CALFED
BAY-DELTA
PROGRAM

CALFED Bay-Delta Program

Draft Finance Plan*

June 1999

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5.0 FINANCING PLAN

Executive Summary

With the signing of the Record of Decision, scheduled for June 2000, CALFED will need to have a financing plan in place to begin implementation. In fact, early implementation of portions of the Program will begin in 1999 with existing funding sources. To be prepared for program implementation, a finance plan is needed to guide state and federal administration and legislative discussions regarding new bonds, new fees, and proposed budget appropriations.

This draft lays the initial framework for developing a CALFED Finance Plan. The Plan provides background, definitions, description of Program benefits, description of possible funding sources, financing options, and issues to resolve to finalize a Finance Plan. CALFED will work to complete the Finance Plan in 1999, but no later than the time of the ROD.

The Finance Plan for implementing the CALFED Bay-Delta Program is a critical component of the Program because of the assurance needed by member agencies and stakeholders that a serious and concerted effort will be made to secure funding for all components over the life of the Program. In developing financial strategies and cost-sharing for the many aspects of the CALFED Program, CALFED is following several basic steps:

- Identifying the priority actions for implementation
- Developing cost estimates for priority actions
- Identifying the funding and cost-sharing formulas in existing laws and agreements
- Identifying program/project benefits and beneficiaries
- Identifying finance issues that affect the successful implementation of the Program
- By the time of the ROD, CALFED will recommend cost allocation procedures and cost-sharing strategies for each program element and in some cases for individual projects.

A fundamental philosophy of the CALFED Program is that costs should, to the extent possible, be paid by the beneficiaries of the Program actions. There are reasons, other than equity and fairness, that the beneficiaries pay principle be applied to CALFED and other water resources programs. Having beneficiaries pay for public programs encourages them to more carefully review their water and power needs and the costs of proposed programs (including mitigation costs) in relation to the benefits they receive. Such a policy also encourages examination of a

fuller range of alternatives, including locally funded measures, in order to assure that public funds are spent in the most cost-effective way to meet Program goals.

Definitions. There are several terms that require definition to provide clarity in the chapter: (a) initial funding shares (which may or may not correspond to final funding shares); (b) cost allocation - the distribution of costs to project purposes and beneficiaries; (c) cost shares (formulas typically used for sharing the costs allocated to each project purpose); (d) proposed cost shares - the shares that would be recommended for use by the CALFED Program; and (e) effective cost shares (the percentage that each beneficiary group ultimately pays). The effective cost shares differ from the proposed cost shares if repayment terms are at below-market rates.

Historical Financing. CALFED's finance strategy must be considered within the current and historical context of state and federal water resources financing. Historically, federal water projects have been financed with appropriations and, in some cases, repayment was provided by beneficiaries at below market rates of interest (or no interest). This resulted in historically low levels of effective cost-sharing. Since the 1980's, federal water resources agencies have been requiring higher levels of non-federal cost-sharing, through higher levels of up-front cost-sharing and other means. In the CVP, the Central Valley Project Improvement Act of 1992 enacted tiered water rates, Mitigation and Restoration payments, and other fees to be deposited into a Restoration Fund to be used for environmental purposes. Financing for the State Water Project relies principally on general obligation bonds and revenue bonds repaid by water and power users, which provides high levels of effective cost-sharing. In general, there has been a shift in federal and state water financing toward higher levels of repayment and higher effective cost shares by local entities.

Program Benefits/Beneficiaries. At this time, because many of the actions have not yet been specified, (e.g., water use efficiency actions, storage sites), the specific benefits cannot be identified or measured, and Program costs cannot be allocated. In other cases, such as ecosystem restoration, benefits can be identified but not easily measured. However, to initiate the finance discussions, and lay the framework for a CALFED finance strategy, this chapter identifies expected benefits and beneficiaries at the program level. For actions where benefits can be measured, the program or project costs will be allocated among the benefit categories. In the Final Finance Plan a specific cost allocation procedure will be identified. For those program elements where benefits cannot be easily measured (ecosystem, water quality, watershed programs) CALFED will need to identify a procedure for estimating and allocating costs. After the benefits analysis and cost allocation, CALFED may propose cost shares that differ from existing state and federal cost-sharing formulas or may use the cost-sharing formulas in existing programs. Final decisions on cost-sharing will be made by the state and federal legislatures.

The benefits from each program element (both near-term and expected future benefits), as well as cost-sharing issues and potential cost-sharing options are described in this chapter. In general, these options differ financially (the extent to which they require higher levels of repayment from beneficiaries), or institutionally (in terms of what mechanism they rely on to secure repayment,

ranging from existing programs, up-front cost-sharing, recovery through water rates, or recovery through other user charges). Some of these options address user fees targeted at the beneficiaries of a particular program (e.g., directly linked to a group of benefitting water districts, such as Delta diverters).

Financing Mechanisms. This chapter compares several different financing mechanisms, all of which have been used to date and are expected to be used in the future, including state and federal appropriations, state general obligation bonds, state water and power revenue bonds (tied to SWP water and power rates), private financing, and a broad-based user fee (e.g., the Mitigation and Restoration payments imposed by the CVPIA). The advantages and disadvantages of these various funding sources and financing mechanisms are described.

CALFED and CALFED stakeholders have discussed the use of a broad-based Bay-Delta system diversion fee, particularly to finance some of the programs or actions with broad-based public benefits, such as the Ecosystem Restoration Program (such a fee is discussed, for example, in the 1996 report *Maintaining Momentum on California Water Issues: Business Leaders' Findings - Financing Options for Water-Related Infrastructure in California* produced by the California Business Roundtable, the California Chamber of Commerce, the California Farm Bureau Federation, and the California Manufacturers Association). The basic concept is a fee that would apply to all diverters, or all major diverters of water from tributaries that flow into the Delta as well as exporters of Delta water. This chapter explores how such a broad-based diversion fee could be structured and what revenues could be expected for fees similar to those established in the CVPIA. The crediting of contributions to date would be an integral part of implementing any broad-based diversion fee.

5.1 Definitions

Cost-sharing and cost allocation are sometimes used interchangeably but to mean quite different things. For clarity, this report will distinguish different uses of these terms.

Initial Funding Shares. Typically, funds for constructing state and federal water resources storage projects are provided by the respective governments. For some programs local up-front cost-sharing may be provided concurrently. But these initial funding shares may or may not represent the ultimate cost shares. For example, repayment of the water delivery costs by water contractors in the Reclamation and state programs means that these users ultimately share in the costs of the project (see the definitions of "cost-sharing" and "effective local cost shares" below.) If no additional payments are required and if no other adjustments are made, the initial funding shares become the same as the "effective cost shares."

Cost Allocation. Cost allocation is used to mean the allocation of costs among program purposes or benefit categories. Traditionally, benefits of water resource programs have been categorized by project purposes. For example, the federal *Economic and Environmental*

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Principles and Guidelines for Water and Related Land Resources Implementation Studies (Principles and Guidelines) (U.S. Water Resources Council, 1983), which govern benefit-cost procedures for federal projects, recognize the following benefit categories: municipal and industrial water supply, agriculture (including avoidance of flood damage), urban flood damage, hydropower, navigation, recreation, and commercial fishing. Many, but not all, of the benefits of the CALFED Program elements can be placed in the same categories.

Historical Cost-Sharing. Historically, both the federal and state governments have applied cost-sharing formulas or percentages to allocated costs, either as a matter of law or policy. In some cases, the non-federal cost shares may be met by a combination of cash contributions and local "in-kind" contributions (for example, land, easements, rights-of-way, relocations, and dredged material disposal - LERRDs). While these cost-sharing formulas may reflect the historical federal or state willingness to fund the type of project or program (and while these cost share formulas may rely on costs allocated based on an assessment of the benefits of individual projects or programs), they may not fully reflect the beneficiaries pay principle because they have not required full repayment of allocated costs. For example, for construction costs allocated to flood control, the Water Resources Development Act of 1996 establishes 65% as the maximum cost share paid by the federal government, with 35% coming from non-federal sources (operation and maintenance costs for flood control usually require 100% non-federal payment).

As part of the CALFED discussion of cost-sharing, this chapter reviews some of the major existing state and federal programs, laws, and policies which specify cost-sharing. The cost-sharing in these existing programs will be evaluated and may or may not be proposed for CALFED proposed cost-sharing. The initial funding shares that have occurred to date in CALFED will be one consideration in developing proposed cost-sharing, but may not be the final proposed cost shares.

Proposed Cost Shares. The term "proposed cost shares" is used to reflect the proposed CALFED distribution of costs to the beneficiaries. The CALFED Program could either use the cost shares contained in existing law, programs, or policies or the CALFED Program could propose different cost shares and seek authorizing legislation for them.

Effective Cost Shares. If repayment over time of some project costs is required and if below-market rates of interest are used to compute repayment, then the effective cost share of that beneficiary would be less than the proposed cost share expressed in nominal terms. For example, several of the loan programs authorized under Proposition 204 require repayment over 20 years at 50% of current interest rates on general obligation bonds. If the current interest rate were 5%, then repayment at 2.5% would result in an effective local cost share of about 82%, with the remainder of the costs being paid by the state. If no repayment over time is required, then the effective cost shares would be the same as the initial funding shares (for example, the 35% up-front cost share for flood control required by WRDA 1996).

Public Benefits are generally those that are shared by a wide cross-section of the community and from which individuals cannot realistically be 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 them to spend their money for these benefits. This means that if these benefits are to be created, public funding (obtained from the community benefitting) must usually be used.

Private 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 addition there are good reasons why beneficiaries should pay for private benefits: bearing the cost provides incentives for wise use of the resources and it is fair that only those enjoying the benefit should pay. In some cases, such as metered water use, individuals or districts can be charged on the volume of use. In other cases, such as access to recreational facilities, charges are based on simple access to the benefit. Note that as used here, private beneficiaries would include "public" water districts, which supply agricultural or municipal and industrial water to an identifiable group of water users.

5.2 Historical Context for State and Federal Cost-sharing

CALFED is developing the Finance Plan for the Bay-Delta Program relying primarily on a benefits-based approach. This approach is consistent with historical procedures, as well as with recent changes and trends in water financing at the state and federal level. Following is a historical description of state and federal water project financing to provide additional context for the CALFED approach. (See Tables 5.1 and 5.2)

Federal Cost-Sharing. When federal water resource programs were initiated, they had quite different goals from what they have today. The evolution of these programs and changing program goals, as well as altered federal financial priorities, have been the principal motivations for altering cost-sharing and effective cost shares on federal projects.

For example, when the Reclamation program was established in 1902, its principal goal was to assist in settling the West by providing irrigation water to family farms. Repayment was made into a revolving fund, with interest-free repayment occurring over 10 years, which resulted in an effective cost share by water users of about 85%. But irrigators had difficulty meeting these repayment terms, and some projects did not result in as much irrigation as originally envisioned. As a result, a series of measures were passed between 1914 and 1939, which lengthened the interest-free repayment period to 20, 40, and then 50 years, thereby reducing the effective cost-sharing to levels of 50%. As interest rates rose starting in the 1960s, the effective level of non-federal repayment fell to around 15% for irrigation. Over this same period, the cost-sharing for operation and maintenance costs for irrigation remained 100% local.

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TABLE 5.1
Summary of Water Project Cost Sharing For Federal and State Construction

Costs allocated to:	Initial financing share	Nominal local cost share	Effective local cost share	Notes
Construction - federal				
M&I and Hydropower - USBR	100% federal	100%	60% - 70%	below market rates of interest
Irrigation water - USBR	100% federal	100%	15%	zero interest, more than 15% if required up-front
M&I and Hydropower - USACE	100% non-federal	100%	100%	WRDA 1986
Irrigation - USACE	35% non-federal	35% +	35% +	WRDA 1986
Flood control - USACE	35% non-federal, up-front	35%	35%	WRDA 1996, up from 25% in WRDA 1986
Navigation recreational - USACE	50% non-federal	50%	50%	WRDA 1986
Environmental Restoration (general USACE, not CALFED)	25% to 35% non-federal, up-front, depending upon program	25% - 35%	25% - 35%	WRDA 1996
Construction - SWP				
Hydropower, M&I water, and irrigation water	100% state (bonds)	100%	close to 100%	bonds used to finance require repayment

Notes:
USBR = U.S. Bureau of Reclamation
USACE = U.S. Army Corps of Engineers
WRDA = Water Resources Development Act
SWP = State Water Project
Conveyance costs are treated the same as storage, environmental mitigation costs are included in construction costs, the costs of feasibility studies and design are included in construction costs.

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TABLE 5.2
Summary of Water Project Cost Sharing
For Federal and State Planning, Operations and Maintenance

Costs allocated to:	Initial financing share	Nominal local cost share	Effective local cost share	Notes
Planning				
Federal appraisal or reconnaissance studies	100% federal	0%	0%	
Federal Feasibility studies	50% federal	50+ %	50+ %	Planning costs become part of construction costs if project is built
SWP planning	100% SWP water users	100%	100%	Planning costs paid by SWP funds
State comprehensive storage investigations	100% state	Varies	Varies	If a project proceeds to construction then all planning costs will be reimbursed by project sponsors
Operation and Maintenance				
Federal and State	NA--an ongoing expense	100%	100%	100% except for some cases of deferment

Note:
Conveyance costs are treated the same as storage.

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During the first half of the century, additional project purposes were added to federal projects, including municipal and industrial water supply, hydropower, and eventually recreation and fish and wildlife. Unlike irrigation water, municipal and industrial water and hydropower user payments were computed with interest, although sometimes the rates were below current government borrowing rates. The effective cost shares for these uses generally ranged from 60% to 70%, with higher levels on some projects [U.S. Water Resources Council, 1975]. Also, since hydropower was profitable, Congress also adopted provisions under which hydropower revenues could be used on some projects to pay that portion of the construction costs allocated to irrigation - namely that portion which was estimated, through economic analysis, to be above the irrigators payment capacity. This cross-subsidy between these two user groups has become known as taking into account the irrigators' "ability-to-pay."

Starting in about the 1960s, there was increasing recognition that federal subsidization of irrigation water supply in the western states had several negative consequences and was not serving contemporary needs. For one, the small effective cost shares from local water districts encouraged both large capital expenditures on new projects and inefficient water use on existing projects. Too, environmental concerns about the impact of large scale projects were on the rise. Federal policy began to shift toward analyzing and mitigating environmental impacts on projects and to questioning whether the funding of additional large water storage projects was in the national interest now that the western states were settled, especially in the face of low water prices and growing competition for water resources.

Federal policy changed in several ways: funding for large-scale projects received much greater scrutiny; benefit-cost procedures were revised to be more rigorous; more emphasis was placed on the efficient use of water from existing projects, including water transfers; greater levels of non-federal cost-sharing were sought; and methods to increase water fees were examined and, in some cases, mandated by Congress. These policies received additional emphasis in the 1980s as concerns rose over balancing the federal budget and limiting federal spending.

In 1984, federal water resources agencies worked together on several of these items. One result was the adoption of federal policies requiring greater levels of "up-front" cost-sharing on new construction, non-federal contributions made during project construction. For projects constructed by the U.S. Army Corps of Engineers (USACE), these policies eventually became embodied in the Water Resources Development Act of 1986, which comprehensively addressed cost-sharing for Corps of Engineers projects (See Table 5.1). This act raised the required local cost share for flood control projects to 25%, of which a maximum of 20% could be provided by LERRDs (lands, easements, rights of way, relocations, and dredged material disposal). For general navigation, the act required that non-federal sponsors pay from 10% to 50% of the costs during construction, depending on depth. For inland waterways subject to fuel taxes, 50% of the construction cost must be contributed from such user taxes. The Water Resources Development Act of 1996 increased the non-federal cost-sharing requirement for future flood control projects to 35%. The WRDA of 1986 requires that 100% of the costs allocated to M&I water supply and

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35% of the costs allocated to irrigation water be provided by non-federal sponsors. Although not embodied in legislation, the same 1984 set of initiatives indicated that greater levels of up-front cost-sharing for irrigation on new federal projects (targeted at a 35% non-federal contribution during construction) were to be examined on a case-by-case basis.

On a separate track, the Office of Management and Budget raised the criteria for qualifying for water resources loan programs by requiring a higher level of effective cost-sharing. Where interest rates were set at below market rates, this was achieved by requiring a shorter repayment period or requiring a mix of loans that contained a greater percentage of loans with higher interest rates.

In 1982, Congress passed the Reclamation Reform Act (RRA), which required users of irrigation water to pay "full cost," which included interest charges, for water delivered to acreage in a farming operation that was over the 960-acre limit set in the act for receiving water at the historical rates computed on the basis of interest-free repayment. In 1992, the Central Valley Project Improvement Act required contractors for USBR-supplied project irrigation water to pay $6 per acre foot in addition to normal contract or "cost-of-service" rates. Contractors for municipal and industrial water are required to pay $12 per acre foot above the usual rates. The act also established a set of tiered water rates, with higher rates to be charged for water delivered above 90% of historical levels. The CVPIA also contains a formula used to establish additional payments from hydropower users. All of these various collections are paid into a Restoration Fund and is used for authorized environmental purposes.

As regards environmental purposes generally, environmental mitigation has been required for federal projects, with the costs distributed to the project purposes. The WRDA of 1986, 1990, and 1996, which covers Corps of Engineer projects, explicitly recognized environmental restoration and authorized funds for this project purpose, as well as setting out requirements for non-federal cost-sharing.

In general, this history shows a federal policy shift toward higher levels of repayment and higher effective cost shares by non-federal entities, implemented through a combination of increased local up-front financing, financial terms with higher effective levels of repayment, higher user fees, and the adoption of special programs and fees dedicated to environmental restoration.

