

Financing Strategies for Delta Vision

For Delta Vision Process

Roger Mann, Ph.D., RMecon¹

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¹ Dr. Stephen Hatchett, Western Resources Economics, provided information used in Section 5

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Summary

This paper proposes a financing strategy for Delta Vision costs. These costs will be primarily for storage and conveyance, ecosystem, levee improvements, governance and science. Local conservation and water storage costs could also be important. The finance of conservation and local and regional storage projects are being covered in different processes so they are not directly addressed here.

This paper does not propose a finance plan. A finance plan would detail costs, specify the allocation of costs to purposes, assign responsibility for purposes to beneficiary groups, propose finance tools to pay costs when they are incurred, and show how the financed capital costs and operational costs will be repaid. The Delta Vision Strategic Plan currently does not provide the level of detail on projects and programs needed for a finance plan. Rather, a finance strategy is proposed which will facilitate financing by minimizing costs, maximizing benefits, and increasing sources of finance and revenues to repay costs.

The Delta Vision finance strategy includes three elements; 1) proposals for analysis, structures and collaboration that will increase the economic and financial feasibility of Delta Vision strategies, 2) a general description of the relationship between Delta Vision strategies, purposes, beneficiaries, finance tools and repayment, and 3) a general description of finance tools and beneficiary payments that may be used.

The strategy includes a brief discussion of conventional cost allocation procedures for multipurpose projects. The analytical framework shows how collaboration can lead to a project that all participants are willing to finance. Also, the conventional approach may be required for federal cost sharing.

Under the conventional approach, a participant's minimum cost share is their separable cost; the cost they alone impose on the entire project; and the maximum must be less than their benefit. However, participants often do not agree on key assumptions, and some future benefits are very uncertain. In this context, it is more helpful to focus the finance strategy on actions that should increase the probability that the Delta Vision package, including its financing, will be feasible for all participants.

These actions are recommended to improve the financial feasibility of Delta Vision programs.

- Consider cost-effectiveness and efficiency when designing projects and programs.
- Understand and expand the federal role through existing programs and new federal authorizations and appropriations
- Expand participation by recognizing and developing benefits and corresponding revenue mechanisms
- Include incentive structures that will reduce costs and increase benefits
- Develop financing contingencies and assurances tied to key uncertainties
- Tie local financing to local benefits
- Coordinate Delta Vision finance strategy with existing and forthcoming finance plans

A table of beneficiaries, Delta Vision programs and the types of benefits of each program is provided as Table S-1. There are a variety of private user groups, but most private benefits accrue

to water users who benefit from water supply reliability and property owners who benefit from flood control. State benefits are public good benefits and benefits to Californians that are not captured as private benefits. Some water supply reliability public benefits have a regional focus. National benefits are defined by authorized federal purposes for water project development.

The general relationships between Delta Vision programs, purposes, beneficiaries, financial tools and repayment are shown in Table S-2. Most financing would come from State Revenue and GO bonds, federal appropriations including new authorizations, and financing by water users and property owners. Most repayment would come from water charges, user fees and assessments, federal and State tax revenues, and revenues from services provided including ecosystem services.

Financing of regional or local storage is not covered by this report because most potential projects have their own finance plans. Storage financing is similar to conveyance except that recreation, flood control and hydropower may be important and cost allocations for water users and ecosystem are closely related to allocation of storage space.

This finance strategy differentiates financial tools and beneficiary payments. Financial tools are used to raise funds to pay project costs. Many project capital costs must be paid off over time with interest. Debt financing is normally provided in expectation of future repayment, revenues or benefits. Beneficiary payments are the revenues used to provide repayment as well as paying for ongoing expenses. Some beneficiary payments are public economic benefits which are not themselves revenues, but they may be used to justify a public cost share. In some cases ongoing costs may be financed, and in others, capital costs may be financed by beneficiaries.

Financial tools assure that cash is available to pay expenses as they are incurred. Important financial tools are:

Revenue bonds, self-liquidating bonds, tax anticipation notes (short-term debt securities), certificates of participation (selling a share of future revenues). These tools are based on reliable beneficiary payments in the form of future revenues. Revenue bonds may be issued by the State, but local governments, water districts and others may also issue bonds or securities. Revenue bonds are commonly used to finance water systems in California.

General obligation (GO) bonds. GO bonds are issued by the State. These are normally paid off using general tax revenues. They are generally associated with the public cost share of a project, frequently associated with the State's citizens as the beneficiary. GO bonds have frequently been proposed to pay for ecosystem costs because there are non-use benefits and other public good benefits that are expensive or impractical to charge for. Public cost shares based on ecosystem benefits are hard to calculate because environmental restoration and enhancement benefits are hard to quantify. Other State public cost shares may involve reduced shortage costs, economic base and security, and reduced food costs; some of these may not be counted in conventional benefits analysis.

