives 2 and 3 will also have fish screens at Hood on the Sacramento River, and both alternatives envision that the majority of Sacramento River water being exported will pass through these screens. Although screens of this size have never been constructed, a CALFED Fish Facilities Technical Team of agency and consultant experts evaluated the feasibility of installing effective fish screens of the necessary size at this location and concluded that it is feasible. Screens at the Hood location would have a number of features and anticipated effects:

- Bypass flows will exist in the Sacramento River so the screened fish will not need to be handled and trucked to another location for release.

- Fish residing and spawning in the Delta below the Hood diversion will be exposed to lower rates of diversion in the south Delta.

- Some fish migrating through the Sacramento River will be exposed to screening stresses. This is a particular concern for all Sacramento runs of chinook which presently do not encounter any large fish screens and water diversions in the northern Delta.

- The new screens at Hood will still be unable to screen certain (primarily very young) life stages of fish. Therefore, unscreenable life stages of fish that spawn in the Sacramento River will be lost in proportion to the amount of water diverted at Hood. This is a particular concern for striped bass which usually conduct at least 80 percent of their spawning upstream of the proposed Hood diversion. Alternatively, diversions could be curtailed during times of migration, with an associated increase in reliance on south Delta facilities or reductions in exports.



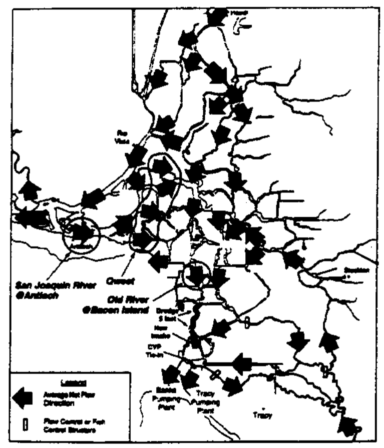
Alternative 2 raises two screening concerns not present with Alternatives 1 or 3:

- That portion of the water screened at Hood which goes to export pumps in the south Delta must be screened again to remove fish entrained as the water passes through the Delta, so the south Delta screens will need to have a capacity of about 15,000 cfs as in Alternative 1.

- Many thousands of adult fish of a variety of species will migrate upstream to the Sacramento River through the new channel into which the water diverted at Hood is discharged. The passage of those fish will be blocked at the pumping plant downstream of the Hood fish screen as shown in the adjacent figure. Substantial fish passage facilities will be needed to bypass the pumping plant and fish screens and get the upstream migrants into the Sacramento River.

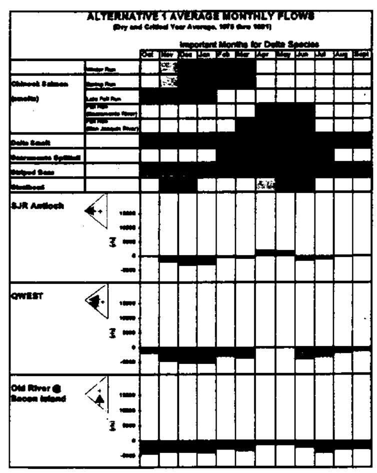
Diversion Effects on Delta Flow Patterns

The CALFED alternatives are characterized by distinctive flow distribution (hydrodynamic) patterns that differ to varying degrees from current Delta conditions. Thus, each alternative will result in some degree of change in the amount of indirect mortality associated with altered Delta flow patterns that result from export diversions.



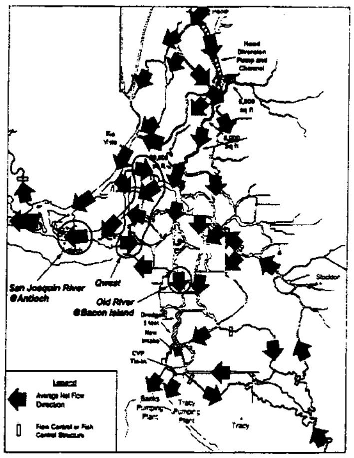
For Alternative 1, the direction of net flows during the critical spring and early summer period is toward the pumping plants from the junction of the Sacramento and San Joaquin Rivers. This flow reversal pattern exposes fish to being drafted toward the export pumps from a larger area of the Delta than either Alternatives 2 or 3. The figures illustrate conditions when these diversion effects are most pronounced, at times of high exports and low Delta inflow. This condition occurs during the spring and summer of dry and critically dry years. Highlighted are three Delta locations where mean flow directions affect indirect mortality associated with export diversions:

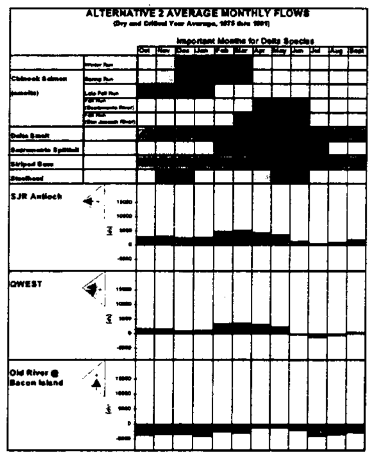
- San Joaquin River at Antioch
- QWEST (the sum of Sevenmile Slough, San Joaquin River at Bradford Island, False River and Dutch Slough)
- Old River at Bacon Island



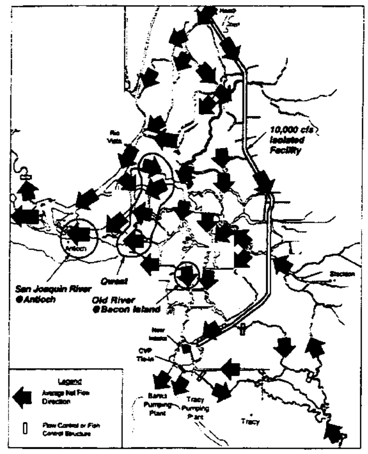
The bar graph at the right shows Alternative 1 average monthly flows at these locations (for the dry and critical years of the period 1975 to 1991) and the months that are important to Delta species. Note that negative flows occur in most months.

With Alternative 2, sufficient water is diverted at Hood to maintain net downstream flows in the San Joaquin Delta west of the Mokelumne River. The following bar graph also illustrates that the flows at Antioch and QWEST are more positive. Hence fish west of the Mokelumne would no longer be subject to being drafted towards the pumps. Important populations east of that point would still be subject to being drafted towards the pumps.