Cost-Sharing on the State Water Project. The State Water Project began operations much later than the federal Reclamation program and had different goals and a different financing basis. In 1960, California voters approved the Burns-Porter Act which authorized the sale of $1.75 billion in general obligation bonds to build the project. Funds from the sale of general obligation bonds and revenue bonds have provided the major sources of financing (approximately 75 percent) for the construction of the State Water Project. All of these sources of funding are repaid with interest by SWP contractors. Another 10 percent of the cost of project construction has been funded by interest free loans from the tideland oil and gas revenues and

repaid by SWP contractors (revenues have been deposited in the California Water Fund). The remaining 15 percent of the construction costs have been funded by a variety of revenue sources (federal flood control payments, legislative appropriations for recreation). Although no precise estimates are available, the effective level of cost-sharing by project beneficiaries (irrigation districts, municipal districts, and hydropower) is probably close to 100% for new construction.

5.3 Cost Allocation

Over the years, federal and state agencies have developed very specific, agreed-upon procedures for defining project benefits, estimating such benefits, and for allocating project costs to those benefit categories. The interagency *Principles and Guidelines* govern benefit cost analysis on federal projects. The California Department of Water Resources generally follows the same procedures. Benefit and cost definitions and measures are important on multi-purpose projects not only for planning, but also because they are the basis for one of the most frequently used methods for allocating costs, the Separable-Cost Remaining Benefits (SCRB) method.

Although the SCRB procedure is the one preferred in federal cost allocation procedures, other methods are recognized for applications where SCRB cannot be applied. For example, the use of facilities method, which allocates joint costs on the basis of a physical measure, such as storage capacity, may be appropriate in some circumstances where use of facilities can be determined on a comparable basis and where benefit measures and separable costs are not available or too expensive to obtain. Other cost allocation methods and their strengths and weaknesses are discussed in the March 1998 *CALFED Implementation Strategy*, part of the *Technical Appendix of the Programmatic EIS/EIR*, and that discussion is not repeated here.

CALFED Approach to Cost Allocation

Many of the benefits of the CALFED program elements can be categorized in the same way as for multi-purpose projects. The CALFED program elements are organized along functional lines, such as water quality, ecosystem restoration, water use efficiency, storage, and conveyance. Any one of these program elements may have benefits that fall into one or several of the traditional categories (municipal and industrial water supply, agriculture, flood damage, hydropower, navigation, recreation, and commercial fishing). For example, this is true of water storage and conveyance facilities. In this report the benefits and beneficiaries of the CALFED program elements are identified and placed in similar categories. For example, water quality improvements to diverters benefit both agriculture and urban water supply. One additional category is used to reflect non-market benefits to the general public, such as broad ecosystem benefits. For example, water quality can also have broad ecosystem benefits, as well as directly benefitting water diverters.

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The federal benefit-cost and cost allocation procedures have evolved around the planning and design of well defined, multi-purpose projects to be constructed over a relatively short period of time. These are not characteristics of the CALFED Program taken as a whole. Therefore, the SCRB procedure and other established cost allocation methods are ill-suited to allocate the overall costs of the CALFED Program. For one, the various CALFED program elements will continue for over 30 years. Since many of the specific actions and projects have yet to be determined, neither costs nor benefits can be determined at this time. Too, under the principle of adaptive management, program elements and projects are subject to revision as the CALFED Program proceeds. As a result, if the SCRB method or other established procedures were used, they would, in principle, have to be used not once, but applied many times to recalculate benefits as the Program evolved. These considerations make the costs of the CALFED Program, taken as a whole, ill-suited to allocation through established cost-allocation methods. Established cost allocation methods, such as SCRB or proportionate use of facilities would be suitable, however, for analyzing some program elements or actions in the CALFED Program.

Applying Cost Allocation. The program elements to which established procedures would be the most applicable would be storage, conveyance, and water quality improvement projects. Under these procedures, environmental mitigation costs of new facilities are allocated to the project purposes. In many cases, it will not be possible to determine beneficiaries or to estimate benefits until a CALFED Program action reaches the planning and design phase. For example, a storage facility may or may not involve water deliveries for environmental purposes. Similarly, a water use efficiency measure could be designed with the explicit goal of augmenting an instream flow or it could be designed to increase the long-term stability of water supplies to beneficiaries within an agricultural or urban district/region. Therefore, it will be necessary to examine each program element and, in some cases, each action, in order to assign costs based on the beneficiaries of that program element or action. In other cases, it may be possible to group together several actions with the same program benefits in estimating and allocating costs. It is at this step in the analysis that CALFED would apply an appropriate cost allocation method.

Assessment of Non-Market Benefits. The difficulties in applying established procedures Program-wide would also be compounded in the case of CALFED for other reasons. The CALFED Program has a large proportion of program elements with non-market benefits, such as ecosystem restoration and watershed management. Although federal benefit-cost procedures recognize and include methods, such as contingent valuation, for evaluating the non-market benefits of programs (such as recreation), these methods are expensive to implement well. (In the case of environmental quality, including enhancement, on Corps of Engineers projects, it is simply assumed that the benefits are equal to the costs -- a requirement stemming from the WRDA of 1986, Section 907 [33 U.S.C. 2284], although a cost-effective analysis is performed). Therefore, CALFED does not intend to measure benefits for those portions of the Program with a large percentage of public, non-market benefits, such as ecosystem restoration. For example, strict application of a SCRB cost-allocation procedure in these cases, which depends on the measurement of benefits, would be time-consuming and expensive to use.

The first step in the process of distributing costs is to examine what benefits and groups of beneficiaries (private user groups or the public) are linked to each of the CALFED program elements. For some of the program elements, there is a relatively small list of beneficiary categories. For others, the number is larger. As noted above, for some programs or actions, the beneficiaries cannot be determined until the site-specific and functional details of a program are known.

5.4 Program Benefits/Beneficiaries and Finance Options

This section discusses the benefits and beneficiaries for each of the eight CALFED program elements and for the Comprehensive Monitoring Assessment and Research Program. As a point of reference, these sections also contain brief discussions of the existing cost-sharing provisions under current federal and state law or policy. Finally, each section proposes finance options and discusses issues related to cost-sharing under CALFED.

Definition of Benefits. Before examining benefits and beneficiaries on a program-by-program basis, it is useful to review how benefits are defined. Economic benefits are a measure of the willingness of beneficiaries to pay for the flow of services from a program or project - either to obtain additional benefits (additional or more reliable water supplies) or to avoid damages (flood damages, higher treatment costs, or less reliable water supplies). Benefits are not measured simply by looking at the ongoing stream of benefits from existing activities - for example, the economic activity associated with Delta agriculture and recreation. Rather, benefits are measured as the difference between the benefits that would occur with the program compared to the benefits that would occur without the program.

Many of the CALFED program elements involve modifications to existing water flows, water uses, or water quality. The benefits of increased water deliveries would be the willingness to pay for such deliveries, which, in the case of agricultural water, could be measured by increased farm income (less expenses). Water supply benefits would need to be considered in relation to the costs of alternative sources, including water transfers. Sometimes benefits can be measured by the damages avoided. For example, the benefits of improved water quality could be measured as the treatment costs avoided or the avoided health impacts. Flood damages avoided (e.g., by enhanced storage or by levee reconstruction) would be a Program benefit.

The differences in Program benefits with and without a program would need to be considered over time. For example, if a negative impact, such as recreational, agricultural, or environmental losses due to flooding were relatively brief and recovery were possible over the period of a few years, then the benefit of avoidance would be smaller than if the damages were to last for several decades.

5.4.1 Storage

Program Description

CALFED's water management strategy includes groundwater and/or surface water storage which can be used to improve water supply reliability, provide water for the environment at times when it is needed most, provide flows timed to maintain water quality, and protect levees through coordinated operation with existing flood control reservoirs. Decisions to construct groundwater and/or surface water storage will be predicated on complying with all Program linkages including:

- Completion of the Integrated Storage Investigation, which includes an assessment of groundwater storage, surface storage, re-operation of power facilities, and fish barriers.
- Demonstrated progress in meeting the Program's water use efficiency, water reclamation, and water transfer program targets.
- Implementation of groundwater monitoring and modeling programs.
- Compliance with all environmental review and permitting requirements.

New groundwater and/or surface water storage would be developed and constructed, together with aggressive implementation of water conservation, recycling, and a protective water transfer market, as appropriate to meet Program goals. During Stage 1, CALFED will evaluate and determine the appropriate mix of surface water and groundwater storage, identify acceptable projects, and initiate permitting and construction if Program linkages and conditions are satisfied.

The total volume of surface water and groundwater storage being assessed for the Preferred Program Alternative range up to 6.25 MAF. Facility locations being considered are located in the Sacramento and San Joaquin Valleys and in the Delta.

Program Benefits/Beneficiaries

Identification of benefits and cost-sharing for new storage projects needs to be on a project specific basis. As stated above, selection and construction of additional water storage facilities will follow other steps and may not occur for several years. This section, therefore identifies the benefits generally associated with water storage facilities. Potential benefits include:

- **Water Supply Reliability** -- storage facilities can capture excess runoff to be released at times when demands are higher or to accommodate the growth in demand over time.

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- **Water quality** -- appropriately designed storage facilities can provide flows for improved water quality.

- **Ecosystem** -- appropriately designed storage facilities can also provide flows for environmental purposes, such as releases timed to match fish migrations, refuge water supplies, or ecosystem water quality, etc.

- **Flood control** -- some projects provide for increased protection from large flood events.

- **Hydropower** -- some projects provide for the generation of electric power.

- **Recreation opportunities** -- some projects or project facilities can provide enhanced recreational opportunities.

The beneficiaries of new storage facilities would also depend upon the design and operation of each facility and the allocation of the water supply, but could include the following:

- **Agricultural water users.**

- **Municipal and industrial water users.**

- **The public** -- to the extent that water is allocated to environmental restoration or enhancement and increased flood protection is provided for the Delta ecosystem.

- **Floodplain residents/landowners.**

- **Recreational users** of the storage facility directly or those benefitting from ecosystem restoration (e.g., fisheries).

Estimating benefits and cost allocation. As described in the introduction to this chapter, government agencies have adopted procedures for estimating the benefits of several of the purposes of multi-purpose storage facilities (agricultural water use, municipal and industrial use, reduction in flood damages, and recreational uses), as well as standardized approaches to cost allocation among such benefits/purposes. CALFED agencies propose to apply these or other procedures to individual storage projects as they are planned and designed. These standardized procedures don't address environmental restoration per se, but costs could be allocated based on the water used directly for such purposes and not benefitting private users. The allocation to public uses will be addressed by CALFED for each storage facility.

Existing Programs and Funding

Cost-Sharing for Construction. Both federal and state water programs, the Central Valley Project and the State Water Project, were, from their inception, devoted to constructing major storage and delivery systems within California's Central Valley. As described in the introduction to this chapter, there has been an evolution in the goals and financing of federal water projects. The concern over low effective cost shares (in the range of 10% to 15%) for irrigation has placed more emphasis on increasing the repayment from water users or general policies requiring higher levels of up-front cost-sharing (see Table 5.1--cost-sharing table). As Table 5.1 indicates, in some cases this emphasis on increased cost-sharing has resulted in new legislation. Federal law and policy requires that the cost of environmental mitigation on new facilities is allocated to the project purposes which caused the need for the mitigation. Accordingly, the cost-sharing rules or effective cost shares for those project purposes would apply to mitigation costs.

Cost-sharing for Planning and Feasibility Studies. Federal policy for water resources programs does not generally require local cost-sharing for "reconnaissance" level or "appraisal" level review. However, more detailed feasibility or planning studies usually require an up-front non-federal cost share that is generally administered on a "pay-as-you-go" basis in smaller portions. Although federal cost-sharing policy for planning and feasibility studies can vary by authorizing legislation, Bureau of Reclamation projects typically require a 50% local cost share for planning (see Table 5.2). Recent cost-sharing policy for USACE projects, which provide storage mainly for flood control purposes, requires a 50% local up-front cost share for feasibility studies, with an option for the local sponsor to contribute an additional cost share to add a storage function to a project. For project purposes which require repayment, such as irrigation water and municipal and industrial water supply and power, the other 50% of planning costs become part of the construction cost of the project.

In the State Water Project, planning studies have typically been undertaken using SWP funds generated from bonds repaid over time from water and power charges. In the case where planning is for a new facility that benefits only certain SWP contractors, the costs are borne by the benefitting contractors (i.e., costs are included only in the rates to those contractors). In summary, SWP planning costs have an effective local cost share of 100% (or near 100%). Recently, state public funding has been provided for planning and evaluation costs associate with storage investigations (Proposition 204 and state budget General Fund appropriations). See Table 5.2.

Cost-sharing for Maintenance. Maintenance on both state and federal projects is generally funded 100% by the beneficiaries or local interests (see Table 5.2). All SWP O&M costs are repaid by the SWP contractors, for example. Bureau of Reclamation projects require 100% non-federal funding for O&M. The USACE does not fund any O&M on its flood control projects, with a few rare exceptions for pre-1986 facilities.

Proposed Finance Options

Given the magnitude of potential storage expenditures in the CALFED Program, the selection of financing options for new storage will be an important component of the Program. The beneficiaries pay principle indicates that the payment for such storage facilities should be closely linked to the beneficiaries, particularly where such groups can be easily identified, as in the case of water supply.

Options for Cost-Sharing for Construction

Option 1 -- Construct additional storage as part of the federal system and require up-front cost-sharing from water and hydropower users following existing federal cost-sharing laws and policies.

Option 2 -- Construct additional storage projects as components of the State Water Project, which has high levels of local effective-cost-sharing. This option would assure application of the beneficiaries pay principle, while avoiding the need to seek changes in those provisions of federal law that provide low effective cost shares for irrigation water supply. Cost-sharing for the flood control and recreation segments could be handled under existing legislation.

Option 3 -- Construct additional storage projects under a mix of state and federal authorities, relying on the effective levels of local cost-sharing in existing law.

Option 4 -- Construct additional storage projects under a mix of state and federal authorities, but seek new legislation to specify levels of cost-sharing for specific facilities.

Option 5 -- Variation of above -- For certain groundwater storage projects, public funding may be appropriate to ensure implementation and local support.

Cost-Sharing for Planning

In the Revised Phase II Report, December 1998, CALFED stated a policy of seeking public financing for the planning and evaluation of storage projects to ensure a comprehensive and fair comparison of storage options. However, should a storage project proceed to construction, then the public funds used for planning and evaluation will be reimbursed by the project beneficiaries. This financing policy does not foreclose the option of also receiving up-front cost-sharing by potential project beneficiaries.

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Cost-Sharing for Operation and Maintenance

Consistent with existing federal and state policy and law and the principle of beneficiaries pay, CALFED would recommend that for irrigation, M&I, and hydropower, users pay 100% of O&M costs.

Issues/Questions

- *Because CALFED cost-sharing policies for new storage facilities will be a highly visible component of the Program, should the Program establish a clear policy that the costs of new water supplies destined for water districts (irrigation and M&I) be based on the beneficiaries pay principle and be funded 100% by water users?*

- *What is the best vehicle for assuring compliance with the beneficiaries pay principle for new irrigation and M&I water supplies - up-front financial participation, construction as part of the SWP, or some other means? If not, what assurances can be provided to other CALFED Program participants that the beneficiaries pay principle will be followed?*

- *If planning costs are to be payable only if a storage project moves forward, should measures be put in place to assure that potential beneficiaries share the risk (and the financial responsibility) that a storage project may not ultimately get built?*

- *If ecosystem benefits are part of a project (e.g., flows used to enhance Delta water quality), is it appropriate to consider broad-based user charges to cover a portion of the costs?*

- *Who will ultimately own and operate a new facility? (the answer could influence cost allocation and cost-sharing).*

- *How should the Program address the concerns raised by agricultural water users who have indicated an unwillingness or inability to pay the high costs of new water supplies? Should a cross-subsidy between beneficiaries be considered to cover such costs (e.g., under federal Reclamation law, hydropower subsidizes costs above irrigators' estimated ability to pay)? If so, from what groups - hydropower? M&I users? Other users?*

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5.4.2 Conveyance

Program Description

CALFED's strategy for Delta conveyance improvements is to use the existing Delta system with some modifications, evaluate its effectiveness, and add additional conveyance and/or other water management actions if necessary to achieve CALFED goals and objectives. These actions will be continually monitored, analyzed and improved as necessary to meet CALFED goals. Potential Stage 1 improvements to the existing south Delta region include new screens for the SWP and CVP export facilities, changes in operations, channel enlargements, and other improvements to increase water supply reliability while decreasing impacts on fish and Delta water users. In the north Delta region, proposals include channel enlargement for flood control, changes in Delta Cross-Channel operations, and consideration of a new screened diversion from the Sacramento River to the interior Delta to help balance water quality and fisheries concerns.

The Preferred Program Alternative includes a process for determining the conditions under which any future additional conveyance facilities or water management actions would be taken. The process would include:

- An evaluation of whether water supplies can provide a level of public health protection equivalent to 50 parts per billion (ppb) bromide and 3 parts per million (ppm) TOC.

- An evaluation based on reports from an independent panel of experts--one report on CALFED's progress toward these measurable water quality goals; and the second report on CALFED's progress toward ecosystem restoration objectives, with particular emphasis on fisheries recovery.

Program Benefits/Beneficiaries

Identification of benefits and cost-sharing for conveyance improvements will need to be on a project specific basis. This section, however, identifies the benefits generally associated with water conveyance facilities. Potential benefits include:

- **Water supply reliability** due to conveyance improvements such as channel enlargements, new facilities, and operational changes.