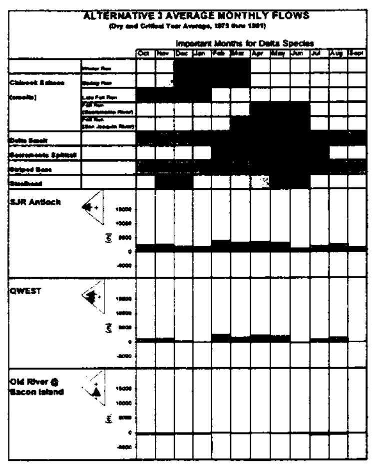




Finally, with Alternative 3 under operating scenarios, about 80% of the water exported from the Delta would pass through the Isolated Facility and 20% would be diverted directly from the south Delta. While net upstream flows would still occur in some areas under worst case circumstances (adjacent figure), approximately an 80% reduction in fish entrainment in the south Delta could be expected in relation to Alternative 1 and a somewhat lesser percentage in relation to Alternative 2. The bar graph below also shows that the flows in all three locations are improved.



Chinook salmon in the Sacramento River system would benefit substantially from habitat improvement features of the common programs both in the river and in the estuary. Under Alternatives 2 and 3, Sacramento River salmon that are diverted into the Central Delta will also benefit from the restoration of net downstream flows throughout the Delta. Existing conflicts with water project operations would continue with Alternative 1 and to a lesser degree with Alternative 2. Under Alternative 3, some conflicts would continue due to the inability to screen egg and larval stages of striped bass, and reduced Sacramento River flows below Hood.



Chinook salmon in the San Joaquin system would also benefit from habitat improvement features of the common program elements and the use of an operable barrier or its equivalent at the head of Old River. These fish would be affected very differently by conveyance aspects of the three alternatives. Under Alternatives 1 and 2 existing diversion effects would be perpetuated, offset somewhat by improved fish screens. Improved flow conditions in the western Delta under Alternative 2 would also offer some benefit to San Joaquin chinook salmon, although these salmon would still have to pass through extensive areas of adverse flow conditions before reaching this part of the Delta. Alternative 3 would be expected to reduce direct diversion effects by at least 80 percent, and flow conditions would be improved for San Joaquin chinook throughout the Delta.

Other fishes, such as delta smelt, splittail, striped bass and white catfish, would benefit to varying degrees from habitat improvement features of the common programs. They would also be affected very differently by the three conveyances of the alternatives. Under Alternative 1, existing diversion and flow distribution effects would be perpetuated. These would be offset some by the improved fish screens, but to a lesser degree than for salmon, since these species generally suffer more losses from handling and transport than salmon. These other fishes would be expected to receive some benefit from Alternative 2, due largely to improved flow distribution in the western Delta, but substantially greater benefit under Alternative 3. The latter would result from approximately an 80 % reduction in diversion losses in the South Delta and improved flow distribution throughout the Delta. Some risk would continue from exposure to diversions at Hood and reduced flows below Hood.

An important question is whether, even with screen relocation and improvement, the effects of continued diversions from the south Delta (including entrainment effects and changes in Delta flow patterns) will outweigh the benefits afforded by the other elements of the CALFED Program. If this were true the implication would be that, even with extensive ecosystem restoration and water quality actions to enhance the estuarine environment, recovery of threatened and endangered species would be unlikely. Such a finding would, in turn, have major implications for a Delta decision. This question has been sufficiently discussed by the experts to reveal that there is not a clear-cut answer. It is, however, possible for the decision makers, interested parties, and the public to develop a more complete understanding of the considerations involved.

To provide an independent perspective on the issues, a science review panel will be convened between release of the draft programmatic EIS/EIR and certification of a final EIS/EIR. The panel will be composed of recognized experts having a range of expertise applicable to the problem. Some of the specific issues that the panel may address are:

- How would fish populations be expected to respond if effects of diversions are reduced, thereby reducing direct and indirect mortality?
- Can diversion effects be offset by habitat improvements?
- Which species, populations, and life stages are most sensitive to diversion effects? When and where are they most affected?
- What uncertainty exists regarding diversion effects on fish species?
- What Sacramento River flow is required below a Hood diversion to protect salmon, striped bass, and delta smelt?

- What survival rate can be expected for striped bass eggs and larvae and delta smelt passing through a Sacramento River screen and pumps in Alternative 2?

- What is the expected effect of potential operational plans under each alternative? Which species would benefit? Which would be harmed? Can operational plans be flexible to fish needs?

- Have alternatives been tested through a large enough range of operational policies to fully evaluate potential beneficial and adverse impacts?

- How would fish populations be expected to respond to the direct and indirect effects of each alternative?

- Do we have sufficient information to predict the probability of fish species recovery under each alternative?

- What increment of protection or improvement for fish species will be provided by other programs such as the Central Valley Project Improvement Act, biological opinions, etc.?

Refining and Developing Consensus on Program Elements

As noted at the beginning of this Phase II Report, CALFED understands that there are substantial concerns among stakeholders and members of the public about particular Program elements. In Chapter 3, we attempted to summarize some of the major concerns that have already been brought to our attention. We anticipate that the public hearing process and written comments submitted during the Draft EIS/EIR comment period will also raise additional significant technical and policy concerns about all of the Program elements.

It is critical to the ultimate success of this Program that CALFED understand and address the substantive concerns raised by the public about all aspects of the Program. Throughout this Phase II Report, we have highlighted specific issues on particular Program elements, and asked for specific comments from the public. In addition, we believe that the entire technical analysis presented in this Phase II Report and in the rest of the Draft EIS/EIR should receive substantial review, and welcome your comments on how best to facilitate that review.

Each issue raised will need to be resolved, and the resolution process may differ depending on the issue. CALFED already anticipates that several issue resolution processes should be established for particular issues. Most of these are discussed in the detail program descriptions and alternatives evaluations in previous chapters of this Phase II Report. In general, these proposed processes fall into the following distinct categories:

Additional Review

Many of the issues raised by stakeholders and the public will require additional technical analyses. For example, CALFED already anticipates that questions raised about hyrological and water supply analyses in the Draft EIS/EIR and Phase II Report may lead to additional refinements in assumptions or, in some cases, perhaps completely different analytical approaches. In addition, we envision substantial additional modeling to review alternative configurations that are developed in response to public comments.

Other issues will also require additional technical review. For example, many have expressed concerns about the potential loss of prime agricultural land as a result of possible Program actions for habitat restoration, levee improvements, facilities construction, etc. A first step in the resolution of this issue is a comprehensive technical evaluation and inventory of the resources at risk. The Program needs to refine its understanding of the actual scope of this problem, and can then consider alternatives.

Similarly, we anticipate that additional economic analyses may be useful in resolving some of the outstanding issues associated with the Water Use Efficiency Program and the Water Transfer Policy Framework. This economic analyses should include an evaluation of alternative methods of achieving water supply reliability objectives, and should be accessible enough so that decision-makers at all levels can understand the many trade-offs in water supply investments. We are also proposing a workshop approach for discussing the role of bromide in maintaining safe drinking water.

CALFED will work with the public during and after the Draft EIS/EIR comment period to identify the most essential additional technical analyses and to prioritize CALFED resources accordingly.

CALFED will also be using the tool of additional scientific review as a process for resolving stakeholder issues. In some cases, this review may be similar to the formal "peer" review process used in evaluating the Ecosystem Restoration Program last fall. This kind of formal process is vital to maintaining the scientific objectivity and defensibility of the CALFED effort. As noted above, CALFED is already proposing a similar science review panel effort to explore the interplay between fisheries recovery and the choice of conveyance alternatives.

By convening these kinds of expert panels, CALFED hopes to move both CALFED agencies and members of the interested public to a common understanding of the issues and possible resolution of these types of issues.

Implementation Planning

CALFED is developing an integrated implementation strategy that describes the overall structure and process by which the CALFED Program will be implemented. This strategy will identify the roles, responsibilities, and reporting relationships of the CALFED agencies, other agencies, environmental, agricultural, urban, and recreational interest groups, and the public who will be involved in the implementation of the Program. The strategy will also describe the process for moving the Program from the programmatic level of detail to ultimate decisions on investments and the adaptive management process. The Implementation Strategy will be completed by the time of certification of the Programmatic EIS/EIR latter this year.

Some of this work for the Implementation Strategy has already begun. For example, CALFED has already begun working with interested stakeholders to develop a process for strategic planning for the ERP. This joint stakeholder-agency effort has prepared a draft outline and has begun identifying a team of scientists to assist in preparing a *Strategic Plan* for the ERP. CALFED will host several strategic planning workshops in the near future to fully develop issues and concerns associated with the structure and content of the *Strategic Plan*.

Similar efforts will be initiated for the water quality program, water use efficiency program, levees program and watershed coordination program.

Additional stakeholder efforts

As CALFED begins to address the issues and concerns raised by the stakeholders and members of the public about various Program elements, it will maintain the existing outreach efforts as a primary forum for conflict resolution. Accordingly, the substantial dialog developed through the Bay Delta Advisory Committee and its many subcommittees should continue.

In addition, CALFED believes that particular issues may require particular stakeholder outreach efforts. For example, the issue of agricultural land conversion noted above requires a more focused outreach effort. Only by engaging with the local landowner communities can CALFED identify and take advantage of the most creative and "multiple benefit" approaches to this issue. Similarly, CALFED intends to initiate a more comprehensive outreach effort to identify and coordinate with local watershed groups in both the upper and lower watershed for the Bay-Delta. These groups frequently have years of specific experience in dealing with many of the problem areas targeted by the CALFED effort.

CALFED is eager to work with stakeholders and the interested public over the next several months to identify other appropriate processes for resolving the many issues facing this Program, and encourages comments on this issue during the public comment period..

Developing a Consensus Assurances Package

The technical evaluations described in the previous chapter did not make any attempt to consider the question of "assurances". In theory, an assurances package could be constructed that would assure implementation of any of the alternatives. As the debate over the Peripheral Canal in 1982 showed, however, the assurance issues associated with an isolated facility are substantial.

Included below is a summary of the substantial work done by CALFED and the Bay-Delta Advisory Council Workgroup on Assurances to define the assurances issues and develop a range of tools and approaches for resolving these issues.

Before CALFED can move forward with any preferred program alternative, the CALFED agencies and the many stakeholder communities must develop a consensus on an assurances package. As noted below, CALFED recognizes that the assurances process may affect both the timing (staging) and the substance of the implementation of a preferred program alternative. CALFED will continue developing a consensus package by relying on the BDAC Assurances Workgroup effort, although we anticipate additional processes will be necessary to successfully resolve this issue before the Programmatic EIS/EIR is finalized in late 1998.

Assurances

An assurances package is a set of actions and mechanisms to assure that the program will be implemented and operated as agreed. The assurances package will include mechanisms to be adopted immediately as well as a contingency process to address situations where a key element of the plan cannot be implemented or operated as agreed.

CALFED has been working with the Bay-Delta Advisory Council's Assurances Workgroup and stakeholders to identify the building blocks that will make up an assurances package. Thus far, CALFED has identified assurance needs and issues for each of the program elements; identified the assurance concerns of stakeholders; compiled a list of assurance tools; and developed guidelines for evaluating a package of assurances. Each of these elements is described in greater detail in the *Implementation Strategy* appendix to the Draft Programmatic EIS/EIR.

In addition, regardless of which program alternative is selected, CALFED must design an implementation strategy that will operate for the life of the Program actions. Because any alternative will likely require a number of funding, legislative, regulatory, contractual and institutional changes, implementation will be a complex, long-term process. Additionally, the nature and complexity of each program element make it impossible to implement the entire program simultaneously. The Program, therefore, will be implemented in stages.

The challenge in implementing a program in stages is to allow actions that are ready to be taken immediately to go forward, while assuring that each interest group has a stake in the successful implementation of the entire program over the implementation period. CALFED has identified the following three characteristics for a successful staging strategy:

- Each stage should be completed before the next one can begin
- Each interest group should have strong inducements to support the completion of each and every stage
- Program elements which are outside the control of the CALFED agencies should be implemented as early as possible to reduce the risk that outside actors may affect implementation

There is a significant amount of work to occur between the present and certification of the final EIS/EIR if the long-term solution is to be successfully implemented. To that end, the Program is developing individual implementation plans for each program element. Those plans will include:

- A description of the program element
- A summary of the goals, objectives and targets the element is seeking to achieve
- A detailed description of the actions to be taken and the tools and strategies to be used. This section will include a description of the order in which actions should be taken and their relative priorities
- A discussion of how and when success is to be measured
- Any other information necessary to assure timely and effective implementation

These individual implementation plans will be integrated into a program-wide implementation strategy and will also include financing and assurances. As part of this process, Program elements will be refined to improve overall performance.

In addition to the general information described above, CALFED has identified a number of significant assurance concerns relevant to the alternatives being analyzed in this EIS/EIR. A brief summary of some of these concerns follows.

Institutional Arrangements Including a New Entity for Ecosystem Restoration Program - Many stakeholders are concerned that the existing diffused approach to ecosystem management and restoration with responsibilities resting in state, federal, local and private entities is inadequate to assure implementation of the ERPP as envisioned. CALFED, therefore, is examining a variety of implementing approaches including the potential creation of joint powers authorities or new entities.