- **Ecosystem** benefits from fish screens and operational changes (i.e., Environmental Water Account).

- **Water quality** benefits from structural and operational changes.

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- **Flood control** benefits from channel enlargements and other conveyance improvements.

Beneficiaries of the water conveyance actions/improvements potentially include:

- **Agricultural and M&I water users** would benefit from conveyance improvements.

- **The public** would benefit from conveyance improvements that enhance environmental conditions in the Delta and provide increased flood protection for Delta ecosystem.

- **Regional landowners** would benefit from flood control for lands, and infrastructure susceptible to flooding.

Estimating Benefits and Cost Allocation. Traditionally, the costs of conveyance improvements associated with the delivery of water for agricultural or municipal use are allocated to those project functions. Similarly, if particular conveyance facilities are designed primarily for delivering water to wildlife refuges, the costs would be allocated to ecosystem restoration. Delta conveyance improvements may also benefit water exporters through benefits in water quality, as well as those susceptible to flooding and the ecosystem. The extent of such benefits will continue to be analyzed in the Program, both through biological studies and through modeling efforts. Consistent with the benefits definition in the introduction to this chapter, some of the key questions that would need to be addressed would be the following:

- What would be the difference in the willingness to pay for the level of agricultural water supply with and without the proposed Delta improvements?

- The same question would apply to the levels of municipal water with and without the conveyance improvements. Note that the answers to the above questions would also be linked to the quality of the water supplies (see discussion under Water Quality Program). The answers to these questions would have to be re-examined if an isolated conveyance facility is considered.

- What is the magnitude of the flood control damages avoided solely by the conveyance improvements? This question is perhaps best answered in conjunction with analyzing the benefits of levee protection.

Ultimately, a recommendation will have to be made by CALFED as to how the costs of conveyance facilities should be allocated and approval sought from legislative bodies as to who will share the costs of conveyance facilities.

Existing Programs and Funding

Since conveyance costs are traditionally allocated to the recipients of water supply, the cost-sharing of conveyance facilities has tracked that of water storage (see section on storage, above). Therefore, the associated federal and state programs and the effective levels of local cost-sharing have been the same as for storage. For example, planning and construction of the SWP California Aqueduct has had high levels of effective cost-sharing as its planning and construction costs are nearly all being repaid by the SWP contractors through the SWP Delta Water Charge.

Planning and construction of SWP conveyance facilities that benefit only certain contractors, such as the Coastal Branch, are borne by the benefitting SWP contractors.

Funding for fish screens (fish screens are a component of the through-Delta conveyance proposal) comes from a variety of funding sources under differing cost-sharing arrangements. The CVPIA, Section 3406(b)(21) provides for up to 50 percent federal cost-sharing for construction of screens on unscreened diversions or actions to improve existing screens. Sections 3406(b)(4) and (5) of the CVPIA provide cost-sharing for screening the Tracy Pumping Plant and Contra Costs Canal Pumping Plant at 37.5% federal expenditure to be reimbursed by project water and power users, 37.5% non-reimbursable federal expenditure, and 25% to be paid by the state.

Although some channel enlargement has been paid for and carried out by the Army Corps of Engineers under its responsibilities regarding navigable waterways, these improvements have generally not been the same improvements that would be required for improving conveyance through the Delta. Therefore, commercial shipping is not considered to be a beneficiary of conveyance improvements.

Proposed Finance Options

The options for cost-sharing for conveyance improvements are similar to those for storage, given that the costs of conveyance are traditionally allocated in the same manner as storage facilities (the allocation is based on end use of the water). Where an allocation is made to public purposes, then the costs would be paid for by the state or federal government, contingent upon appropriation by the state and federal Legislatures.

Issues/Questions

A primary issue in the Conveyance Program is what amount of conveyance costs could be deemed to have an ecosystem (public) benefit, as opposed to a water supply and supply reliability benefit (private). The issue is complicated by the fact that some conveyance improvements benefitting export water quality may actually not be beneficial to fish populations.

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Too, the array of ecosystem impacts are quite different for the through Delta conveyance option now being considered compared to those from an isolated facility. As a result, the Program will continue to address the following issues:

- *What would be the best analytical methods (e.g., water resources modeling combined with biological studies) for defining what portion of the costs of conveyance improvements should be allocated to ecosystem benefits?*

- *Should a portion of the costs of conveyance improvements allocated to general ecosystem improvements be covered by a broad-based user charge?*

- *Should a portion of the costs of conveyance improvements allocated to general ecosystem improvements be covered by a user charge assessed only on the Delta exporters that benefit from the conveyance improvements?*

- *Should improvements to existing conveyance facilities be considered part of the cost associated with operations and maintenance and therefore covered by the water users currently paying for O&M?*

5.4.3 CALFED Levee Program

Program Description

The Levee Program objective is to reduce the risk to land use, infrastructure, and associated economic activities; water supply; and the Delta ecosystem from catastrophic breaching of Delta levees. To achieve the Levee Program objective and the other CALFED objectives, in addition to meeting CALFED's Solution Principles, the Delta levee system must remain generally in its current configuration. In addition to improving the integrity of the Delta levee system, the Program aims to integrate ecosystem restoration and Delta conveyance actions with levee improvement activities. Improvements in the reliability of water quality would be a natural by-product of the Levee Program.

The specific elements of the Levee Program, as outlined in the Long-Term Levee Protection Plan (LTLPP), include the Delta Levee Base Level Protection Plan, Delta Levee Special Improvement Projects, Delta Levee Subsidence Control Plan, Delta Levee Emergency Management and Response Plan, and the Delta Levee Risk Assessment. The Base Level Protection element would incorporate the levees currently covered under the existing Delta Levee Subventions Program and aims to improve all levees to a uniform base level standard. The Special Improvements Project element would adopt the goals of the existing Special Projects Program and provide additional flood protection separate from the Base Level Protection element for Delta islands that protect public benefits such as the ecosystem, as well as water quality, life and personal property, agricultural production, cultural resources, recreation, and local and statewide infrastructure. The

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Subsidence Control Plan element would reduce or eliminate the risk to levee integrity from subsidence. The Emergency Management and Response Plan element would enhance existing emergency management response capabilities in order to protect critical Delta resources in the event of a disaster. The Risk Assessment element would identify the risks to Delta resources from Delta levee failure, quantify the consequences and develop recommendations to manage the risk.

Program Benefits/Beneficiaries

Benefits of the Levee Program vary somewhat between each of the 5 elements of the program described above. The benefits of the program as a whole are:

- **Land use protection** of Delta agricultural resources, municipalities, infrastructure, and ecosystem habitat in the interior of the Delta islands.

- **Water quality improvements** due to reducing the likelihood of levee failure which can cause saltwater intrusion impacts that could potentially degrade both agricultural and municipal water supplies from Delta exports for several months.

- **Rapid Response to Levee Distress and Failure.** The Emergency response component of the Levee Program would provide for suitable funding, equipment and material availability, and coordination to augment the ability for rapid response to levee distress and failure.

The beneficiaries of the Levee Program include:

- **Delta landowners including farmers, business owners, and residents** who benefit from increased flood protection.

- **Delta water users and exporters** who benefit from increased protection of water quality and thus greater water supply reliability for both agricultural and M&I water supply.

- **The public** -- due to improved ecosystem water quality from reduced salinity intrusion in the Delta.

- **Railroads, state highways, utilities, and water distribution facilities** which benefit from increased flood protection.

- **Recreational boaters and tour operators** who benefit from navigation benefits.

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Estimating Benefits. Benefits would be measured in the Levee Program based on the difference in benefits with and without the levee improvements. For each benefit category or group of beneficiaries, the key questions would be the magnitude, duration, and frequency of damages that would be incurred both for short-term flooding events (and the cost of emergency response) and for catastrophic failure with the program compared to without the program. For Delta agriculture, what would be the reduction in loss of net agricultural income? What would be the reduction in loss of Delta infrastructure due to flood damages? For Delta exporters, how would the severity of the impacts be reduced on Delta water quality connected with a catastrophic failure? Both with and without the program, how long would supplies be disrupted, what alternatives would exist for obtaining or using substitute supplies, and what would be the cost of the disruptions? Would there be impacts on recreational boating in the Delta? Over what area and for how long?

Existing Programs and Funding

The Delta Levee Subventions Program was established in 1973 (SB 541) to provide state financial assistance to local districts for improving non-project Delta levees. (A "project" levee is defined as a flood control levee that is a project facility under the State Water Resources Law of 1945.) It was revised with enactment of the Delta Flood Protection Act of 1988 (SB 34) and further amended in 1991(SB 1065) and 1996 (AB 360). The Delta Levee Subventions Program requires that levee work be funded up front by the local agencies and reimbursed up to 75% by the state through DWR. California Water Code Section 12300 authorizes $6 million a year to be appropriated to the Delta Flood Protection Fund from the California Water Fund for the Subventions Program until July 1, 2006. Historically, annual appropriations have been less than what has been authorized. No funds are currently appropriated for the program past June 30, 1999. There is very little federal participation in non-project levee work in the Delta. Federal participation in non-project levee maintenance is authorized through Public Law 84-99. Islands must meet the PL84-99 levee standard to be qualified for post-flood levee rehabilitation funding. Currently only two islands are qualified and funding is subject to appropriation.

The Special Flood Control Projects program, created by the Delta Flood Protection Act of 1988 (SB 34) and amended in 1991(SB 1065) and 1996 (AB 360), provides additional flood protection separate from the Delta Levee Subventions Program for Delta islands based on (1) the importance or degree of public benefit needing protection, and (2) the need for flood protection work (Water Code section 12313). Cost-sharing percentages under the existing Special Projects Program vary from 75% to 100% state funds, depending on the ability of the state to find a local cost-sharing partner. Although no federal cost-sharing agreements exist for the Special Projects Program, the California Water Code encourages DWR to seek cost-sharing with, or financial assistance from, federal agencies with programs applicable to or an having an interest in flood protection projects. Although the state is required to seek a local cost-sharing partner under the Special Flood Control Projects Program, historically the state has provided higher cost-sharing (up to 100%) for these projects than for the Subventions program primarily because of the program's focus on broad public benefits.

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No existing program currently provides funding specifically for subsidence work; however, subsidence research currently is funded under the existing Special Projects Program.
Local levee districts provide funding for initial emergency response through benefit assessments. The provides assistance and funding when local resources are exhausted. If the governor declares an emergency and requests emergency assistance where life or substantial property is at risk, federally funded emergency assistance is provided.

DWR currently funds a Seismic Stability Evaluation for Delta levees through SWP contractor fees.

Proposed Finance Options

The cost estimate for the Long Term Levee Protection Plan over a 20-30 year period is estimated at $1.5 billion. There are several options for financing the Levee Program:

Option 1 -- Continue current cost-sharing. Levee maintenance and repair work would continue to be funded up front by the local agencies and reimbursed up to 75% by the state through DWR. State cost-sharing percentages for the existing Special Projects Program would vary from 75% to 100%, depending on ability-to-pay analysis completed for each participating local agency. Local agencies would provide the remaining funds. Federal funding for non-project levee work in the Delta would continue to be limited.

Funding for initial response to flood emergencies is currently provided by local resources. Once local resources have been exhausted, the state provides assistance and funding. If the governor declares an emergency and requests emergency assistance, federally funded emergency assistance is provided.

Option 2 -- Modify current cost-sharing to allow for Federal Cost Share. The levee program would obtain long-term federal and state funding authority and develop cost-sharing scenarios between state, federal, and other interests building upon the existing programs. The primary difference would be a shift in cost-sharing to the federal government and reduction by the local and state agencies. In addition, the Levee Program would seek to resolve problems in current funding strategies and identify mechanisms that best secure long-term funding.

- Proposed cost-sharing for the levee maintenance program (Base Level Component) would be 65% federal, 25% state, and 10% local for construction to PL 84-99. Local agencies can contribute land, easements, rights of way, relocations and disposal costs (LERRDs), which would be credited toward their 10% share. Planning costs would be cost shared at 50% federal, 25% state, and 25% local. Funding for maintenance would be provided 100% by the local

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agencies up to $1,000 per mile of levee improvement. Costs above $1,000 per mile of levee improvement would be cost shared 65% federal, 25% state, and 10% local, and would be considered re-construction.

- Funding for the Special Improvements Projects element of the Levee Program would be cost shared at 65% federal and 35% state. The state would seek a local cost-sharing partner. As in the Base Level Protection element, local agencies would contribute LERRDS. Planning costs would be cost shared at 50% federal and 50% state. Funding for maintenance would be provided 100% by the local agencies up to $1,000 per mile of improved levee.

- Funding for the Subsidence Control element of the Levee Program would be cost shared at 65% federal, 25% state, and 10% local.

- Funds for the Emergency Management and Response element would be provided 100% by local interests for initial response. After local resources have been exhausted, secondary response funds would be cost shared at 50% federal and 50% state. After the established state funds are exhausted, funding would be 100% federal. First-year start-up costs to establish a $10 million Emergency Response Fund would be cost shared at 50% federal and 50% state. After the Emergency Response Fund is exhausted, the Federal Government would provide funds through the Corps. Local agencies would contribute any necessary LERRDS.

- Funds for the Risk Assessment element would be covered under Special Improvement Projects funding.

Option 3 -- Benefits based approach. This option could include a possible increase in the local agency cost share, and a cost share from water users that are not currently contributing under the existing model. For example, water users and exporters who benefit from the increased water supply reliability provided by the levees could pay a user fee toward levee maintenance. In this case, levees could be viewed as part of the "conveyance structure" and payment for their maintenance provided similarly to the application of the minimum operations, maintenance, power, and replacement costs (OMP&R) Component of the Transportation charge to the State Water Contractors for maintenance of California Aqueduct reaches.

The percentage public contribution toward the Special Improvement Projects element should remain proportionally higher than that for the Base Level Protection element because of the Special Improvement Projects' focus on public benefits. However, the Special Projects element could be modified to include a water user cost share for the same reasons described above.

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Issues/Questions

- *Should a local district's ability-to-pay be considered when deciding their portion of the cost share for levee work?* Many local agencies cannot afford their share of costs under the current cost-sharing arrangements for levee work, nor presumably the additional financial burden of proposed levee upgrades to the PL84-99 standard. Consideration of ability-to pay in this context does not refer to existing Federal law and rules for flood control projects.

- *Should water exporters contribute toward Delta levee protection?*

- *Should the levee maintenance program continue to be locally implemented regardless of the funding paying for the activity?* Concern has been raised that if USACE funds are secured for the levee maintenance program, the USACE would require that the levee maintenance work be performed by the USACE as is the current USACE policy.

- *How and/or should the "polluter pays" philosophy be worked into Levee Program funding*? An example would be requiring boater fees or instituting a "speeding permit" because boat wakes increase levee erosion.

- *Should public funding for levee subventions be provided through reimbursements to local agencies or as an up-front cost share?* Under the existing state levee programs, local agencies have financed projects in anticipation of reimbursements. The reimbursement process can be time-consuming and involve uncertainty because of the state appropriations process. The uncertainty and time lag from work performance to reimbursement can pose financial difficulties for local agencies.

5.4.4 CALFED Water Use Efficiency Program

Program Description

The purpose of the Water Use Efficiency (WUE) Program is to provide assurances to agencies, stakeholders, and the general public that water is used efficiently within the CALFED solution area. The Program is based on the recognition that implementation of efficiency measures occurs mostly at the local and regional level. The role of CALFED agencies in water use efficiency would be to offer support and incentives through expanded programs to provide planning, technical, and financial assistance. CALFED agencies would also support institutional arrangements that give local water suppliers an opportunity to demonstrate that cost-effective efficiency measures are being implemented.

Program Benefits/Beneficiaries

Some potential water use efficiency benefits may not be cost-effective locally, but may be so regionally or from a statewide perspective. For one thing, water may be more valuable to an entity outside the immediate local area and that entity may be willing to fund the efficiency improvement in exchange for transferring the conserved water. Second, water efficiency improvements that also increase water quality could have benefits to a larger group of water users in the region. Finally, where the water saved through water use efficiency measures results in increased water being dedicated to in-stream or Delta uses on a permanent basis, there may be a public benefit. In these latter situations, CALFED planning and cost share support may be particularly effective.

Benefits of the WUE Program would include:

- **Increased Water Supply Reliability** -- Reducing irrecoverable losses by reducing losses currently unavailable for reuse (because they flow to a salt sink or an inaccessible or degraded aquifer, or are lost to the atmosphere)

- **Improved Water Quality** -- Increases in irrigation efficiency can reduce the amount of tailwater that drains from a farm field. Efficiency actions also may change tailwater quality. This may improve in-stream water quality by reducing the return flow of salts, sediments, organic carbon, selenium, or other substances.

- **Contribution to Ecosystem Restoration** -- Increased emphasis on efficiency measures would improve water quality from reduced discharge of unwanted constituents, timing, and in-stream flows, provided the improved in-stream flows are administratively and legally protected, e.g., by Section 1707 of the California Water Code, supplemented by other protections.

The beneficiaries of the WUE Program would include:

- **Agricultural water users** would benefit from more efficient use of water through conservation practices. These may be reflected by reduced costs of production, increased crop yields, or both, leading to increased net farm income.

- **Municipal and industrial water users** would benefit from increased water supply reliability (through reduced irrecoverable losses) and improved water quality (from reduced discharge of unwanted constituents in agricultural and municipal return flows.)

- **Users of Delta exports** would benefit from increased water supply reliability (through reduced irrecoverable losses) and improved water quality (from reduced discharge of unwanted constituents in agricultural and municipal return flows.)