Any implementing entity would have the powers and resources necessary to implement the ERPP. In addition, the decision of how and by whom new actions in the remainder of the program will be implemented is also pending. Program-wide coordination throughout the implementation phase is essential to successfully implementing the entire program. A decision on an ecosystem entity cannot be made without considering the remainder of the program.

Ongoing Stakeholder Involvement - Many stakeholders are also concerned with the nature and scope of their involvement in the implementation phase of the Program. The almost unanimous opinion expressed at BDAC Assurance Workgroup meetings is that stakeholders would like to advise agencies in a meaningful and timely manner throughout implementation. For some stakeholders, this concept is expressed in stakeholder representation on the governing board of whatever entity implements the ERPP.

Endangered Species Assurances - Many stakeholders are concerned with the nature and extent of assurances given to the recovery of endangered species and the assurances given to water users for protection from future regulatory interference with their activities. The overall concept of "no surprises" is an important assurance for both the ecosystem and the water users. CALFED and stakeholders are examining California and federal endangered species laws to craft mutually acceptable assurances for the Bay-Delta ecosystem, as well as the water users.

Assuring Appropriate Operations of Conveyance Facilities - Many stakeholders are concerned that construction and operation of an isolated conveyance facility will unacceptably alter the "common pool" conditions which currently provide export water users with an incentive to protect the delta levees and channels and maintain specified water quality standards throughout the delta. These stakeholders fear that if water could be exported without first passing through the delta that the delta itself could be harmed and that the incentives to continue to protect the delta will be smaller for those now receiving water from a conveyance facility isolated from the delta.

Although some stakeholders believe a small isolated conveyance facility presents overwhelming problems for assurances, most believe that these difficulties increase with the size of the facility. These stakeholders worry that no assurance mechanisms can adequately prevent the future misuse of a large isolated facility.

Each of these descriptions is but a snapshot of a much larger and complex discussion that is continuing in the BDAC Assurances Workgroup and elsewhere. Although it would be easier developing assurances after a preferred program alternative has been selected, the above discussion should provide some insight into the importance of discussing assurance concerns while alternatives are being evaluated.

The list of potential "tools" available for addressing these and other stakeholder concerns about assuring the implementation of the Program is long and varied, ranging from fairly simple contractual agreements to more complex long term financial agreements and multipurpose legislation. These tools are discussed in more detail in the draft Implementation Strategy attached as an appendix to the Programmatic EIS/EIR. Given the complexity of the assurances issues and the need to coordinate both state and federal authorities applicable to the Bay-Delta problem, CALFED is assuming that any significant assurances proposals (such as changes in agency missions, or substantial long term funding commitments) will require state and federal authorizing legislation.

The assurances effort will continue in public BDAC Assurances Workgroup meetings, briefings to BDAC and other discussions with agencies and stakeholders. An implementation plan will be presented in the final EIS/EIR to be released in late 1998.

Financial Package

The second component of a long-term CALFED implementation plan is the financing package. During Phase II of the Program, a work group appointed by the Bay Delta Advisory Council ("BDAC") identified and discussed a number of issues relating to development of the Financial Implementation Strategy. The work group identified what it considered to be the most important issues relating funding the Solution. A summary of major funding sources is provided below followed by a brief discussion of financial principles and remaining issues to be addressed.

Funding Sources - The implementation strategy for finance is to fund the preferred program alternative through a combination Federal, State and user funds. The majority of the funding to date has been for ecosystem actions. Congress authorized Federal funding in the amount of $143 million per year for three years in 1996 for ecosystem-related actions. Proposition 204 provides for over $500 million of State General Obligation (G.O.) bond funding for CALFED actions, the majority of which is for ecosystem-related activities. User funding is currently being provided through a number of ongoing programs for a variety of activities that are consistent with CALFED objectives, in addition to the over $30 million of user funds for the Category III program.

> **Federal Funding**: Additional Federal funding for ecosystem actions as well as other Program elements will be required in future years. As was the case in 1997 when Congress allocated $85 million to the Bureau of Reclamation for CALFED ecosystem restoration, Federal funding is expected to be appropriated in the form of a consolidated line item for the CALFED Solution, in order to maximize efficiency and effectiveness of the implementation of the Solution.
>
> **State Funding**: Additional State funding will also be required for ecosystem and other Program actions. Governor Wilson has proposed $1.3 billion in additional State G.O.

bonds for a mix of CALFED actions, which would need to be approved by the Legislature and State voters during 1998.

User Funding: Additional user funding is also required. Actions that benefit users directly are expected to be paid for with user funding. In addition, some portion of the common Program elements that create widespread user benefits may be funded with user money. To accomplish this, some type of new broad-based user charge will likely be necessary in order to reach the necessary spectrum of users benefiting from a CALFED solution. The amount and potential application of such a charge has not been determined, and implementation of this approach will likely require state and federal legislation.

Financial Principles - Several principles guide development of the financial package:

Benefits-Based Approach: Sharing the costs of the Solution based on the benefits being created is the cornerstone principle of the CALFED Financial Strategy. The fundamental philosophy is that costs will be paid by those who enjoy the benefits of the actions, as opposed to seeking payment from those who, over time, were responsible for causing the problems being experienced in the Bay Delta system.

Many of the benefits are difficult to quantify. Benefits associated with restoring ecosystem health, for example, are not measurable in the same way as the benefits of water supply improvements. This implies that while the benefits-based approach is useful as a guide, benefits cannot be used in a strictly quantitative way to arrive at an answer regarding sharing of costs.

Also, even though they agree in principle with the benefits-based approach for future costs, some stakeholders and CALFED agencies feel that direct beneficiaries of water development, including water users, should pay something for past damage to the ecosystem prior to using the benefits approach for future costs. The essence of this concept is that a benefits-based approach for the future is only fair if all parties start out from an equal position. Some feel that reaching this "level playing field" would take an initial adjustment in favor of the ecosystem. Assessing water users for this type of adjustment is difficult because there is not general agreement over what role any particular water diversion, or water diversions in general, may have played in degrading the ecosystem to date. In addition, water users argue that they have already paid sufficient amounts over time to offset any past actions.

The remaining questions that must be resolved relating to the benefits-based approach revolve around what to do when benefits that cannot be quantified, and whether or not any adjustment for past impacts is appropriate prior to using the benefits approach going forward.

Public/User Split: Both public money and user money will be used to fund the CALFED solution. The public and user concepts have also been extended to describe the benefits. In principle, public money will be used to do things that create public benefits, and user money will be used to do things that create user benefits. *User money* refers to money, which is collected in exchange for provision of a good or service. Fees paid for water service are a clear example of user money. Although many of the water providers are public agencies, funds collected by these agencies in exchange for their services are not defined as public money for purposes of funding the CALFED solution.