- **The public** would benefit from ecosystem restoration in those cases where the increase in water use efficiency results in reduced discharge of unwanted constituents or increased flows to improve water quality in the Delta. The public also benefits from increased in-stream flows, where the dedication of such increased flows is administratively and legally protected.

Estimating Benefits and Cost Allocation. Provided that the end users of water are designated in any water use efficiency proposal, the costs could be allocated based on end-use (e.g., M&I, agricultural, or ecosystem use). This would make it unnecessary to estimate the benefits of use as a step toward cost allocation. If necessary, the benefits could be estimated in the same manner as they are for storage and conveyance.

Existing Water Use Efficiency Programs

Current state and federal programs and laws have provided funding, primarily in the form of loans and grants, to assist local agencies with implementation of water conservation or water recycling projects.

State Programs and Funding

The Office of Water Recycling in the State Water Resources Control Board (SWRCB) provides grants and loans for water recycling projects. The SWRCB, through the State Revolving Fund (SRF), also provides loans of up to $50 million per agency per year with a 20-year payback period and an interest rate of one-half of the interest rate currently used for state general obligation bonds, which result in an effective local agency cost share of about 80%. These loans are for construction of wastewater treatment, wastewater recycling, and non-point source pollution prevention projects. The SWRCB also provides Wastewater Recycling Loans and Small Community Grants.

The Department of Water Resources' (DWR) Water Conservation, Groundwater Recharge, New Local Water Supply and Local Projects Program provides financial assistance to local agencies constructing water management infrastructure projects. DWR administers four bond laws under which some funding is available for water conservation and recycling: the Clean Water Bond Law of 1984 (Proposition 25); the Water Conservation and Water Quality Bond Law of 1986 (Proposition 44); the Water Conservation Bond Law of 1988 (Proposition 82); and the Safe, Clean, Reliable Water Supply Act (Proposition 204). Collectively, these acts provide funding for loan and grant programs to assist local agencies with construction of voluntary, cost-effective, capital outlay water conservation and groundwater recharge facilities projects, and in the development of new local water supply projects. The bond laws provide for:

- Capital Outlay Loans of up to $5 million per eligible project to public agencies for cost-effective, capital outlay projects. The maximum repayment period for loans is 20 years (Propositions 44, 82, and 204) and 25 years (Proposition 25).

- Feasibility study loans up to $100,000 per project for water conservation and groundwater recharge and up to $500,000 for new local water supply are also available.

- Local project feasibility study grants of up to $500,000 each to public agencies in selected counties, as well as land acquisition loans of up to $1,000,000.

Federal Programs and Funding

The Bureau of Reclamation is authorized under the Reclamation Wastewater and Groundwater Studies and Facilities Act (Title XVI of Public Law 102-575) to provide grants for specified water recycling projects. In 1992, Title XVI authorized the Bureau of Reclamation to participate in the design and construction of water reuse projects in five specific geographic areas, four of which are in California (San Diego, San Gabriel, Los Angeles, and San Jose) and one in Arizona. As of December 1996, all four of the California projects had received federal grant funding, and no construction money had been provided for the Arizona project. Federal contributions can be up to 25% of the total costs. In 1995, the Bureau of Reclamation adopted a self-imposed $35 million annual cap for funding the projects authorized under Title XVI. In 1996, Title XVI was amended by the Reclamation Recycling and Water Conservation Act of 1996 (P.L. 104-266), which authorized another 16 recycling projects and 2 desalinization projects. PL 104-266 also established a maximum $20 million cap per project for federal contributions, maintained the 25% maximum federal cost share, and requires a cost share agreement before federal funds can be appropriated for a project.

Other Programs/Actions. Although not a program of federal funding directly to water districts, federal and state actions to facilitate and administer voluntary market transfers of water have been another source of improvements in water use efficiency. For example, starting in 1988, the Metropolitan Water District of Southern California agreed to fund a number of water efficiency improvements in the Imperial Irrigation District in exchange for the conserved water.

Private Programs and Funding. The California WateReuse Finance Authority, a Joint Powers Agency (JPA), provides low interest loans to its members through its California WateReuse Variable Rate Borrowing Program, for water and wastewater capital projects ranging from $1 million to $100 million. Applications for loans are reviewed by the Program Administrator, who together with the Program bond counsel prepare loan documentation. Once the loan is approved by the bond insurer and the JPA, the applicant adopts an ordinance prepared by the bond counsel and joins the JPA. Following the enactment of the ordinance, funds can be made available for the project. Approximately $200 million was made available for loans in 1998. Interest rates on variable rate bonds are reset every seven days and have averaged 3.582% since 1990.

Proposed Finance Options

Applying a benefits based approach to water use-efficiency (WUE) financing, the costs of a WUE program would be allocated to the beneficiaries who benefit from the cost savings or the use of the conserved water. This would need to be determined for each loan or grant provided under the program.

Where the benefits accrue to agricultural and municipal water suppliers, the options below provide either financial incentives in the form of loans or grants. The effective local cost share would depend upon the financial terms of the loans or grants (see options, below).

All of the options described below incorporate the concept that if a WUE measure provides public ecosystem benefits and is not locally or regionally cost effective, it would qualify for public funds. If a portion of the conserved water is dedicated to in-stream or Delta uses over the long term and is administratively and legally protected for those uses, then the costs of that portion can be allocated to the public because of the ecosystem benefits. For the WUE measures that provide ecosystem benefits, CALFED proposes to provide grants to finance that portion of water use efficiency measures that are not cost effective at the local or regional level, if certain criteria are met.

Cost Share Options

In all cases, CALFED proposes to fund the technical assistance program with public funds because of the limited cost of the program and the demonstration value and broad societal benefits of such a program. Providing technical assistance creates an incentive to develop innovative techniques for water use efficiency that may be too costly at the local level, but can be made cost-effective with the help of public funding. The primary difference between the following options for financial assistance programs is the level of local cost-sharing required.

Option 1 -- Market Rate Loans & Grants. State and federal funding -- provide loans at market rates for locally cost effective projects and provide grants for projects (or portions of projects) that meet the criteria for public benefits.

Option 2 -- Low Interest Loans & Grants. Continue programs with levels of effective local cost-sharing similar to current state and federal programs. With state and federal funding, provide low interest loans for water conservation projects. Provide grants for projects (or portions of projects) that meet the criteria for public benefits.

Option 3 -- Same as Option 2, but emphasize the ranking of proposals based on their percentage of effective local cost shares and the percentage of water dedicated to public purposes.

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Option 4 -- Public Funding. Fund the CALFED actions mostly with public funds, offering primarily grants and obtaining cost-sharing when feasible.

Issues/Questions

- *Should grants or low interest loans be offered for local projects that are locally cost effective?* Current federal and state programs provide grants and low-interest loans for water conservation projects, such as the SWRCB's State Revolving Fund and DWR's various loan and grant programs, discussed earlier. If a measure is cost effective for a local agency, 100 percent of the program benefits in many cases can be attributed to the local agency and therefore there is an argument that the local agency should pay 100 percent of the program cost. However, there may reasons (new technology, demonstration benefits) that support the use of public funding through grants or low interest loans for some locally cost effective WUE measures.

- *If grants instead of loans are provided for WUE projects that are not locally cost effective but have broad public benefits -- how would the determination of public benefits be made and by whom?* The agricultural element of CALFED's WUE Program has proposed that the Agricultural Water Management Council (AWMC) make the initial determination for what is or is not cost effective at the local level. Technical review and oversight would be provided by CALFED staff to ensure that public funding is appropriately awarded. A stakeholder review process would be developed to provide further review and refinement. A Request for Proposal (RFP) process would be used to select programs for funding and would help provide a framework for analysis and review.

- *What program benefits justify a grant and how can assurances be provided that the benefits would occur? For example, should grants for WUE measures be awarded only if the measures increase in-stream flows?* For example, when the water is for environmental purposes, for grants should be dependent on the appropriate administrative and legal protection of the flows to ensure the water is left for its intended environmental use and not diverted downstream. Are current protections in California water law (e.g., Section 1707) adequate for this purpose? Are there additional changes that have been recommended by water users or others that CALFED should be endorsing? For example, improving provisions for in-stream flows is one of the actions in the Water Transfer Program. The Program would be developing methodology for monitoring in-stream transfers and associated tracking measures and also evaluating whether additional statutory or regulatory protection of water transfers for in-stream purposes is necessary. At this time, in some locations, the methods and equipment are not in place for tracking whether or not water conserved water for in-stream use is kept in the stream for environmental uses.

- *Under what circumstances would public funding be awarded for actions that are locally cost effective?* Public funding may be provided to support locally cost effective actions if the actions are considered critical to achieving efficient water use as part of Stage 1 Assurances or for catalyzing other vital local programs. For example, if an efficiency action (e.g. drip irrigation) met the following criteria:

  - locally cost effective
  - considered vital to Stage 1 assurance and 404 compliance
  - was not being sufficiently adopted

  Then public funding may be employed to catalyze adoption. In most cases, this type of support for locally cost effective actions would be limited to loans or technical assistance, but could include grant funding in rare cases.

5.4.5 CALFED Water Transfer Program

Program Description

The CALFED Water Transfer Program proposes a framework of actions, policies, and processes that, collectively, would facilitate water transfers and the further development of a properly regulated state-wide water transfer market. Because water transfers can affect third parties (those not directly involved in the transaction) and local groundwater, environmental, or other resource conditions, the framework also includes mechanisms to provide protection from such impacts.

Program Benefits/Beneficiaries

Water transfers are institutional mechanisms to move water from one use to another. Therefore, they can benefit various water uses - agricultural, municipal and industrial, and environmental. While transfers may or may not include efficiency improvements, they can provide incentives for more efficient use of water and potentially could produce revenue to be used for investing in such improvements.

Benefits of water transfers include:

- **Increased Water Supply Reliability** -- By helping to relieve the mismatch between water supply and demand by moving water available in one area to satisfy a need in another area. Water supply reliability is also increased by providing a short-term method to move existing supplies from one location to another while other facilities are being constructed (new conveyance, surface storage, or conjunctive use), during temporary reductions in water supply due to outages of conveyance facilities, or until other technologies or land use policies offer other alternatives (such as desalination).

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- **Improved Water Quality** -- Water quality benefits can result from actions taken to make water available for transfer (reducing agricultural return flows and reducing urban wastewater flows--although, in some cases, degradation of water quality can also occur).

- **Improvements to the Ecosystem** -- By providing water for in-stream flow augmentation and by providing a mechanism to move water assets into and out of a proposed Environmental Water Account (EWA).

Beneficiaries of water transfers:

The primary purpose of the Water Transfer Program is to facilitate the development of a water transfer market which benefits buyers and sellers and protects environmental values and the public interest. More specifically, beneficiaries of the Water Transfer Program can be described as follows:

- **Agricultural, M&I, or environmental users who purchase** water would benefit from increased water supplies and increased water supply reliability;

- **Water users who willingly sell water** and who invest the proceeds in local water conservation or water management would benefit from lower costs and/or increased productivity (most water will be purchased from existing agricultural users, but some may also be from M&I users);

- **All agricultural and M&I water suppliers and users** would benefit from environmental water transfers because, as environmental conditions improve, regulatory conditions on water diversions should relax;

- **The public** would benefit from water transfers between consumptive uses that, to some extent, offset or defer the need for new facilities or other potentially environmentally degrading water supply sources, or sources that would be built at public expense. Benefit would also be derived from legally protected environmental transfers (i.e., under Water Code Section 1707) intended to augment instream flows above regulatory baseline conditions resulting in improved environmental conditions.

Estimating Benefits and Cost Allocation. The Water Transfer Program is primarily focused on improving institutional mechanisms, which is not amenable to traditional benefits analysis. It is clear, however, that existing water districts (as buyers and sellers), would benefit when appropriate transfers can be approved more easily. Other transfers would be for public purposes, such as those from the Ecosystem Restoration Program. Costs of the Water Transfer Program could be allocated between public and private uses based on the expected quantities of water

devoted to public transfers, as opposed to private transfers. Since this may not be known in advance, one option might be to simply include a portion of the administrative cost of this program in an application fee for water transfers.

Existing Water Transfer Programs

The Water Transfer Program proposes a framework to facilitate the further development of the water transfer water market in California, while protecting water rights and area of origin priorities and providing safeguards against source area environmental and economic impacts. Generally, the water transfer element relies on the existing legal and regulatory framework of water rights and jurisdictional authorities and does not recommend any major changes to California water law or the water rights system. Currently, agencies which have jurisdictional authorities to administer transfers (USBR, DWR, SWRCB) use a combination of application fees and public funds included in their budgets to administer and facilitate transfers.

Program Funding Options

Water transfers are water management tools that help provide numerous water resource benefits to many beneficiaries -- from agricultural users and urban communities to the environment in the form of in-stream flows. Streamlining processes for approving water transfers, as well as overcoming other institutional issues, would benefit these same groups.

Since most of the actions in the Water Transfer Program involve policy and procedural changes, the costs would likely be absorbed into existing agencies' budgets (USBR, DWR, and SWRCB)

within the first few years. The newly established Clearinghouse, however, may be an exception. Several funding options for long-term funding, such as the Clearinghouse, are possible.

> **Option 1** -- Buyers or Sellers pay. Impose a surcharge on future transfers to cover the long term costs of the Water Transfer Program, such as the expense of Clearinghouse operations and administration. This fee should be applicable to transfers for in-stream purposes as well. The advantage to this approach is that the beneficiaries of transfers pay for them. The disadvantage to this approach is the possibility that if the Clearinghouse funding is dependent on transfers, it might create an incentive for the Clearinghouse to promote all transfers just to keep revenue coming in to cover costs.
>
> **Option 2** -- Combination of Public funds and Transfer Surcharge. Impose a fee on future transfers to cover at least some of the long term costs of this program. Existing federal and state transfers have a fee to cover a portion of administrative costs, so the CALFED Program costs could be incorporated into such a fee. On the basis that some transfers (those to legally and administratively protected in-stream uses) would benefit the general

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public, some percentage of the costs of the program could be publicly provided. This is the same approach that existing agencies with jurisdictional authorities to administer transfers currently use.

Option 3 -- Use all public funding. On the basis that streamlining the water transfer process is of general benefit to the public, that at least some transfers would be for ecosystem purposes, and that the costs of the program are relatively small with respect to other CALFED program elements, the costs of the program could be born 100% by the federal and state government. An advantage to this approach is that it is simple, and the costs of the program mostly fall within existing agency budgets. New costs for the CALFED Water Transfer Program that are not included in other budgets occur in the first few years, when it may be difficult to create and assess a new surcharge in time to cover costs. One concern is that buyers in a market could be publicly subsidized even in cases where transfers do not have broad public benefits.

Note that regardless of which option is chosen, the principal costs of specific water transfers (water, application process, legal, and engineering costs) would be paid for by buyers and sellers in the transaction. The Water Transfer Program goal is to encourage the water transfer market, but financing specific transfers falls outside the scope of the program.

5.4.6 CALFED Water Quality Program

Program Description

The purpose of the CALFED Water Quality Program is to improve the quality of the waters of the Sacramento-San Joaquin Delta estuary for all beneficial uses (including municipal and industrial water use, agricultural water use, recreation, and aquatic habitat). Because species dependent on the Delta and its tributaries are affected by upstream water quality conditions in some areas, the scope of the Water Quality Program also includes watershed actions to reduce water quality impacts on these species, as well as impacts on municipal, industrial, and agricultural uses.

Section 303(d) of the federal Clean Water Act (CWA) requires states to identify water bodies with impaired quality with respect to supporting beneficial uses. This process has resulted in a number of water bodies in the Bay-Delta estuary and its tributaries being listed as impaired. Therefore, an important component of correcting the overall problems of the Delta estuary is undertaking actions to effectively reduce the toxicity of aquatic habitats and reduce constituents, such as salinity, that affect the usability of Delta water supplies.

Early implementation actions for the Water Quality Program have been identified. Most of the work in these first two years (Stage 1a-- Fiscal Years 2000 and 2001) focuses on pesticides such as diazinon and chlorpyrifos, mercury source control, drinking water improvements (Total

Organic Carbon (TOC) and Bromide), on-farm selenium control management practices, and investigations and control of low Dissolved Oxygen. In the long-term, the Water Quality Program would address water quality concerns related to low dissolved oxygen concentrations, source drinking water quality, mercury, pesticides, organochlorine pesticides, salinity, selenium, trace metals, and turbidity and sedimentation.

Program Benefits/Beneficiaries

The benefits of the Water Quality Program include:

- **Increased Water Supply Reliability** -- Reduction of salinity and other contaminants increases reuse opportunities which lessens the demand on fresh water.

- **Improvements to the Ecosystem** -- Reduced toxicity to phytoplankton, zooplankton, benthic invertebrate organisms, and fish communities that inhabit the Delta.

- **Public Health** -- Increased safety of drinking water supplies, such as reduced pathogens in drinking water exported from the Delta, reductions in disinfection byproduct concentrations related to Bromide and TOC, and reduced levels of mercury contamination of fish.

- **Enhanced Recreational Use** -- Reduction of disease-causing organisms and increased aesthetic values by reduction in nuisance algae blooms.

The beneficiaries of the Water Quality Program include:

- **The Public** -- The public would benefit from ecosystem improvements and increased aesthetic values, such as a reduction in nuisance algae blooms.

- **Municipal and Industrial Water Users** -- M&I users would benefit from increased water supply reliability through increased reuse opportunities, reduced cost of pretreatment and accretion of mineral deposits in piping, cooling, heating, and other industrial equipment, and the public health benefits of better water quality.

- **Agricultural Water Users** -- Agricultural users would benefit from reduced salinity which would lessen toxicity in plants, as well as the possibility for promoting more efficient water use by enabling multiple stages of tailwater recycling.

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Estimating Benefits and Cost Allocation. At this time, CALFED has not quantified or measured benefits received by the beneficiaries. However this information can be obtained to some degree of detail and used to further develop a more detailed benefits based finance option. For example:

1. For M&I use, the benefits would be the cost savings in treatment costs, as well as health costs. The first step in assessing the relative magnitude of these benefits would be to use existing studies indicative of these cost savings.

2. For agricultural use, the benefits would be increased productivity and greater potential for re-use. The first step in assessing the relative magnitude of these benefits would be to review existing studies indicative of these benefits.

3. The relative magnitude of the public benefits of water quality (over and above meeting required standards) would be much more difficult to measure. Some of the benefits could be increased recreational benefits.

Existing Water Quality Programs and Funding

The State Water Resources Control Board (SWRCB) offers low interest loans and grants to solve water quality problems associated with discharges from non-point source dischargers and for estuary enhancement. California's State Revolving Fund (SRF) loans, the Non-point Source Implementation Grants (CWA 319(h) grants), the Water Quality Planning Grants (CWA 205(j) grants), and the Wetlands Program Development Grants (CWA 104(b)(3)) are all loan and grant programs offered through the SWRCB that help fund water quality actions.

CWA Section 319(h) grants are available to states, Territories, and Indian Tribes. These grants support a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific non-point source implementation projects. A 40% project cost share (in the form of dollars or in-kind services not supported by federal programs) is required to qualify for a 319(h) grant, and no more than 10% of funding may be used for administrative expenses. The federal grant per project ranges from $25,000 to $350,000. Since the local funds (or in-kind services) are required concurrently with federal funds, the effective local cost share is 40%.

CWA Section 205(j) grants fund water quality planning projects that reduce, eliminate, or prevent water pollution and enhance water quality. In order to qualify, projects should address one or more significant water quality problems, and priority is given to projects which target specific watersheds identified by the Regional Water Quality Control Boards. The federal grant may fund up to 75% of project costs, and the remaining 25% must come from a non-federal match (dollars or in-kind services not supported by federal programs). The federal grant per

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project ranges from $25,000 to $125,000. Some $134,650 was available for Delta Tributary Watersheds in 1998 through the Central Valley Regional Water Quality Control Board (CVRWQCB).

CWA Section 104 (b)(3) wetlands grants provide financial assistance to states, federally recognized Indian Tribes, and local governments to support wetlands development or augmentation and enhancement of existing programs. The federal grant per project generally ranges from$25,000 to $500,000. Approximately $750,000 is expected to be available to California in federal fiscal year 2000. A minimum 25% non-federal match of the total cost of the project is required.

The State Revolving Fund (SRF) offers low interest loans to address water quality problems associated with discharges from non-point source (NPS) dischargers and for estuary enhancement. Over $300 million is available from the SRF for California in Fiscal Year 1999-2000. The interest rate on an SRF loan is 50% of the interest rate on the most recently sold general obligation bond. The maximum amortization period is 20 years. Loans may cover up to 100% of the cost of planning, design, and construction of NPS pollution control structures and 100% of NPS pollution control programs.

Proposition 204 made available $80 million to the SRF and $30 million to the Small Communities Grant Program, both administered through the SWRCB. Section 78613 of Proposition 204 states that the board may make grants to small communities for construction of eligible treatment works so that any combined federal and state grant does not exceed 97½ percent of the eligible cost of necessary studies, planning, design, and construction of the eligible project. The total amount of grants for any single project may not exceed $3.5 million.

The Municipal Water Quality Investigations Program (MWQI) is managed in DWR's Water Quality Assessment Branch of the Division of Local Assistance. The MWQI budget is approximately $1.8 million, which comes mainly from State Water Project funds. The MWQI Program studies current and potential contaminants in Delta water supplies, assists water supply agencies in planning, protecting, and improving drinking water sources and water supply facilities, and documents water quality under a variety of hydrologic conditions for studying water transfer alternatives, water quality standards, and predictive modeling capabilities.

Proposed Finance Options

The CALFED water quality actions provide drinking water, agricultural, and ecosystem benefits. The types of actions proposed by the program generally can be categorized in two areas -- (a) research, studies, and monitoring, and (b) site specific implementation of water quality actions aimed at direct improvements to water quality. Possible financing options for these two categories of actions are described below.

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Options for Research, Studies and Monitoring

Option 1 -- Costs shared between public and a broad-based water user fee. All actions receive the same cost-sharing between the two funds--benefits and costs are not evaluated for each action, but it is assumed that overall the distribution between the funding reflects the overall benefits from the actions.

Option 2 -- Funding is still from public and broad based water user fees, but individual actions are evaluated for their benefits and funding is assigned based on the benefits assessment.

Options for Water Quality Improvement Actions

Some water quality programs that would measurably improve the quality of water diversions could benefit a small group of beneficiaries. Others could benefit a large group of Delta exporters. Other programs may be targeted to solve particular environmental problems related to species restoration. Therefore, it is important to broadly categorize water quality programs by groups of beneficiaries. Then, the relative magnitude of ecosystem vs. water diverter benefits would be assessed as the basis for recommending an allocation of costs.

Polluter Pay Issue. For some actions there might be one primary polluter or primary cause of the problem. In order to make appropriate resource use decisions in the future leading to a sustainable Delta system, polluters must consider the external costs of their actions, including their ongoing effect on the ecosystem. A beneficiaries pay principle should not preclude polluters from paying for actions that they would be required to perform by law in the absence of CALFED. Furthermore, a water quality action may reduce a pollutant that is harmful to the environment to a level below what is allowable by the EPA. Although the benefit of this action is the ecosystem and the beneficiary is mostly the public, this does not mean that the public should foot the bill. This would leave no incentive *not* to pollute, and be detrimental to the goals and objectives of the Water Quality Program. In summary, a polluter should pay at least for the portion of costs that would help them meet EPA standards and possibly more. Polluters also benefit from actively participating in the process of solving Delta problems. Furthermore, participation in cost-sharing provides an incentive for them to support solutions that are less costly to them.

For example, CALFED is proposing a partnership with the business community in the development of best management practices (BMPs) for diazinon and chlorpyrifos. The Urban Pesticide Committee (UPC) is already developing BMPs, and there is an opportunity here for funding from a private foundation, where the manufacturers of the chemicals might be interested in contributing funds to a solution that would educate users of their product and help solve the problem, while still allowing their products to stay on the market.

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The following basic options could be employed for Water Quality Improvement Actions:

Option 1 -- Costs shared between public and direct beneficiary or polluter. The benefits/beneficiaries for each action would be identified and, as appropriate, cost share requested. Example actions include the urban pesticide education program with cost-sharing from pesticide manufacturers, and water quality improvements in Barker slough with cost-sharing from the North Bay water diverters. Cost-sharing could be in the form of a loan or with direct up-front financial contributions.

Option 2 -- Same as 1, but costs shared between the public and appropriate groups of benefitting water users by using increments to SWP or CVP water rates.

Options for Cost-sharing for Planning

Option 1 -- Utilize existing federal or state cost-sharing policies for planning.

Option 2 -- Fund with a combination of public funds and broad based water user fees.

Option 3 -- Provide planning at public expense, up to the point of design.

Issues/Questions

- *Should the CALFED Program use a broad-based Bay-Delta system diversion fee to cover water quality programs? Or would that spread the costs much more broadly than the benefits of many water quality programs? Would a fee based on discharges be more appropriate for the Water Quality Program?*

- *Should the CALFED Program expand the use of a broad-based fee based on water deliveries or diversions to cover just that portion of the costs of water quality programs judged to be appropriately allocated to ecosystem restoration?*

- *Would it be effective to include the cost of an appropriate share of the water quality programs (based on water user benefits) in SWP and CVP water rates, with the rate increments charged to appropriate groups of beneficiaries?*

- *Would the Water Quality Program be an appropriate opportunity to implement a user fee on pesticide application within the Central Valley? Or alternatively to place emphasis on public/private partnerships?*

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5.4.7 CALFED Watershed Program

Program Description

The two main components of the Watershed Program are to provide assistance - both financial and technical - to local watershed programs and to aid in the coordination and integration of local watershed programs with the rest of the CALFED Program. The Watershed Program supports and encourages locally-led watershed activities that benefit the Bay-Delta system, recognizing that local watershed approaches may vary and that community involvement and support are essential. The Watershed Program strives to strengthen the partnerships and relationships between the public, local watershed organizations, and governments at all levels. Like the rest of the CALFED Bay-Delta Program, watershed activities included in the Watershed Program should ensure that adaptive management processes can be applied at multiple scales and across ownerships.

In summary, the draft Watershed Program includes the following elements:

- Support Local Watershed Activities -- Implement watershed restoration, maintenance, and conservation activities that support the goals and objectives of CALFED.

- Coordination and Assistance -- Facilitate and improve coordination and assistance between government agencies, other organizations, and local watershed groups.

- Watershed Monitoring and Assessment -- Facilitate monitoring efforts that are consistent with CMARP's protocols and support watershed activities to ensure that adaptive management processes can be applied.

- Education and Outreach -- Support resource conservation education at the local watershed level and provide baseline support to watershed programs.

- Watershed Processes and Relationships -- Identify the watershed functions and processes that are relevant to the CALFED goals and objectives, and provide examples of watershed activities that could improve these functions and processes.

- Integration with other program elements, especially the efforts of the Watershed Program with the actions implemented under the Ecosystem Restoration and Water Quality Programs.

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Program Benefits/Beneficiaries

Benefits of the Watershed Program include:

- **Ecosystem Quality** -- Watershed activities that improve terrestrial and riparian habitat, increase or improve fisheries habitat and passage, restore wetlands, or restore the natural stream morphology affecting downstream flows or species may benefit ecosystem quality. Some examples include stream flow enhancements, sediment balance, geomorphic stabilization, fire management, and improved spawning habitat through water quality improvements.

- **Water Quality** -- Watershed activities may benefit water quality in the Bay-Delta system by helping to identify and manage non-point sources of pollution and identify and implement methods to control or treat contaminants. Actions within the watershed which reduce the pollutant loads in streams, lakes, or reservoirs could measurably improve downstream water quality.

- **Water Supply Reliability** -- As land use activities within a watershed intensify, the ability of that watershed to slow runoff and allow water to infiltrate into the ground and percolate into aquifers tends to decrease. A result of this modified condition can be increased surface runoff and higher peak flows during storms and lower base flows during the dry season. This condition can make flood management more difficult, reduce opportunities to capture runoff in downstream reservoirs, and decrease groundwater recharge. Activities designed to restore or enhance the ability of watersheds to naturally absorb, store, and release water can reduce peak flows during storms, extend stream base flows through the dry season, and increase the potential for groundwater recharge.

- **Levee and Channel Integrity** -- In some cases attenuation of flood flows coming from the upper watershed may provide benefits far downstream in the system. Delta levees are most vulnerable during high winter flows; watershed activities which reduce these flows can help maintain the integrity of the levees.

Beneficiaries of the Watershed Program include:

- **The Public** would benefit from ecosystem restoration (habitat, water quality, natural hydrograph), and from proposed monitoring within the watersheds of the greater Bay-Delta system.

- **Delta Farmers** may benefit from reduced flood risk and increased water supply reliability.

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- **Users of Delta exports** (water diverters) may benefit from increased water supply reliability and improved water quality.

- **Local Communities** -- The Watershed Program is based at the local level. Local communities include land owners, governments, municipal and industrial water users, businesses and others interested in the health and productivity of their watershed.

  -- **Local land owners and local governments** may benefit from reduced fire risk, drinking water improvements, increased water supply reliability, and expanded recreational opportunities.

  -- **Local municipal and industrial water users** (local water districts) may benefit from improved water quality and increased water supply reliability.

  -- **Local business** -- One way businesses may benefit from the Watershed Program is through fire and fuel load management actions. As fuel loads through various vegetation management practices are reduced, businesses may profit from increased timber production opportunities made possible by fuel load management programs.

Estimating Benefits and Cost Allocation. The Watershed Program contains many features designed to strengthen communication, cooperation, and collaboration between all who have a stake in watershed management. Such activities, by themselves, are not amenable to economic benefit analysis and formal cost allocation. Where activities generate specific benefits to local business or benefit water quality, the costs can be allocated to the benefitting parties. Alternatively, where the benefits of the Watershed Program parallel those of other CALFED program elements (such as water use efficiency and water quality), the benefits could be estimated and the costs allocated in the same way as for those program elements (see discussion of options below).

Existing Watershed Programs and Funding

There are many existing programs at the national, state, and local level which use a watershed approach. There are several federal programs with watershed protection goals, several of which are spending money within the CALFED area. Most of the federal programs provide federal funds on a cost-sharing basis. Many of these programs provide a cost share in the range of 75%. Some of theses federal programs have dollar limits either on individual projects or the amounts provided to or the amounts provided to a project sponsor, grantee or landowner.

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Federal Programs and Funding

The Federal Agriculture Improvement & Reform Act of 1996 (the Farm Bill) created and expanded federal watershed programs to address high priority environmental protection goals. The Farm Bill authorized more than $2.2 billion in additional funding for conservation programs, extended the Wetland Reserve Program, and created new initiatives to improve natural resources on America's private lands, such as creation of the Environmental Quality Incentives Program (EQIP).

The EQIP was established through the Farm Bill, and offers financial, educational, and technical help for farmers and ranchers who face serious threats to soil, water, and related natural resources. The Natural Resources Conservation Service (NRCS) is the lead agency for EQIP, and works with the Farm Service Agency (FSA) to set the program's policies, priorities, and guidelines. EQIP was funded nationally at $130 million in fiscal year 1996 and $200 million annually thereafter. Livestock-related conservation practices receive half of program funding, with the remainder going to other significant conservation priorities. In fiscal year 1998, approximately $2.75 million was funded within the geographic scope of the CALFED Bay-Delta Program. Higher priority is given to areas where state or local governments offer financial or technical assistance, or where agricultural improvements help meet water quality objectives. Cost-sharing provisions pay up to 75% of the costs of conservation practices for technical assistance, and limits total cost-share and incentive payments to any person to $10,000 annually and to $50,000 for the life of the contract.

The Wetland Reserve Program (through NRCS) helps landowners work toward a goal of no net loss of wetlands. Acres of wetlands on private lands are enrolled in the program through easements. The WRP has an enrollment cap of 975,000 acres. The WRP requires that one-third of total program acres be enrolled in permanent easements, one-third in 30-year easements, and one-third in restoration only cost-share agreements. Individuals may choose the category for their eligible land. The WRP provides landowners with 75% to 100% cost-sharing for permanent easements, 50% to 75% for 30- year easements, and 50% to 75% for restoration cost-share agreements. Cost-sharing would help pay for restoration. Approximately $12.5 million from this program was spent within the geographic scope of the CALFED Program in fiscal year 1998.

Other federal programs include: CWA Section 205(j) and CWA 319(h) [discussed in more detail in the Water Quality section of this chapter], CWA Section 320 - National Estuary Program (EPA), Clean Water Action Plan (EPA/NRCS/Forest Service/BLM), CVPIA and Partners for Wildlife (US Fish & Wildlife Service), State and Private Forestry Program (USFS), Forest Service and BLM Watershed Management Programs, and the Resource Conservation and Development Program (NRCS).

State Programs

California Department of Parks and Recreation (DPR) offers grants to cities, counties, and districts through the Habitat Conservation Fund Program (HCF). Grants are awarded for acquisition, restoration, and enhancement of wildlife habitat and significant natural areas, such as wetlands. Annually $2 million is available, with no more than $500,000 awarded per project. Grants require a 50% non-state share of costs. Grants for development may be matched by monetary or in-kind services.

California Department of Forestry and Fire Protection's (CDF) California Forest Improvement Plan (CFIP) offers technical and financial assistance to local governments and private owners for practices that will improve the long-term quality of forested lands in terms of timber productivity, retention of soil cover, and value for wildlife. The program was established by the California Forest Improvement Act of 1978 and is available statewide. Under CFIP, a landowner works with a registered professional forester to develop a forest land management plan. The CDF typically reimburses the landowner up to 75% for the cost of preparing the management plan and for management practices, though it may go as high as 90% under certain circumstances. The landowner's contribution to the project cost can be in the form of labor, materials, or direct outlay. The annual maximum reimbursement amount is $30,000.

Some of the other state and local programs available for watershed activities include: Prop 204 funds, Fire Safe Program, Vegetation Management Program, and Timber Harvest Effects Monitoring Program (CDF), DWR's Urban Stream Restoration Program and Local Assistance Program, Clean Water Act State Revolving Fund (EPA/SWRCB), and the Safe Drinking Water State Revolving Fund (EPA/SWRCB) (SRF loans are described in the Water Quality Program section of this report).

Proposed Finance Options

The actions and primary benefits proposed by the Watershed Program support the following CALFED resource areas--water quality, ecosystem restoration, water supply reliability, and possibly levee improvements. Financing for these actions should therefore be consistent with the financing ultimately proposed for the other program elements addressing these resources areas.

The majority of watershed actions provide water quality and ecosystem benefits, therefore the finance strategy for the Watershed Program should be consistent with the strategy for the ERP and the Water Quality Program. For example, if the finance strategy for ERP is a combination of funding from the public and from a broad-based user charge, then that would also be the appropriate approach for those watershed actions that have ecosystem benefits. Similarly if in the Water Quality Program, actions where specific beneficiaries or polluters can be identified would require cost-sharing from them, this also should be the approach adopted by the Watershed Program.