Benefits can be generally classified as either "public" or "user" based on the practicality of excluding individuals from access. If individuals can be effectively excluded from receiving a benefit, then they can probably be charged for access to it.

> *Public benefits* are generally those that are shared by a wide cross-section of the community and from which individuals cannot be realistically excluded. Inability to exclude individuals means that imposing charges for access to the benefit is difficult. If "free riders" can access the benefits without paying, there is no economic incentive for users to spend their money for these benefits. This means that if these benefits are to be created, public funding must be used.
>
> *User benefits* are generally those that accrue to an identifiable subset of the community, and from which individuals can be excluded. The ability to restrict benefits to those that pay enables these benefits to be funded with user money. In some cases, such as metered water use, individuals can be charged based on volume of use. In other cases charges are based on simple access to the benefit.

There are additional questions in defining public versus user benefits that arise in conjunction with benefits that are not clearly one or the other. Some user benefits are so widespread that the group sharing them is substantially the same as the general public. The keys to resolving this issue may lie in whether or not access to the benefit can reasonably be excluded to those who do not pay for that access, and in whether future behavior can be beneficially affected depending on the choice of funding mechanism.

Ability to Pay: This issue relates to whether or not specific users will be obligated to pay the full cost allocation for their benefits, or whether some obligations should be reduced based on the limited ability of certain users to pay the full cost of their benefits. Such reduced obligations would have to be subsidized either by other users or with public funds. A third option that must be considered is the possibility for reducing or eliminating benefits for those who are unable to pay for them. A third option that must be considered is the possibility for reducing or eliminating benefits for those who are unable to pay for them.

In principle, users should pay their full share, with any exceptions to be considered on a case by case basis after a full cost allocation has been made assuming no ability to pay constraints. The concept is that any reductions in cost obligations based on inability to pay the full cost share should be explicitly identified and justified.

Crediting: This policy relates to reducing Solution-related cost obligations to reflect payments made by obliges toward other parallel efforts to address Bay-Delta issues. An interim policy granting credit for cash contributed to the Category III Program has been approved by CALFED, but no additional provisions for long-term crediting have been approved.

In principle, all expenditures directed at the Bay-Delta system are part of the overall effort to improve that system. Consolidating all of the parallel efforts to address Bay-Delta ecosystem issues has been advocated as an important step in ensuring effective and efficient use of the available funding for such efforts. Consolidating these efforts is seen as a way to coordinate the timing and implementation of many diverse and complex projects, as well as to enable flexible use of available funding.

As part of the long-term crediting policy many additional details must be agreed upon, including the start date for crediting, types of payments to be credited, consideration of the timing of payments, and others.

Cost Allocation Methodology: This relates to selection of particular cost allocation techniques for making detailed cost allocations within the sphere of a benefits-based cost allocation approach. No policy decision has been articulated here, although individual CALFED agencies have historical policies relating to cost allocation techniques. Within the stakeholder community, there is general consensus that while traditional methodologies may be applicable for conventional facilities, they may not be appropriate for use with the Common Programs due to the difficulty in including non-market benefits created by the Common Programs in the allocation process.

There are many possible cost allocation methods, each with its own strengths and weaknesses. The BDAC Finance Work Group developed a set of conceptual criteria to guide the selection of methods for dividing the costs of the CALFED solution. Selection of a specific method for each Program element may be in order, and this selection will probably involve tradeoffs among these criteria. There is no single best method that addresses all of the criteria in an optimal way.

While the fundamental policy direction for each of the Financial Principles discussed above has been identified, much work remains to be completed. Most of the remaining work is in the detailed application of these policies to a preferred program alternative. Resolution of these issues will require the involvement of policy level representatives of Federal and State agencies and stakeholder interests. The process for moving these issues through the public and stakeholder process that has defined the Program to date must be implemented during 1998 to enable resolution of these issues prior to finalization of the Implementation Strategy for the Preferred program alternative.

6. OTHER CONTINUING/FUTURE WORK EFFORTS

Restoration Coordination

In December 15, 1994, the Bay-Delta Accord included a commitment by the agency and stakeholder signatories to develop and fund non-flow related ecosystem restoration actions to improve the health of the Bay-Delta ecosystem. This commitment is commonly referred to as *Category III*. Some of the specific non-flow factors identified to be addressed as part of the Category III commitment include unscreened water diversions, waste discharges and water pollution prevention, fishery impacts due to harvest and poaching, land derived salts, exotic species, fish barriers, channel alternations, loss of riparian wetlands, and other causes of estuarine habitat degradation.

While the details of the preferred program alternative are not finalized, Category III actions can be beneficial to the long term program regardless of which alternative is selected. The Category III actions must be consistent with each of the three alternatives and provide early implementation benefits. This implementation will also provide valuable information for use in adaptively managing the system in later years of the program. Category III projects must have appropriate environmental documentation, have no significant adverse cumulative impacts, and must not limit the choice of a reasonable range of alternatives.

Funding sources for near-term restoration activities include $60 million from state Proposition 204 funds (Bay-Delta Agreement Program) and stakeholder contributions of $30 million. In addition, Congress authorized $430 million for fiscal years 1998, 1999, and 2000 to fund the Federal share of Category III and initial implementation of the ERP. In Federal fiscal year 1998, $85 million was appropriated for Bay-Delta ecosystem restoration, a portion of which is considered Category III funding. Proposition 204 also include $390 million for implementation of the ERP, however, this funding will not be available until after the EIS/EIR is final.

In June 1997, CALFED issued a request for proposal (RFP) soliciting applications for ecosystem restoration activities. The RFP focused on targeted species, including anadromous fish, Delta native fish and migratory birds. CALFED received 332 proposals which were evaluated by technical panels comprised of agencies and stakeholders. In addition, public input was obtained via the Bay Delta Advisory Council and its subcommittee, the Ecosystem Roundtable.

On December 17, 1997, the CALFED Bay-Delta Program announced more than $100 million in funding for 50 ecosystem restoration projects selected from the proposals submitted pursuant to the RFP. This included approximately $60 million of CALFED awards using Proposition 204, federal and stakeholder funds, with more than $40 million in cost sharing from project proponents. About three-fourths of the money was devoted to projects that restore rivers, riparian forests, wetlands, and marshes. The remainder went to projects such as installing fish screens to keep endangered fish from being pumped out of rivers; preventing introduction of exotic species that are accidentally released into the wild; water quality monitoring and research, educating farmers on how to improve farming practices to lessen reliance on pesticides, as well as research on endangered species such as delta smelt. Currently, $21.6 million in additional proposals are being considered. Approximately $48.5 million in remaining funds will be awarded in 1998.