One financing concern in the Watershed Program is how to help support local community participation and organization initially, but encourage self-sufficiency for program management and administration. One possibility would be to use mostly public funds for community development actions in the first 18 months to 2 years of implementation and gradually transition to requiring greater levels of local funding, combined with funds from outside beneficiaries where applicable. During this initial period, efforts would be made to train local community-based watershed groups to administer project funds, write grants, etc. By the end of Stage 1, the objective would be to have many successful self-administered, self-sufficient local watershed programs.

As discussed above, financing for CALFED's Watershed Program should be consistent with the financing ultimately proposed for the CALFED program elements addressing the same resource areas. Some general options can be proposed based on the program's proposed actions and existing sources of funds.

Option 1 -- Use a combination of public funds and local cost-sharing based on current established cost shares in existing program elements. This option could be used if most of the funding for CALFED's Watershed Program is administered through existing federal and state watershed program elements.

Option 2 -- Fund the Watershed Program consistent with other CALFED Program financing proposals for cases in which funding is administered by CALFED. Use Option 1 when the Watershed Program is dependent on existing agencies/program elements to implement actions.

Option 3 -- Fund the Watershed Program consistent with other CALFED related program elements (i.e., Water Quality, ERP, Water Supply, etc.). If necessary, seek legislation to change cost-sharing, where applicable, to be consistent with other related CALFED program elements.

Issues/Questions

- *Should a portion of the Watershed Program be supported by user fees, based on benefits received?* As discussed in the Ecosystem Program and Water Quality Program, a broad-based diversion fee may be appropriate and, if so, that fee could be extended to the Watershed Program to support actions providing ecosystem and water quality benefits. In addition, targeted fees may be appropriate for certain beneficiaries of the program.

- *Should local communities be asked to contribute an increasing share of community organization and planning costs as these activities as these program elements continue over the life of the CALFED Program?*

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5.4.8 CALFED Ecosystem Restoration Program

Program Description

The Ecosystem Restoration Program (ERP) is the principal mechanism that CALFED will use to restore the health of the Bay-Delta System. The ERP emphasizes the restoration of ecological processes in order to create and maintain the diverse and vital habitats of the multiple plant and animal species in the Bay-Delta system. To do so, the ERP identifies over 700 programmatic restoration actions, including restoring, protecting and managing diverse habitat types representative of the system; restoring critical flows; improving Delta outflow during key springtime periods; developing prevention and control program elements for invasive species; and modifying or eliminating fish passage barriers.

Program Benefits/Beneficiaries

Benefits of the Ecosystem Program include:

- **Improved Ecosystem Health.** The objective of the ERP is to improve the ecosystem health of the Bay-Delta system. The ERP focuses on improving terrestrial and aquatic habitats and ecological functions to support sustainable populations of plant and animal species in the Bay-Delta System. Actions under the ERP will also reduce the negative biological and economical impacts of established non-native species.

- **Improved Water Supply Reliability.** A primary conflict in the Bay-Delta system has been between fisheries and water diversions. As the ecosystem health improves and fish populations recover or are stabilized, the conflicts will diminish and water supplies will be more reliable.

- **Improved Water and Sediment Quality.** Actions under the ERP to improve water and sediment quality will prevent toxic impacts to organisms in the system.

- **Flood Control Benefits.** Some ecosystem restoration actions (e.g., setback levees) will provide non-structural flood control benefits.

Beneficiaries of the Ecosystem Program include:

- **The Public.** There are broad public benefits for maintaining and restoring ecosystem heath, habitats, and plant and animal populations.

- **Water Diverters.** As fish populations recover, in-delta diverters and upstream diverters could benefit by diversion restrictions being lessened. Diverters also could benefit from improved fish screens and ladders which reduce fish mortality

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and allow for more reliable diversions, and from the lessening of non-native species impacts which can also affect diversions.

- **Commercial Fisherman.** As fish population increases, the restrictions on harvest limits could be reduced allowing for increased fishing and increased profits.

- **Recreationists.** Recreationists (such as hunters, sport fishing, bird watching) will benefit from improved ecosystem conditions.

- **Regional landowners** would benefit from non-structural flood control for lands, infrastructure, and ecosystem habitat susceptible to flooding.

Estimating Benefits and Cost Allocation. Much of the Ecosystem Restoration Program would result in broad public benefits. Benefits to water users could be measured by the reduced frequency of disruptions or reductions in supply owing to the ERP actions. The benefits to commercial fishing and recreation would need to be estimated based on water quality and other modeling.

Existing Program elements and Funding

For the most part, ecosystem restoration program elements and actions have been publically funded by state and federal funds. Numerous state bond acts and annual state and federal budget appropriations have provided funding for habitat acquisition and restoration, for ecosystem monitoring and research, and for managing ecosystem projects and program elements. Under the CVPIA, water users fees also contribute significant funding annually to ecosystem restoration in the Central Valley. Private and nonprofit foundations and organizations have also provided environmental funding, but to a lesser degree than public and water user funding. The following section provides a summary of the more recent ecosystem funding related to the CALFED Program.

The Restoration Fund under the CVPIA provides approximately $45 million a year, at least $30 million of which is going toward actions that are consistent with achieving CALFED goals and objectives. For example, many actions under the CVPIA's Anadromous Fish Restoration Program are consistent with ERP actions. Several ecosystem recovery measures authorized under the CVPIA (Section 3406(b)) have specific cost-sharing provisions--such as the Shasta Temperature Control Device and mitigation of the fishery impacts of the Tracy Pumping Plant, have cost shares of 37.5% federal, 37.5% CVP water users, and 25% state. Other measures split the costs evenly between the state and federal governments or between water users and the federal government.

The 1994 Bay-Delta Accord, "*Principles for Agreement on Bay-Delta Standards*" contained a funding commitment (Category III) for non-flow related ecosystem restoration measures. Water users provided approximately $32 million in contributions between 1996 and 1998 in support of

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activities consistent with CALFED objectives and priorities. Additional state and federal funding is being provided through Proposition 204 (state funds) and the Bay-Delta Environmental Enhancement and Water Security Act (federal funds) described below.

In 1996, with the passage of Proposition 204 (The Safe, Clean, Reliable Water Supply Act), $60 million became available immediately in support of Category III ecosystem actions related to CALFED objectives. An additional $390 million will become available at the time of a final decision on a Preferred Program Alternative. These funds may only be expended once the EIR/EIS is certified by the state lead agency, filed by the federal lead agency, and the state and federal governments have entered into a cost-sharing agreement for eligible projects.

In November 1996, the President signed the California Bay-Delta Environmental Enhancement and Water Security Act, which authorized $430 million in federal funding for Bay-Delta ecosystem restoration activities. A total of $160 million has been appropriated in the last two years (1998 and 1999) in Bay-Delta Act funds to address high priority actions that can be undertaken, consistent with CEQA regulations, prior to completion of the Programmatic EIS/EIR. High priority actions include fish screening and passage, habitat acquisition and restoration, exotic species management, and monitoring of ecosystem health. In FY 2000, $95 million is proposed for ecosystem restoration and other CALFED program elements.

Other federal sources of funds include the recent Water Resources Development Acts (WRDA) and the Omnibus Parks and Public Land Management Act. The National Wildlife Refuge System Improvement Act has provided funds to Agencies such as FWS to enhance and protect the nation's wildlife refuges. The 1996 Farm Bill, described more fully in the section on Watershed financing, provides several program elements for private land enhancement. Starting with the WRDA of 1986 (Section 1135), project modifications for "improvement to the environment" were recognized. The WRDA of 1990 (section 304) made this program ongoing, set an annual appropriations limit of $15 million (with no more $5 million to be spent on any one project). Projects do not have to be linked to an existing Corp project to qualify. Non-federal interests are required to provide between 25% and 35% of the construction costs (including lands, easements, rights of way, and relocations) and 100% of operation and maintenance costs, but at least 5% financing is required.

Proposed Finance Options

As described in the previous section, there are public funds currently available or expected to become available at the time of the ROD. Following the ROD, $390 million of Prop. 204 funds becomes available. Also, an additional $270 million under the Federal Bay-Delta Act may still be appropriated and a portion of the $30 million from the CVP Restoration Fund may support CALFED actions while also meeting the CVPIA objectives. These funds could cover much of the ecosystem costs expected in Stage 1.

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Option 1 -- Combine a broad-based diversion fee and public funding. Adopting a fee, in connection with using other funding sources, would allow program flexibility with multiple funding sources.

Option 2 -- Rely on existing funding sources and consider a broad-based user fee in the future only as needed. Sufficient funding from existing sources (public and the CVPIA Restoration fund) is available for several years and possibly through Stage 1 for the ERP. However, existing funding sources are limited in their uses. For example, bond funds cannot be used for ongoing land management costs (See Table 5.3). However, relying solely on existing sources with user fees collected only from CVP water and power users raises additional concerns about the fairness and consistency of user fee funding.

Option 3 --Variation of Option 1 and 2. Impose additional cost-sharing requirements on those diverters receiving funding for fish screens and ladders to reflect the water user benefits received from increased water supply reliability.

Policy Issues/Questions

- *Should the ERP be supported in part from a broad-based Bay-Delta diversion fee?*

- *If so, should a diversion fee be adopted in the early years of Stage 1 to balance the contributions from state and federal water users and provide for program flexibility by having a variety of funds to draw from - or should existing public funding be expended/used before a diversion fee is initiated?*

  Also see the issues listed in Section 5.6 regarding a broad-based diversion fee.

5.4.9 Comprehensive Monitoring, Assessment, and Research Program

Program Description

The purpose of a comprehensive monitoring, assessment, and research program is to provide those new facts and scientific interpretations necessary to implement and evaluate the success of the CALFED Program. Monitoring involves measuring and sampling physical, chemical and biological attributes of the resources and can include social and economic attributes of associated human activities. Assessment involves developing correlations among monitored data. Research involves analysis or experiments to establish mechanisms that explain observed correlations, such as documenting fish distributions and mortalities for different flows. The information generated from monitoring, assessment, and research provides managers with the understanding needed to design actions and to detect responses to their actions. The principal monitoring

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objectives include documenting conditions; recognizing trends; assessing causes of observed changes; partnering with agency/ecosystem management for adaptive management; and reducing scientific uncertainties.

Program Benefits/Beneficiaries

The CALFED Comprehensive Monitoring, Assessment, and Research Program (CMARP) would serve all aspects of the CALFED Program and therefore would provide benefits for ecosystem, water quality, levee protection, water use efficiency, and water supply reliability. The CMARP would describe the baseline conditions against which the Program can measure its progress, would provide monitoring data and information needed to evaluate the implementation of the Program, and would assess the success of meeting the Program objectives -- all of which is critical to the decisions that will need to be made by the CALFED managers through the adaptive management process.

For certain monitoring, research and assessment actions, benefits can be narrowed and therefore beneficiaries could be more specifically identified; for example, monitoring related to mortality impacts related to diversion in Delta and drinking water quality monitoring in the Delta. Generally, the beneficiaries of the CMARP would fall into one or more of the following categories.

- **The Public** -- There are broad public benefits from a Bay-Delta system-wide monitoring, assessment, and research program. For those CALFED program elements in which the beneficiaries are the general public (such as Ecosystem Restoration, and portions of the Watershed, Water Use Efficiency and Water Quality Program), monitoring assessment and research for those program elements would have the same beneficiaries.

- **Agricultural Water Users** -- Agricultural water users that benefit from water use efficiency, water supply reliability, and ecosystem improvement would also be beneficiaries of the CMARP.

- **Municipal and Industrial Water Users** -- M&I water users that benefit from increased water supply reliability and improved drinking water quality would be beneficiaries of the CMARP.

Estimating Benefits and Cost Allocation. Monitoring, assessment, and research are essential to the CALFED mission and also serve to integrate the Program. However, it is often very difficult to assess the benefits of information, taken by itself. At least some of the costs of CMARP can be regarded as essential to running a successful water delivery system and allocated to water users, as is done currently. Other costs related to ecosystem monitoring could be regarded either as a component of the cost of water deliveries or as a public cost.

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Existing Programs and Funding

Central Valley Project Improvement Act (CVPIA). The Anadromous Fish Restoration Program (AFRP) of the CVPIA includes a Comprehensive Assessment and Monitoring Program (CAMP). Although CAMP is much smaller in scope and more focused in its goals, it is of a similar nature to the CALFED Program in terms of monitoring and assessment needs. Unlike CALFED, there is no research component to the CAMP. The cost-sharing provisions for CAMP are 37.5% CVP users (through the CVPIA Restoration Fund), 37.5% federal and 25% state. Approximately $2.5 million is provided each year.

Interagency Ecological Program (IEP). The IEP is a cooperative effort among ten member agencies (3 state agencies, 6 federal agencies, and SFEI). The members work together to develop a better understanding of the estuary's ecology and the effects of the SWP and CVP operations on the physical, chemical and biological conditions of the estuary. The IEP is funded through each of the ten member agencies' budgets. In 1998-99 the total funding committed to IEP purposes was approximately $14 million. Approximately 40 percent of the annual funding over the last ten years has been provided by DWR and USBR.

The San Francisco Estuary Institute (SFEI). The mission of the SFEI is to foster development of the scientific understanding needed to protect and enhance the San Francisco estuary through research, monitoring and communication. SFEI is governed by a Board of Directors whose members are selected so as to assure a balance of environmental, business and user groups, regulatory and management and scientific interests. Entities currently represented on the Board are the Santa Clara Valley Water District; Western States Petroleum Association; University of California, Berkeley; BayKeeper; Port of Oakland; U.S. Geological Survey; CALFED; and Marin County Audubon Society. There is also a panel of Scientific Advisors that serves the Board of Directors. A large portion of SFEI funding (for the Regional Monitoring Program) is provided by dischargers to the San Francisco Bay, as required by the San Francisco Regional Water Quality Control Board (SFRWCB). Funds are also available from grants.

Other Monitoring Program elements. Individual agencies provide monitoring and assessment related to specific objectives and program elements. For example, the Municipal Water Quality Investigations Program (MWQI) managed by DWR, provides monitoring to evaluate the quality of Delta water related to drinking water. The MWQI is funded by municipal SWP contractors.

Proposed Finance Options

Monitoring, research, and assessment will be costly for a very large and complex system like the Bay-Delta and Central Valley in which there is a lot of uncertainty. Possible funding options include:

> **Option 1** -- Continue and extend current approach -- Use a combination of funding from water users, public funding, and discharger fees. To the extent feasible, beneficiaries of

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the monitoring and assessment actions would be identified and funding from those beneficiaries used for those actions--such as urban water users and dischargers for drinking water quality, public funding and water user funds for ecological program elements waters, water user funding for hydrological and water management actions.

Option 2 -- Variation of Option 1-- Use a preset percent cost share between water user funding and public funding for CMARP. The program has benefits for all aspects of the CALFED Program and allocating costs to separate beneficiaries could limit the funding for the program as a whole.

Issues/Questions

- *How should the costs of CALFED monitoring, assessment, and research be shared between public and water user funding?*
- *Is it appropriate to use a broad-based Bay-Delta system diversion fee to help fund CMARP, based on the broad benefits that water diverters receive from the program? If so, should water user contributions continue to be provided through existing sources--SWP Funds and CVPIA Restoration Fund?*
- *Should dischargers in the Bay-Delta System (in addition to dischargers in the SFRWQCB region) be required to fund portions of CMARP?*

5.5 Funding Sources and Finance Mechanisms

One of the concerns for the Program is obtaining sufficient revenues for the CALFED program elements, while remaining committed to the principles of ongoing monitoring and oversight and adaptive management. Stakeholder involvement and commitment to the program depends upon assurances that each CALFED program element would be funded at the appropriate time and level and that water quality and ecosystem standards can be met in such a way as to achieve the long-term stability of water deliveries.

Water resources program elements in California have utilized a variety of different financing mechanisms, many of which CALFED has relied on to date and expects to utilize in the future. These include federal and state appropriations, state general obligation bonds, state water and power revenue bonds (tied to water repayments in the State Water Project), private financing, and broad-based Bay-Delta system diversion fees (such as the Mitigation and Restoration payments imposed by the CVPIA). In the Financing Plan section of the December 1998 Revised Phase II Report, CALFED indicated that it would evaluate the need for user fees within the context of other funding sources. Accordingly, this section of the chapter compares various funding sources and their advantages and disadvantages. These are summarized in Table 5.3.

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TABLE 5.3 Potential CALFED Funding Sources Advantages and Disadvantages		
Option	**Advantages**	**Disadvantages**
General obligation bonds	--Can achieve substantial up-front funding, but distribute the financial burden over time. --Focuses stakeholders and the public on next Program phase.	--Can be limited to physical infrastructure and facilities --Requires legislative and voter approval. --Would require repeated approval over 30-year period. --Cannot be used for ongoing costs such as land management costs, monitoring and assessment.
Water and power revenue bonds	--Can provide immediate sources of funding if linked to revenue-generating facilities. --Less burden on state budgets than general obligation bonds. Does not require voter or legislative approval. --Linking beneficiaries to program elements in SWP rates is consistent with beneficiary pay.	--Can be limited to physical infrastructure and facilities. --Works well for private benefits (water deliveries and power), but hasn't been used to cover program elements with broad public benefits.
State appropriations	--Provides immediate sources of funding. --Focuses stakeholders and the public on next Program phase. --Allows annual legislative review.	--A more direct financial burden than bonds. --Competition with other state program elements. --Requires annual approval which reduces assurances of long term funding. --Would require repeated approval over 30-year period.
Federal appropriations	--Provides immediate sources of funding. --Focuses high-level state and federal attention on the Program. --Allows annual Congressional review.	--Competition with other federal priorities. --Requires annual approval which reduces assurances of long term funding.. --Would require repeated approval over 30-year period.
Private financing	--Can be more immediate than funding from public sources. --Some contributions have been made to solve regional problems, as well as local problems.	--Is generally focused on local needs.
Broad-based diversion fee	--Dependable and ongoing source of revenues (may fit with program elements for ongoing funding needs). --Tied to diversion impacts on the Delta. --A broader-based fee would provide consistency and fairness with CVP users, who currently pay such fees. --Supported by stakeholder groups - Business Roundtable, etc.	--Since revenues come in annually, the funding available initially is less than with bonding or appropriations.