For 1999 funding, CALFED is revising and updating the priorities to ensure that they are consistent with the ERPP and to build on restoration actions funded to date. These revised priorities will guide development of restoration actions.

Feasibility Studies

CALFED will also continue work on feasibility studies for the storage and conveyance, water quality, and ecosystem restoration elements. These studies will provide more detailed information than that obtained from the impact analyses for the programmatic EIR/EIS and will move program elements closer to implementation. The following paragraphs show some advantages of continuing with feasibility studies:

Provide Support for Implementation Plans - The prefeasibility studies provide support for implementation plans by developing specific information on costs, water supply, flows, water quality, site impacts, and other factors for representative combinations of Program elements. For example, the feasibility of implementing offstream storage to enhance water supply opportunities depends on the specific locations available for development such as topography, geology, environmental concern, proximity to a water supply source, and existing conveyance facilities.

Refine Layouts, Sizes, and Other Details - While the impact analyses evaluated a broad range of facility sizes, the feasibility studies provide information for additional sizes within that range. The feasibility analyses will provide additional detail that will lead to narrowing the range of sizes for the preferred program alternative and ultimately lead to the selected sizes for implementation.

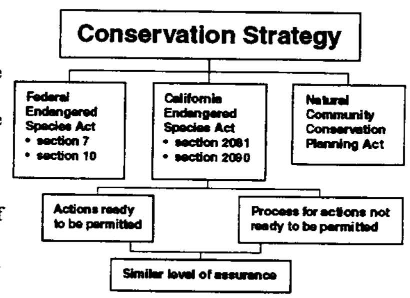
Provide Detailed Costs - The programmatic EIR/EIS will primarily display benefits and adverse impacts of the alternatives and will include only program level costs for the ends of the range being studied. The feasibility studies will provide more detailed cost information to assist the stakeholders and decision makers in their deliberations on the "preferred program alternative".

Shorten Time to Implementation - The feasibility studies provide early direction for the process of planning, site specific environmental documentation, design, and construction required for project implementation in Phase III. While the studies will not progress so far, before the selection of the preferred program alternative, so as to produce unnecessary analysis, continuing the feasibility studies will allow the Program to move more efficiently into project implementation.

State and Federal Endangered Species Act Compliance

CALFED has begun developing a process to comply with the California Endangered Species Act (CESA) and the Federal Endangered Species Act of 1973, as amended (ESA), and will continue to develop that process during Phase II of the Program. As a foundation for implementing the California and Federal ESA compliance process, CALFED is developing a comprehensive Conservation Strategy for the CALFED Program. The Conservation Strategy is intended to integrate CALFED Program enhancement and mitigation actions to provide for improved species and habitat protection, increase assurances of overall Program implementation, and streamline California and Federal ESA take authorization for approved actions.

The regulatory mechanisms that will be used to authorize incidental take under the Federal ESA include formal consultation pursuant to Section 7, permit issuance pursuant to Section 10(a)(1)(B), which includes the development of one or more Habitat Conservation Plans (HCP), and/or a special rule for threatened species under Section 4(d). The regulatory mechanisms that will be used to authorize take under CESA include Section 2835 of the California Fish and Game Code (the Natural Community Conservation Planning Act), which includes the development of a Natural Community Conservation Plan (NCCP), Section 2081 of the California Fish and Game Code, and/or Section 2090 or successor sections of the California Fish and Game Code. The Conservation Strategy will provide the basis for any and all of the above regulatory mechanisms and will remain constant regardless of which mechanism is used to authorize take (i.e., the Strategy will specify the same measures whether take is authorized through Section 7, 10, or 4(d) of the ESA and Section 2835, 2081, or 2090 or successor sections of the CESA).



The Conservation Strategy will address all federally and state listed, proposed, and candidate species that may be affected by the CALFED Program; other species identified by CALFED that may be affected by the Program and for which adequate information is available also will be addressed in the Strategy. The term "covered species" is used to refer to all of the species that will be addressed by the Conservation Strategy. CALFED is currently developing the list of covered species. The Strategy will address the effects of CALFED Program actions (beneficial, adverse, and neutral) on the covered species, and the minimization and mitigation measures needed to offset the anticipated adverse impacts and allow for species recovery. The Conservation Strategy also will address the conservation and protection of habitats affected by the CALFED Program. In addition, the Conservation Strategy will include a monitoring and reporting program, specify a process for adaptive management, and address funding for implementation of the Strategy and to address unforeseen circumstances. The Conservation Strategy, in the context of the CALFED comprehensive long-term plan, will allow for the recovery of listed species and the conservation of currently unlisted species.

Take authorization would be granted, to the appropriate implementing entity or individual, when adequate information is available to assess project effects on listed or other covered species and a determination is made that the appropriate findings or requirements under the California and/or Federal ESA have been made or met. The Conservation Strategy will outline the criteria and process for determining the appropriate regulatory mechanism for implementing the Strategy and authorizing incidental take associated with specific Program actions. As noted above, Federal authorization of incidental take associated with an action may be through formal consultation (Section 7), an incidental take permit and HCP (Section 10), or a special rule for threatened species (Section 4(d)); State authorization of incidental take may occur through an NCCP (Section 2835), an incidental take permit (Section 2081), or formal consultation (Section 2090).

The CALFED Bay-Delta Program is being conducted in a three-phase planning effort. Phase I, completed in September 1996, identified solution alternatives to be further analyzed in the second Phase. During Phase II, the Program is conducting a comprehensive programmatic environmental review by adding a greater level of detail to each of the program components. Phase II will conclude with the selection of a preferred program alternative, the development of an Implementation Strategy and Conservation Strategy, and the completion of a final programmatic environmental impact statement and report. Commitment to implementing the Conservation Strategy will be embodied in an appropriate mechanism, such as an Implementing Agreement.

While implementation of some of the Program actions may begin during Phase II, implementation of many of the Program actions will take place during Phase III of the Program. This period will include any additional site-specific environmental review and necessary permitting. Implementation is anticipated to occur over a period of years primarily because of the size and complexity of the alternatives in solving the problems. Much of the challenge will be to develop an effective Implementation Strategy that acknowledges this long implementation period and finds a way to keep participants committed to the successful completion of all phases of implementation and all components of the Program.