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General Obligation Bonds. Although federal water resources program elements do not operate with bonding authority, bonds have been heavily relied upon by the State of California. State bonding authority requires approval by the California Legislature and the voters and is typically used only for funding capital infrastructure. As of 1993, state general obligation bonds have been used to finance some 28% of the capital costs of the SWP [O'Connor, 1994]. (Operation and maintenance of the project is funded principally by water contractor payments.) Proposition 204 will provide substantial funding to CALFED through general obligation bonds following completion of the Record of Decision. In some cases, the bonding authority provided by Proposition 204 for CALFED is directed to grant program elements, which do not require any specified effective local cost share from program beneficiaries. In other cases, the Proposition 204 monies are directed to low-interest loans, which impose less of a financial burden on the state (some level of effective local cost share is required). Over its 30-year Program, CALFED expects to seek additional financing from similar bond issues on a periodic, as-needed basis, and general obligation bonds would continue to be an important component in the overall mix of funding.

Bonding authority, such as that contained in Proposition 204, has several advantages. It can provide considerable funding amounts, especially in the initial years after the bonds are issued. Structuring a bonding package has positive side effects: it forces stakeholders to reach agreement on the next phase of the Program, and voter approval maintains visibility for the Program and public commitment to it. On the other hand, passage by voters is not guaranteed, and additional bond issues would require periodic, concerted efforts by all stakeholders to garner public support. General obligation bonds must compete with other state financial needs, and, where the funds are dedicated to program elements that do not require reimbursement or local cost-sharing, general obligation bonds can burden overall state budgets and financing. In addition, bonds generally cannot be used for ongoing annual expenses such as for long term management associated with habitat acquisition and restoration.

Revenue Bonds and SWP Financing. Future facilities contemplated by the CALFED Program could be constructed as components of the State Water Project. Currently, the principal sources for financing SWP water supply and conveyance facilities are water system revenue bonds and power revenue bonds [O'Connor, 1994]. The state legislature provided general authority for the issuance of revenue bonds in 1933. As a result, revenue bonds have the advantage that additional issues do not require authorization from the legislature. However, there must be assurances in the financial markets that future water and power revenues would be sufficient to cover payments to bondholders. Therefore, this financing mechanism is most useful for those program elements that have traditionally involved repayment by water and power users. Since they are backed by contractual repayments, bonds do not compete for general state revenues. Revenue bonds also have the advantages that they are consistent with the beneficiary pay principle and are an accepted source of financing for major SWP facilities. Furthermore, because the State Water Project has a rate structure in which districts pay only for those facilities benefitting them, this financing mechanism has the advantage of linking financial responsibility to specific groups of beneficiaries.

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State-issued revenue bonds would be an important source of funding for some segments of the CALFED program elements, particularly for program elements that are similar to those for which such bonds are currently used (major storage and conveyance facilities). Revenue bonds are not a component of federally funded water resource program elements.

State Appropriations. Another potential funding mechanism for CALFED is direct state appropriations from General Funds to finance particular CALFED actions. The advantages and disadvantages of this funding mechanism would be similar to funding through general obligation bonds. Although no direct voter approval would be required, state legislators would look for general public support. Structuring the required legislation would bring stakeholders together for the required support. Depending on the funding source, most annual financial burden on the appropriations are flexible as to their use--capital outlays, program support, and ongoing expense such as land management. Revenues would be available immediately for the next stage of the program elements financed in this way. The disadvantages of this funding mechanism are that it would compete directly with other state budget priorities and would place a direct burden on state financing. Unlike bonding, where repayments to bondholders are made gradually over time, the state treasury would be immediate. In addition, depending on annual appropriations is difficult for program elements dependent on multi-year funding, such as monitoring and research.

Federal Appropriations. Funding through appropriations at the federal level has similar advantages and disadvantages to appropriations at the state level. However, federal authorizations may face a higher level of competition. Confronted with financial demands from all sectors of the federal budget and with competing nationwide demands, there would be no guarantees that funding would be continued on an ongoing basis. Even where federal moneys have been authorized over a number of years, there is no guarantee that the authorized levels would be appropriated. This problem is compounded for the CALFED Program: since the program would last for some 30 years, funding needs would bridge several Administrations and many sessions of Congress. The federal government does not have a capital budget that can assure outlays over several years. Rather each year, Congress appropriates funds principally for the budget for that year. Nevertheless, because of the visibility and importance of the CALFED Program, CALFED expects that federal legislative support would be forthcoming over the life of the Program and anticipates it to be an important component in the mix of CALFED financing options.

Given federal budget limitations, it is generally easier to convince the Office of Management and Budget and Congress to appropriate federal funds in those cases where repayment in full, or at some other level of effective cost-sharing, would be made. However, even in cases where federal expenditures are expected to have a 100% effective cost share by non-federal entities (i.e., 100% repayment), funding is not guaranteed.

Private Financing. Private financing would continue to be a part of solving water resources problems affecting the Bay-Delta area (here the term "private" is used to encompass funding by water agencies and districts). In addition, water districts would continue to make investments in local storage, conveyance, groundwater storage and pumping, water recycling, and other water efficiency improvements. In addition to these traditional activities of districts, some districts have made contributions to program elements with broad public benefits. More than $30 million in contributions have been made to early ecosystem restoration actions related to CALFED.

User fees, including a broad-based Bay-Delta system diversion fee. The concept that beneficiaries should pay for the costs of program elements that benefit them is a principle of the CALFED Program. User payments are not new -- they have been a feature of both federal and state water resources program elements (e.g., the contractual repayments made for irrigation and municipal and industrial water, as well as charges for hydropower).

In a similar vein, the proposed finance options for several of the CALFED program elements (see Section IV for a discussion of each program element) include user fees that would be targeted to particular groups of beneficiaries. For example, charges designed to recover the costs of specific water quality improvements that would benefit only subsets of water users (such as all Delta exporters or exporters using the south Delta pumps) could be included with the SWP or CVP rates of only the benefitting water users.

CALFED and its stakeholders have discussed the use of a broad-based Bay-Delta system diversion fee, particularly to finance some of the program elements or program elements with broad-based public benefits, such as the Ecosystem Restoration Program. The basic concept is a fee that would apply to all diverters, or all major diverters, of water from tributaries that flow into the Delta, as well as exporters of Delta water.

Currently, only one group of water users - the CVP contractors - are subject to diversion fees for contemporary environmental restoration purposes, namely the fees imposed by the Central Valley Project Improvement Act of 1992. If such a fee were extended to other users, it would have the advantage of providing an ongoing and dependable source of revenues. Reciprocally, such a fee is less suited than bonds to finance large capital projects requiring up-front expenditures. Since such fees are imposed on CVP users, extending them to others would be perceived as consistent and fair. In developing such a fee, particular issues would be raised regarding how to structure the fee in such a way as to be accepted by water users and finding the means to implement it.

A broad-based "Bay-Delta user fee" to finance infrastructure needs that confer broad-based common-property or public-good benefits was proposed by the California Business Roundtable, the California Chamber of Commerce, the California Farm Bureau Federation, and the California Manufacturers Association in the report *Maintaining Momentum on California Water Issues: Business Leaders' Findings - Financing Options for Water-Related Infrastructure in California.*

Their report displayed various options for such fees. The final section of this chapter explores how such a broad-based diversion fee could be structured and what revenues could be expected for fees similar to those established in the CVPIA.

In conclusion, the CALFED Program would need to rely on a variety of funding sources to provide for all the types of actions and program elements within CALFED.

5.6 Broad-based Bay-Delta System Diversion Fee

One item of discussion in the CALFED Program has been the use of a broad-based Bay-Delta system diversion fee (diversion fee) to finance at least a portion of those program elements, or program elements, with broad public benefits, such as the Ecosystem Restoration Program and portions of the Watershed Management and Water Quality Program elements. Such a broad-based diversion fee can be distinguished from other user fees, targeted to particular groups of beneficiaries, and discussed under some of the options for funding individual program elements, above.

One rationale for such a fee is that impacts on the Delta are related to water use, whether the use be upstream of the Delta or by Delta exports. More generally, it is in the interest of all diverters of water from the Delta and its main tributaries to achieve security in the level of long-term water deliveries. Such security can be achieved only if environmental goals of the CALFED Program are met. Broad-based diversion fees are one way in which water users can contribute to the long-term stability and security of their water supplies.

CVPIA User Charges

As of 1994, most users of Central Valley Project water and power began paying new user charges to assist in funding current environmental restoration purposes. Because these charges were imposed by federal legislation (the Central Valley Project Improvement Act of 1992 [CVPIA]), no similar fees were imposed concurrently on SWP contractors or on other major users that could be considered to impact the Delta. However, the imposition of similar fees was considered at the state level by the State Water Resources Control Board in its Draft Decision 1630. A discussion of the CVPIA user charges and the D1630 proposal follows.

One example of broad-based diversion charges designed to fund contemporary ecosystem needs are those imposed by the Central Valley Project Improvement Act of 1992. These charges, described more fully further on in this chapter, are levied on users of federally supplied CVP water and power (except the Exchange contractors and the water rights portion of the settlement contracts). The charges are collected in a Restoration Fund established by the Act and are used for environmental restoration purposes.

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Table 5.4 summarizes the amounts in the Restoration Fund collected from the various sources. Because this funding source is based on water delivered, the amounts collected vary from year to year, but there is a guarantee that moneys will be added to the Restoration Fund each year. Furthermore, there are two provisions in the Act that function to even-out the funds over the longer term: (a) payments from water users are supplemented by payments from hydropower to achieve a target level of $30 million per year (indexed to $35 million at current price levels), and (b) the target is set as a 3-year rolling average so that shortfalls in one year can be compensated by higher collections in the two years that follow (environmental restoration measures have also been supplemented by additional federal appropriations). Table 5.4 suggests that user charges levied on a broader base of water diverters from the Sacramento and San Joaquin River basins (such as State Water Project contractors and other water users) could lead to substantial revenues.

Under the CVPIA, contractors purchasing USBR-supplied irrigation water are required to pay up to $6 per acre foot, over and above prior contract rates or the normal "cost-of-service rates" computed by the Bureau of Reclamation. Contractors purchasing municipal and industrial water are required to pay up to an additional $12 per acre foot. A fee of $25 per acre-foot is assessed on water sold or transferred to non-CVP contractors for municipal and industrial use. For ease of administration, these fees are imposed by the Act on contract deliveries (rather than consumptive use). All of these rates are based on 1992 price levels and subject to annual adjustment. For example, the agricultural and M&I surcharges will be $6.98 and $13.96, respectively, for 1999. These three fees ($6, $12, $25), together with user fees assessed to hydropower users, are termed "mitigation and restoration payments" and, under the Act, cannot exceed $30 million annually (indexed from 1992 price levels), set as a three-year rolling average [Section 3407(d)(2)]. In practice, the agricultural and M&I charges have been set each year at the maximum per-acre foot levels, and the payment assessed against hydropower users has been set to cover the residual amount.

An additional diversion fee established under the Act is assessed on CVPIA contractors in the Friant Division of the CVP (in the San Joaquin drainage), because they are not required to dedicate additional water to instream uses, as are other project contractors. The Friant charges, which are assessed in addition to the $6 and $12 fees described above, were set at $4 per acre foot starting in 1993, with the rates increasing to $7 per acre-foot after 1999 [Section 3406(c)(1)] but not subject to annual indexing. The Friant charges would be discontinued if a plan is implemented that requires water releases for environmental purposes from these contractors.

The total collections into the Restoration Fund, including the mitigation and restoration fees on water and power users, the fee on the Friant Division, the tiered rates described in the introduction, and certain other fees, cannot exceed $50 million per year (indexed from 1992 price levels) [Section 3407(c)(2)]. To date, the collections from the sources other than the mitigation and restoration fees, have consisted primarily of Friant-Division surcharges (see Table 5.4).

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TABLE 5.4
CVPIA Restoration Fund Revenues[1]

	Restoration Payments				Friant Div. Surcharge	M&I Surcharge	Contri-butions	Total[2]
	Irrigation	M&I	Hydropower	Total				
1993	-	-	-	-	$8,051,964	-	-	$8,051,964
1994	$10,352,625	$2,867,240	$5,472,398	$18,692,263	$2,288,281	-	-	$20,980,544
1995	$14,940,635	$3,321,476	$10,582,809	$28,844,920	$4,717,142	-		$33,562,062
1996	$25,472,420	$4,372,886	$8,328,838	$38,174,144	$8,117,936	$1,073	$531,875	$46,825,028
1997	$22,716,942	$5,931,731	$1,945,430	$30,594,103	$6,040,929	$544	$36,386	$36,671,962
Total	**$73,482,622**	**$16,493,333**	**$26,329,475**	**$116,305,430**	**$29,216,252**	**$1,617**	**$568,261**	**$146,091,560**
Percent	50%	11%	18%	80%	20%	0%	0%	100%

Notes:
[1] Based on Annual Financial Reports for the Central Valley Project Improvement Act for the years 1993 through 1997, U.S. Bureau of Reclamation (Sacramento, CA). The information reported is from Schedules 1, 2, and 3.

[2] Total includes minor amounts from other CVPIA fee sources.

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Although the CVPIA was passed some two years before adoption of the Bay-Delta Accord and even though the basic purpose of the Act and the Restoration Fund is somewhat different than for CALFED (re-establishment of fisheries in the Sacramento and San Joaquin Rivers), many of the purposes and program elements support CALFED objectives. For FY 2000, the portion of the Restoration Fund budget estimated to support CALFED is $30.7 million.

Proposed D1630 Fees

In 1992, no charges similar to those in the CVPIA and designed to cover environmental restoration purposes were imposed on users of water from the State Water Project or other major users of water impacting the Delta, but such fees were proposed in Draft Decision 1630 (D1630) of the State Water Resources Control Board. However, there were some differences in the D1630 proposed fees. The D1630 fees first proposed were not differentiated by irrigation and M&I end-use, but rather by those using water within the basin of origin and those exporting water outside the basin of origin.

The D1630 fees, termed "mitigation fees," were to be assessed on all major surface water rights holders that were not subject to the federal CVPIA Restoration Fund fees. The proposed fees were to apply not only to SWP contractors, but also to other major diverters of water (defined as those with storage rights over 100,000 acre/feet or flow rights of greater than 100 cubic feet per second). D1630 contained a list of these entities, which included some 60 water rights holders in addition to the rights held by the major public storage projects (the SWP and the CVP). The D1630 fees were also to apply to those CVP water deliveries that were not assessed charges under the CVPIA, for example to the Sacramento water rights settlement contractors and those receiving water under the Delta-Mendota Exchange contract.

The upper limit of the fee was set at $5 per acre-foot for water rights used in the basin of origin, $5 per acre-foot for CVPIA water rights holders not subject to the CVPIA fees, and $10 per acre-foot for water rights exported outside the basin of origin. Similar to the CVPIA, an annual target was set for the fees ($60 million), with 5% to come from hydropower users. The monies collected were to be deposited in a Bay/Delta Estuary Project Mitigation Fund "to pay for activities and projects that would help mitigate the effects of water diversion and storage projects on survival of fisheries that live in or pass through the Bay/Delta Estuary."

Draft Decision 1630 proposed additional user fees to cover the costs of monitoring. These were to be based on the costs of monitoring and apportioned 75% to Delta exporters, 22.5% to in-basin users, and 2.5% to hydropower. Among the groups of water rights holders, the fees were to be shared proportionally.

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Discussion of Options for Fees

Several different types of user fees have been discussed by CALFED agencies and stakeholders.

Major fees:

a. **Fees on acre/feet delivered,** similar to current CVPIA fees.

b. **Fees on water deliveries and hydropower,** similar to current CVPIA fees. To be more completely parallel to the CVPIA and the D1630 proposal, fees would be charged on hydropower users as well. The rationale would be that although hydropower use consumes little or no water, hydropower use can alter flow patterns and release times and can make water less available for environmental purposes when it is needed. In the case of the CVPIA, the total contributions by hydropower are intended to reflect the overall cost allocation to power.

c. **Variations on the above,** for example setting different dollar amounts for the fees. Any of the fees discussed could be varied in the dollar amounts per acre-foot or in the overall target level (with the residual amount possibly being the responsibility of hydropower uses).

d. **Variations that more closely parallel D1630,** which has higher fees for Delta exporters. Among the variations in fees would be variations that more closely track those of draft D1630, where a major differentiation is between in-basin and out-of-basin use.

e. **$1 per acre-foot or $1 per person per year (for M&I uses), whichever is larger**. The rationale for this fee structure is that it would be closely tied to population and ability to pay, rather the direct impact of diversions.

Other specialized fees:

f. **Broad-based Bay-Delta pollutant discharge fees**. Similar to a diversion fee, the concept would be to place fees on those that contribute to pollutant loading on the Delta. Such a fee, or system of fees, would be targeted to those pollutants that are most widely recognized as contributing to water quality concerns and ecosystem problems in the Delta.

g. **Boating fees in the Delta**. The rationale for these fees would be that they are justified by impact that boat wakes have on levees. One variation of the concept would be to establish boating permit fees for high-speed boating and cruises that make a circuit through the Delta.

Options for Diversion Fees and Potential Revenues

In this draft, only (a), fees on acre-feet delivered, is discussed.

Fees on Acre-feet Delivered, Similar to Current CVPIA Fees. Table 5.5 contains very general estimates of the revenues that could be expected for similar fees assessed on different categories of water users at the current (1999) indexed levels of the CVPIA fees ($7 for agriculture and $14 for M&I use)

Water delivery and potential revenue amounts in Table 5.5 are intended to be somewhat conservative and to show a range of values. For example, the SWP deliveries do not include surplus and unscheduled deliveries. Also the period from 1986 through 1996, used in the table, contained a prolonged period of reduced deliveries (from 1986 to 1992). In concept, a broad-based diversion fee could be applied to all users having an impact on the Bay-Delta system, including at least some in-Delta agriculture and major historical diversions out of the basin, such as the City and County of San Francisco and the East Bay Municipal Utility District. This is the approach taken in the Business Roundtable Report and reflected in Table 5.5. The draft D1630 fees were to apply to approximately 60 of the largest water rights, but this included only a portion of the "major districts" included in Table 5.5. To show a reasonable range of values, Table 5.5 contains an estimate of average annual water use for "all other diverters" based on information from Bulletin 160-98. This estimate is intended to encompass all other water users whose diversions may impact the Delta and tributaries, including not only smaller districts but individual diverters. However, it may not be practical to levy a fee on all diverters in the system because of the high administrative costs of collecting a fee on small diverters, possibly making the fee not cost effective to collect. In summary, the estimated deliveries and potential revenues depends upon which water users are included in the fee assessment.

Of course, there are additional factors that could cause future average deliveries and revenues to differ from the historical values over the 12 year period from 1985 through 1996. In the case of SWP contractors, contractor entitlements have increased over that period. On the one hand, environmental restrictions may reduce future deliveries to some water users. On the other hand, new storage facilities or other measures may increase the level of future deliveries. Regardless of whether new storage is added, there is substantial uncertainty over the level of future water deliveries (due to differences in regulatory and modeling assumptions). Finally, the revenue estimates in the table do not take into account that the fees themselves could reduce the amount of water used, at least to some extent.

For these various reasons the values in the table should be considered estimates only: there could be higher deliveries and revenues for SWP, settlement contracts, and major districts in some years and lower values in other years.

TABLE 5.5
Broad-Based Bay-Delta System Diversion Fee
Estimated Diversions and Potential Revenues
(excluding CVPIA Restoration Fund Revenues)

	Average annual deliveries 1985 - 1996 (million af/yr)			Potential annual revenues[1] ($ millions)		
	Ag	M&I	Total	Ag @$7/af	M&I @$14/af	Total
State Water Project	0.9	1.1	2.1	$6.5	$15.9	$22.4
SWP settlement contracts[2,3]	0.9	0.0	0.9	$6.1	$0.0	$6.1
CVP exchange contract[4]	0.6	0.0	0.6	$4.5	$0.0	$4.5
CVP settlement contracts[2,5]	1.4	0.0	1.4	$9.5	$0.5	$9.9
All other diverters[6]	n/a	n/a	9.0	$59.4	$7.7	$67.2
Major districts only [7]	2.8	0.6	3.3	$19.3	$7.7	$27.0
TOTALS						
SWP & CVP (see above) and other major districts	**6.5**	**1.7**	**8.3**	**$45.8**	**$24.1**	**$69.9**
SWP & CVP (see above) and all other diverters	**12.3**	**1.7**	**14.0**	**$85.9**	**$24.1**	**$110.0**

Notes:
"n/a" denotes not available.
[1] Based on 1985 - 1996 deliveries.
[2] Settlement contracts provide project water to pre-project water rights holders at no cost.
[3] Diverters in the Feather River area.
[4] Includes those districts that exchanged portions of San Joaquin River water used for the Friant- Kern Division for a CVP water contract from the Delta-Mendota Canal.
[5] Includes Sacramento River, Delta-Mendota Canal, and San Joaquin River areas. Sacramento River deliveries tabulated include only the larger contracts. Includes all Delta-Mendota Canal and San Joaquin River deliveries.
[6] Information separating agricultural and M&I water uses in this category was not tabulated except for major districts. To estimate revenues, the remaining diversions were assumed to be agricultural and the $7/AF rate applied. Values are based on DWR Bulletin 160-98 estimates for 1995-level applied water.
[7] Major districts include such districts as San Francisco, East Bay MUD, Turlock ID, Oakdale and South San Joaquin ID's, Merced ID, Modesto ID, Yuba County WA, and Nevada ID.

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Based on the annual revenues estimated in Table 5.5, Table 5.6 contains potential revenues from diversion fees over 7 years and over 30 years. These estimates are based on current price levels; i.e., there is no cost escalation built into the table since no cost escalation is assumed in the Stage 1 or Stage 1a cost estimates discussed in Section 5.7 of this appendix.

Discussion

The next step in considering a broad-based Bay-Delta system diversion fee in the CALFED Program is to consider a range of such fees and fee levels in relation to the costs of selected CALFED purposes. This would allow CALFED and stakeholders to assess which program elements are most appropriate to finance through a broad-based diversion fee, as well as to consider which program elements (or portions of program elements) and their associated costs could be expected to be covered by different magnitudes and types of fees. Accordingly, Table 5.6 arrays potential revenues from one type of diversion fee (per acre-foot fees similar to those in the CVPIA) along with the costs of selected CALFED program elements. Only the costs of those program elements with greater percentages of broad public benefits are included. For each program element, the total costs are shown: no attempt has been made at this stage to separate out only the costs for those aspects of the Program with broader public benefits. Both the costs for the first two years and the average costs over the first seven years are shown.

Principal Criteria. There are three principal criteria that could be used to consider possible matches between these program elements and potential fees.

(1) Broad-based diversion fees are appropriately targeted to funding those program elements with broader public benefits. Although several program elements have some public benefits, the program with the greatest percentage of public benefits is the Ecosystem Restoration Program. Other program elements with elements that provide broad public benefits are (a) those water use-efficiency measures that result in additional protected instream flows, (b) those water quality improvements that have specific ecosystem benefits, and (c) several aspects of watershed management program elements.

For example, CALFED would require ongoing funding, regardless of the success of other elements of the Program, for the maintenance of a reserve for funding short-term leases of water to dedicate to in-stream flows or other environmental protection matters. For several reasons this would be an example of an action that would appear to match particularly well with funding based on a broad-based diversion fee. For one, the needs would be recurring and need a dependable source of revenues. Second, such a program needs to have a reserve account to be spent in times of emergency. Finally, the success of this program element would be particularly beneficial to water diverters, as it might prevent curtailment of diversions due to environmental restrictions.

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No consideration is being given to using new broad-based diversion fees for the construction of major new surface storage projects benefitting water and power contractors or to many other program elements where private cost-sharing has been the norm. For example, as discussed elsewhere in this chapter, construction for surface storage facilities has traditionally been funded through other means and is linked to contracts for water user payments. Those mechanisms can provide for a much more direct link between the benefits and costs of those program elements that could be provided by the kind of broad-based user charge being discussed here. Similarly, as regards the operation and maintenance of new storage facilities, institutions are already in place either to give program beneficiaries direct responsibility for operation and maintenance or for O&M expenditures to be covered by water rates. Therefore, broad-based diversion fees are not being considered to fund operation and maintenance where repayment by direct beneficiaries is the norm.

(2) The magnitude of potential revenues must be considered in relation to program costs. Depending on which fee levels are chosen and what group of water diverters a broad-based fee is levied on, some program elements (or combinations of program elements) could have costs that substantially exceed the potential diversion fees in Table 5.6. Further work would be required to see whether this would be true if only those costs associated with program elements with public benefits were displayed in the table. Of course, higher diversion fees could be proposed to cover a wider range of program elements and higher levels of program costs. But unless higher fee levels were also sought by amending the CVPIA, fee levels on SWP and non-project users higher than those applying to CVPIA contractors would again raise the issues of fairness and consistency - the very principles which the fees are designed in part to address. Also, the higher the fees, the greater the burden would be to analyze and consider the impacts on potential water use, as well as other economic impacts.

(3) The matching of potential fees to program elements would also need to take into account the time profile of funding needs in relation to that provided by different funding sources. For example, some program elements, such as improvements in Delta conveyance require a large-up front investment. Other program elements require sustained funding over time.

In conclusion, broad-based user fees as described in Table 5.6 (which includes a portion of CVPIA Restoration Fund revenue) would total up to somewhere near $100 to $140 million. Depending on what portions of the CALFED Program the fees would be needed for, the revenue shown from Table 5.6 may not cover both 100% of the future ERP and portions of other program elements. At a minimum, this focuses more attention on identifying which elements of program elements have the broadest public benefits and merit potential funding by a broad-based diversion fee.

Crediting and Incentives for Payment of Diversion Fees. The CALFED Program has established the principle that financial contributions would be credited toward the ultimate obligations for the CALFED program. An example of payments that may be credited toward CALFED obligations is the portion of CVPIA Restoration Fund payments that are related to

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TABLE 5.6
Broad-Based Bay-Delta System Diversion Fee
Potential Revenues in Relation to Selected Program Costs
(Including CVPIA Restoration Fund Revenues)
($ in millions)

A. Potential Revenues	**Annual Revenues**	**Total over 7 years[1]**	**Total over 30 years[1]**
Existing Restoration Fund revenues supporting CALFED objectives[2]	$30.7	$215	$921
Additional Broad-Based Bay-Delta Diversion Fee[3]			
SWP, CVP, and other major diverters	$69.9	$489	$2,096
SWP, CVP, and all other diverters	$110.0	$770	$3,300
Total[2,3]			
Restoration Fund, SWP, CVP, and other major diverters	**$100.6**	**$704**	**$3,018**
Restoration Fund, SWP, CVP, and all other diverters	**$140.7**	**$985**	**$4,221**

B. Costs of Selected CALFED Program elements[4]	**FY 2000 costs**	**FY 2001 costs**	**Average Annual Stage 1 Costs**	**Total Stage 1 Costs (1st 7 years)**
Ecosystem Restoration Program	$134	$134	$130	$910
Watershed Program	$30	$30	$30	$210
Water Quality Program	$17	$21	$36	$250

Notes:
[1] The total revenues over 7 years and 30 years are computed as 7 times and 30 times the annual revenues. They do not take into account cost escalation and are not discounted to present worth.
[2] Includes the portion of CVPIA Restoration Funds estimated for FY 2000 that supports the CALFED Ecosystem Restoration Program objectives.
[3] Information regarding the additional broad-based diversion fee is contained in Table 5.5. Includes SWP, SWP settlement contracts, and CVP exchange and settlement contracts.
[4] The costs of selected CALFED program elements do not include operation and maintenance costs.

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CALFED objectives and made after the December 1994 signing of the Bay-Delta Accord. Crediting has already been approved for financial contributions made by the Metropolitan Water District of Southern California, Santa Clara Water District, East Bay Municipal Utility District, San Francisco PUC, Alameda County Water District, and Contra Costa Water District for early ecosystem actions. It has also been established that financial contributions would accrue interest. Although the precise rules governing these credits has not been established, the basic rule that interest credits would be given provides an incentive for early contributions.

Table 5.7 illustrates the value of hypothetical interest credits to date, using annual compounding and 100% of the CVPIA payments. [This table is for illustrative purposes only-- neither the actual historical amounts to be credited nor the interest rates for determining such credits have yet been determined]. As the totals in the table indicate, the total value with the interest credits would be about 13% greater than the total value without interest credits. Put in other terms, a similar per-acre-foot fee imposed on non CVP users would have to be 13% greater than the CVPIA charges to garner the same revenues per acre foot on an annual basis.

TABLE 5.7
Hypothetical Interest Credits[1]
CVPIA Restoration Fund
($ in millions)

			Hypothetical Interest Credits	
	Annual Revenues[2]	Cumulative Revenues	Interest rate (6-month)[3]	Cumulative Revenues With interest credits
1995	$33.6	$33.6	5.59	$35.4
1996	$46.8	$80.4	5.09	$86.5
1997	$36.7	$117.1	5.18	$129.5
1998[4]	$40.0	$157.1	5.00	$178.0
	Cumulative total	$157.1		$178.0
	Percent	100%		113%

Notes:
[1] Credits are computed after the December 1994 signing of the Bay-Delta Accord.
[2] Detail for Restoration Fund annual revenues are shown in Table 5.4.
[3] A value of $40 million is assumed for 1998 in order to assess compound interest through the end of 1998.
[4] Interest rates for 1995 through 1997 are from the Economic Report of the President, Table B-73. The rates used are 6-month borrowing rates.

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When the cumulative revenues from past and future charges are taken into account, the impacts of interest credits would be more substantial. For example, a new diversion fee assessed on irrigation water not covered by the CVPIA user fees and with the new fee starting in the year 2000 and extending to the year 2030 would have to be set more than $2 per acre-foot higher than the parallel CVPIA fees to have the same financial value (on a present-worth basis). The increment required to achieve parity with CVPIA collections would increase for starting dates later than the year 2000. These examples illustrate that if the burden of environmental restoration is to be shared equally on a per acre-foot basis, then the sooner that broad-based user charges are imposed, the lower such charges would be.

Issues and Options

Some of the issues relating to diversion fees and crediting are the following:

- *Should the Program employ a broad-based diversion fee applicable to users other than CVP water and power users?*

- *What groundwork should be laid for imposition of such a fee (e.g., working with the SWP, state legislature).* SWP rates could be a means of setting such fees for SWP contractors. State legislation would be one means of setting fees for other water rights holders.

- *Should the fee be structured in a similar nature to the existing CVPIA charges?* If not, how would parity in payments be obtained and would the charges on non-CVPIA users be perceived as fair?

- *What program elements should such a fee cover?*

- *If the likely revenues from such a fee would not cover the entire ERP or other program elements, should higher options for higher fee levels be examined and their impacts assessed?*

- *Facing the revenue limitations of a broad-based diversion fee, should more consideration be given to the various targeted fees discussed under the program options?*

- *What CALFED Program benefits are needed in order for water users to support a new fee on water diversion?*

- *What portion of past CVPIA charges should be credited to CALFED obligations?*

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5.7 Program Element Cost Estimates

CALFED has developed preliminary cost estimates for the Program for Stage 1 (first 7 years of Implementation). These costs are shown below in Table 5.8. Stage 1 costs are in current year dollars, and exclude interest, inflation, O&M, and individual state and federal agency costs. Also, the program management costs of CALFED (or other oversight coordination entity) are not included.

For the first two years of the Program, (Years 2000 and 2001, referred to as Stage 1a) CALFED has identified high priority actions and developed cost estimates. These cost estimates are based on a better understanding of proposed early implementation actions for the various CALFED program elements. Stage 1a cost estimates, organized by program element, are summarized in Table 5.9. A detailed list of the actions in Stage 1a, organized by bundle, is provided in Table 3.1 of this Appendix.

CALFED has adopted an adaptive management approach, which will allow the Program to be flexible. CALFED will be able to identify if proposed solutions are working, and choose future projects based on scientific information and monitoring. This makes developing cost estimates in future years difficult, however, so cost estimates for future years will change to some degree as CALFED adaptively manages the Program. Refining cost estimates will be an ongoing process, and better estimates will be developed for future years as information becomes available regarding specific actions and projects.

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TABLE 5.8 Estimated CALFED Stage 1 Costs [1] ($ in millions)	
Program Area	**Total Cost**
Ecosystem Restoration [2]	$910
Water Use Efficiency/Recycling	$2,000
Water Transfers [3]	$6
Watershed Management	$210
Water Quality	$250
Levees	$264
Storage [4]	$370
Conveyance [5]	$913
Monitoring [6]	$246
TOTAL	**$5,169**

Notes:
[1] Preliminary; current year dollars based on staff estimates. Total costs assume contributions from State, Federal, and User/Private funding.
[2] Total cost could be paid for by Prop. 204 (State), Federal Bay-Delta appropriation and CVPIA water and energy funds (Federal), and CVPIA Restoration Fund (User).
[3] No major capital investments are necessary for this program.
[4] Includes South of Delta groundwater and North of Delta groundwater ($300 million), Integrated Storage Investigation and related planning and feasibility work ($70 million).
[5] Includes South Delta Improvements ($671 million), North Delta Improvements ($220 million), conveyance studies ($22 million).
[6] Assumes monitoring and assessment costs are 5% of total program costs.

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TABLE 5.9 Estimated CALFED Stage 1a Costs [1] ($ in millions)			
Program Area	**Year 2000**	**Year 2001**	**Total Cost**
Ecosystem Restoration	$136	$137	$274
Water Use Efficiency/Recycling	$50	$100	$150
Water Transfers [2]	$2	$2	$4
Watershed Management	$30	$30	$60
Water Quality	$17	$21	$38
Levees	$33	$26	$59
Storage	$20	$23	$43
Conveyance	$20	$51	$71
Monitoring [3]	$15	$19	$34
TOTAL	**$323**	**$409**	**$732**

Notes:
[1] Preliminary; current year dollars based on staff estimates. Costs derived from actions listed on Table 3.1 of this appendix.
[2] No major capital investments are necessary for this program.
[3] Assumes monitoring and assessment costs are 5% of total program costs.

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