Based on what CALFED expects to complete during Phase II, actions that are likely to have completed California and Federal ESA regulatory compliance and be permitted or conditionally permitted by the end of Phase II include: some ERPP actions, some levee integrity actions, some water quality actions, some conveyance actions within the Delta, and "interim" operating procedures (i.e., covering the transition from existing conditions through completion of the CALFED Program) for water storage and conveyance, including the State Water Project and Central Valley Project.

Compliance with Clean Water Act Section 404(b)(1) Guidelines

Section 404 of the Clean Water Act requires that a project proponent obtain a permit from the Corps for activities that involve the discharge of dredged or fill material into waters of the United States (33 USC 1344). Section 404 requires that the issuance of a permit by the Corps comply with EPA's Section 404(b)(1) Guidelines (Guidelines). These guidelines provide direction and guidance for implementation of Section 404.

EPA's Guidelines (40 CFR 230 et seq.), the Corps' regulatory guidelines (33 CFR 320 et seq.), and the National Environmental Policy Act (NEPA) and NEPA Guidelines (40 FR 1500 et seq) provide part of the substantive environmental criteria and procedural framework used to evaluate applications for Corps permits for the discharge of dredged or fill material into waters of the United States, including wetlands and other designated special aquatic sites. Under the Corps evaluation, an analysis of practicable alternatives is a screening mechanism used to determine the appropriateness of permitting a discharge. The Corps evaluation also includes analysis of compliance with other requirements of the 404(b)(1) Guidelines, a public interest review and evaluation of potential impacts on the environment in compliance with NEPA.

According to the 404(b)(1) Guidelines, an alternative is considered practicable if it is available and can be implemented given considerations of cost, existing technology, and logistics in light of overall project purposes. Practicable alternatives may include siting a project in areas not owned by an applicant, but that could be reasonably obtained by the project applicant, to achieve the basic project purpose (40 CFR 230.10[a][2]).

Many features of CALFED have the potential to require the discharge of dredged or fill material into waters of the United States, including designated special aquatic sites. The ERP contains many such actions, including the restoration of wetlands, restoration of channel islands, construction of fish barriers, construction of fish screens, and restoration of riparian habitat. The Levee System Integrity Program contains actions, such as the creation of setback levees, improvements to levee maintenance, and the flooding of islands, that could require a Corps permit. The water supply reliability components consider actions, such as the creation of additional water storage capacity and the construction of conveyance facilities in the Delta, and the Water Quality Program contains actions, such as the construction of water quality barriers, that would require a Corps permit. Section 404 Permits will be required during Phase III.

A 404 Permit is not required for Phase II of the CALFED process because selection of the preferred program alternative will not authorize implementation of the projects composing the preferred alternative and therefore will not involve the discharge of materials into the waters of the United States. Nevertheless, the alternatives under consideration in the CALFED process are being analyzed in the light of the requirements of the 404(b)(1) Guidelines so that when the Corps is required to determine whether particular Phase III projects comply with the 404(b)(1) Guidelines, it will have the benefit of an analysis as to the consistency of the CALFED preferred program alternative with the 404(b)(1) Guidelines at a programmatic level.

During Phase I of this process, the problems of the Bay-Delta were identified, objectives defined, a comprehensive list of actions for achieving the objectives were compiled, and preliminary alternatives assembled. The remainder of Phase I consisted of an iterative process of analyzing and screening alternatives, leading to the selection of a preferred program alternative. The initial screening of alternatives, beginning with 100 and selecting 10, was principally an effort to combine alternatives so that each, in keeping with the CALFED solution principles, provided balanced benefits to each to the problem areas. In screening from 10 to three alternatives, some were removed from further consideration; others were not eliminated, but became variations of the three main conveyance concepts: existing system conveyance, modified through-Delta conveyance, and dual-Delta conveyance (a combination of through-Delta and isolated conveyance). These three alternatives, and 12 variations associated with them, were carried forward for further refinement in Phase II. In Phase II, the three alternatives are being subjected to further analysis, resulting in further refinements, and will result in the eventual selection of the preferred program alternative.

This process is consistent with the Section 404(b)(1) Guidelines in that the screening of alternatives is intended to lead to the selection of the least environmentally damaging practicable alternative. Implementation of Phase III actions involving the discharge of dredged or fill material into waters of the United States may require site-specific documentation that specific proposals comply with EPA's Section 404(b)(1) Guidelines.

Phase III Site-Specific Environmental Documentation

During Phase III of the CALFED Program, second-tier site-specific environmental documents will be prepared for the individual actions or site-specific projects chosen for implementation during the current Phase II process. Second-tier documents, will be prepared after certification of the Programmatic EIS/EIR to concentrate on issues specific to the individual parts of the program elements being implemented or the site chosen for the action. The second-tier document will summarize and incorporate by reference the issues discussed in the broader program-oriented EIS/EIR and focus on the issues specific to the part of the overall program being implemented. Information presented in the second-tier EIS/EIR will be specific to a smaller area within the CALFED Bay-Delta study area and will focus on impacts within the smaller area and individual action-level mitigation performance criteria.

7. GLOSSARY OF TERMS

AF Abbreviation for acre feet; the volume of water that would cover one acre to a depth of one foot, or 325,851 gallons of water. On average, could supply 1-2 households with water for a year. A flow of 1 cubic foot per second for a day is approximately 2 AF.

Alternative A collection of actions or action categories assembled to provide a comprehensive solution to problems in the Bay-Delta system.

Action A structure, operating criteria, program, regulation, policy, or restoration activity that is intended to address a problem or resolve a conflict in the Bay-Delta system.

Action Category A set of similar actions. For example, all new or expanded off-stream storage might be placed into a single action category.

Anadromous Fish Fish that spend a part of their life cycle in the sea and return to freshwater streams to spawn.

Best Management Practices (BMP) An urban water conservation measure that the California Urban Water Conservation Council agrees to implement among member agencies. The term is also used in reference to water quality standards.

Carriage Water Additional flows released during export periods to ensure maintenance of water quality standards and assist with maintaining natural outflow patterns in Delta channels. For instance, a portion of transfer water released from upstream of the Delta intended for export from south Delta would be used for Delta outflow.

Central Valley Project (CVP) Federally operated water management and conveyance system that provides water to agricultural, urban, and industrial users in California.

***Central Valley Project Improvement Act* (CVPIA)** This federal legislation, signed into law on October 30, 1992, mandates major changes in the management of the federal Central Valley Project. The CVPIA puts fish and wildlife on an equal footing with agricultural, municipal, industrial, and hydropower users.

CFS An abbreviation for cubic feet per second.

Channel Islands Natural, unleveed land masses within Delta channels. Typically good sources of habitat.

Common Delta Pool This concept suggests the Delta provides a common resource, including fresh water supply for all Delta water users, and all those whose actions have an impact on the Delta environment share in the obligation to restore, maintain and protect Delta resources, including water supplies, water quality, and natural habitat.

Common Program Six programs for Water Use Efficiency, Water Quality, Levee System Integrity, Ecosystem Restoration, Water Transfers, and Watershed Management Coordiantion that are essentially the same for each of the three Phase II alternatives.

Component A group of related action categories; the largest building blocks of an alternative. The components for the Phase II Alternatives include a component for Delta conveyance, a component for storage, and the four common programs.

Conjunctive Use The operation of a groundwater basin in combination with a surface water storage and conveyance system. Water is stored in the ground water basin for later use in place of or to supplement surface supplies. Water is stored by intentionally recharging the basin during years of above-average water supply.

Conveyance A pipeline, canal, natural channel or other similar facility that transports water from one location to another.

Core Actions Actions that would be included in all CALFED Bay-Delta Program alternatives. Core actions are no longer viewed as a single set of actions. Rather, these actions are now distributed between the six common programs included in each of the three Phase II Alternatives.

Delta Inflow The combined water flow entering the Delta at a given time from the Sacramento River, San Joaquin River, and other tributaries.

Delta Islands Islands in the Sacramento-San Joaquin Delta protected by levees. Delta Islands provide space for numerous functions including agriculture, communities, and important infrastructure such as power plants, transmission lines, pipelines, and roadways.

Delta Outflow The net amount of water (not including tidal flows) at a given time flowing out of the Delta towards the San Francisco Bay. The Delta outflow equals Delta inflow minus the water used within the Delta and the exports from the Delta.

Demand Management Programs that seek to reduce demand for water through conservation, rate incentives, drought rationing, and other activities.

Diversions The action of taking water out of a river system or changing the flow of water in a system for use in another location.

Drought Conditions A time when rainfall and runoff are much less than average. One method to categorize annual rainfall is as follows, with the last two categories being drought conditions:

wet, above normal, below normal, dry critical.

Dual Conveyance A means of improving conveyance across the Bay-Delta by both improving through Delta conveyance and isolating a portion of conveyance from Delta channels.

Ecosystem A recognizable, relatively homogeneous unit that includes organisms, their environment, and all the interactions among them.

Entrainment The process of drawing fish into diversions along with water, resulting in the loss of such fish.

ESA (Endangered Species Act) Federal and State legislation that provides protection for species that are in danger of extinction.

Export Water diversion from the Delta used for purposes outside the Delta.

Fish Migration Barriers Physical structures or behavioral barriers that keep fish within their migration route and prevent them from entering waters that are not desirable for them or their migration pattern.

Fish Screens Physical structures placed at water diversion facilities to keep fish from getting pulled into the facility and dying there.

Groundwater Banking Storing water in the ground for use to meet demand during dry years. In-lieu Groundwater Banking Replaces groundwater used by irrigators with surface water to build up and save underground water supply for use during drought conditions.

HMP (Hazard Mitigation Plan) One of two standards referred to in the alternatives for levee flood protection. Following the flood disasters of the 1980s, HMP standards were established at 1 foot of freeboard above the 100-year flood event level.

Hydrograph A chart or graph showing the change in flow over time for a particular stream or river.

In-Delta Storage Water storage within the Delta by converting an existing island to a reservoir.

In-lieu Groundwater Banking Replaces groundwater used by irrigators with surface water to build up and save underground water supply for use during drought conditions.

Inverted Siphon A pipeline that allows water to pass beneath an obstacle in the flow path. For example, an inverted siphon could be used to allow water in a canal to pass under a Delta channel.

Isolated Conveyance Facility A canal or pipeline that transports water between two different locations while keeping it separate from Delta water.

Land Fallowing/Retirement Allowing previously irrigated agricultural land to temporarily lie idle (fallowing) or purchasing such land and allowing it to remain out of production for a variety of purposes (retirement).

MAF An abbreviation for million acre feet, as in 2 MAF or 2,000,000 AF. For scale, consider that 10,000 cfs flowing for a year is about 7 MAF.

Mining Drainage Remediation Controlling or treating polluted drainage from abandoned mines.

Meander Belt Protecting and preserving land in the vicinity of a river channel in order to allow the river to meander. Meander belts are a way to allow the development of natural habitat around a river.

Non-native Species Also called introduced species or exotic species; refers to plants and animals that originate elsewhere and are brought into a new area, where they may dominate the local species or in some way negatively impact the environment for native species.

Real-Time Monitoring Continuous observation in multiple locations of biological conditions on site in order to adjust water management operations to protect fish species and allow optimal operation of the water supply system.

Riparian The strip of land adjacent to a natural water course such as a river or stream. Often supports vegetation that provides the best fish habitat values when growing large enough to overhang the bank.

Riverine Habitat within or alongside a river or channel.

Setback Levee A constructed embankment to prevent flooding that is positioned some distance from the edge of the river or channel. Setback levees allow wildlife habitat to develop between the levee and the river or stream.

Shallow Water Water with little enough depth to allow for sunlight penetration, plant growth, and the development of small organisms that function as fish food. Serves as spawning areas for delta smelt.

Smolt A young salmon that has assumed the silvery color of the adult and is ready to migrate to the sea.

Solution Principle Fundamental principles that guide the development and evaluation of Program alternatives. They provide an overall measure of acceptability of the alternatives.

South of Delta Storage Water storage supplied with water exported south from the Delta.

State Water Project (SWP) A California state water conveyance system that pumps water from the Delta for agricultural, urban domestic, and industrial purposes.

TAF An abbreviation for thousand acre feet, as in 125 TAF or 125,000 AF.

Take Limit The numbers of fish allowed to be lost or entrained at a water management facility before it must limit or cease operations. The numbers are set for different species by regulations.

Terrestrial Types of species of animal and plant wildlife that live on or grow from the land.

Through Delta Conveyance A means of improving conveyance across the Bay-Delta by a variety of modifications to Delta channels.

Upstream Storage Any water storage upstream of the Delta supplied by the Sacramento or San Joaquin Rivers or their tributaries.

Water Conservation Those practices that encourage consumers to reduce the use of water. The extent to which these practices actually create a savings in water depends on the total or basin-wide use of water.

Water Reclamation Practices that capture, treat and reuse water. The waste water is treated to meet health and safety standards depending on its intended use.

Water Transfers Voluntary water transactions conducted under state law and in keeping with federal regulations. The agency most involved is the State Water Resources Control Board (SWRCB).

Watershed An area that drains ultimately to a particular channel or river, usually bounded peripherally by a natural divide of some kind such as a hill, ridge, or mountain.