Other State sources. Past initiatives and legislation have authorized State spending for purposes that might fall within the Delta Vision program. Examples include existing bond revenues (84, 1B, 1E), special funds, and transportation funds.

Federal programs, authorizations and appropriations. Existing federal programs may provide important capital funds for Delta Vision programs. New federal appropriations might be provided in the context of existing legislation, or new authorizations may be required.

Private or Public	Beneficiary	Delta Vision Program ¹	Nature of Benefit
Private	Water Users: Exporters	Water Conveyance	Water supplier net revenues Urban water quality management costs
		Levees	Levees protect conveyance
	Delta Water Users	Levees	Levees protect water quality
	Some Water Users	Ecosystem	Ecosystem projects may recover species faster, at less cost, or with less water
	Developers	Water Conveyance	Development potential increased
	Delta Property Owners	Levees	Levees protect private property
		Ecosystem	Conservation/mitigation banking, carbon offsets
	Fishermen	All	Fish populations increased
Other Recreationists	Ecosystem, Levees(?)	Recreation opportunities increased	
Public	State	Water Conveyance	Public shortage costs are reduced. End user water quality benefits Economic base enhanced Food supply costs reduced
		Levees	Levees protect State property Delta as place Reduced risk of fatalities Reduce State costs of levee repairs, pumping, emergencies, etc
		Ecosystem	Non-use values and other public benefits
	Nation ²	Water Conveyance	CVP water supply and quality
			Other water supply and quality
			Fish and wildlife
		Levees	Flood control, water supply, fish and wildlife
Ecosystem	Fish and wildlife, recreation		

1. Regional storage, additional conservation and local projects costs are not covered by this report.
 2. Federal financing of all programs would generally require new authorizations and appropriations. Federal standards generally require non-federal repayment of 100% of water supply and quality, 25% of fish and wildlife separable costs, 50% of recreation separable costs and 35% of flood control costs.

Table S-2. Delta Vision Programs, Purposes, Beneficiaries, Finance Tools and Sources of Repayment for Capital Costs and O&M					
Delta Vision Program	Primary Purposes	Beneficiaries	Finance Tools	Capital Repayment	Operations and Maintenance Payments
Conveyance ¹	Water Supply and Quality ²	CVP and SWP, some public benefit	Federal Authorization and Appropriation, State and User Revenue Bonds. State GO Bonds	Water charges and service fees	Water charges
	Fish and Wildlife	Nation and CA Public	Federal Appropriation and State GO Bonds	Federal and State general tax revenues	State tax revenues
Ecosystem	Fish and Wildlife	F&W Users, Nation and CA Public	Federal Appropriation, State GO Bonds, Private Contributions.	Conservation and mitigation banking, access fees, State tax revenues, private.	Conservation and mitigation banking, access fees, State tax revenues, private.
	Other Ecosystem ³ .	CA Public and the Nation	Federal Appropriation, State GO and Revenue Bonds, Private Contributions.	Carbon offsets, access fees, State tax revenues	Carbon offsets, access fees, State tax revenues
	Water Supply and Quality ²	Water Users limited by ecosystem	Federal Appropriation, State/User Revenue Bonds	User fees tied to cost of debt service	User fees
Levees and Emergency Response	Flood Control	Property Owners	Federal Appropriation and State Revenue Bonds, Private Contributions.	Reclamation district revenues, probably charges based on debt service.	Reclamation district revenues, probably charges based on O&M cost.
	Water Supply and Quality ⁴ .	CVP, SWP and Delta Water Users	Federal Appropriation and State Revenue Bonds.	User fees tied to debt service.	User fees tied to O&M cost.
	Ecosystem ^{4,5} .	Nation, CA Public, All Water Users	Federal Appropriation, and State GO and Revenue Bonds.	Conservation and mitigation banking, State tax revenues, private.	Conservation and mitigation banking, State tax revenues, private.
	Emergency Response	CA Public	State GO Bonds	State tax revenues	State and local tax revenues
Governance and Science	All	All Above	Not much capital/upfront costs	Federal, State and Water User Contributions.	Federal and State appropriation and user fees

1. Storage projects are not evaluated in this report. Storage financing is similar to conveyance except that there may be more purposes and beneficiaries and ecosystem benefits are related to water supply.
 2. Includes improvements because of fish and wildlife and ecosystem improvements; for example, if species are recovered faster or at less cost.
 3. Other ecosystem benefits may include recreation, scenic quality, carbon sequestration
 4. Flood control protection of these purposes by levee improvements.
 5. Includes levee modifications for ecosystem purposes

Water user and private contributions. Water users and private beneficiaries may provide up-front financing for some project components. Some water users might issue revenue bonds to pay a share of construction costs for Delta conveyance. Some private property owners may be able to help with financing of levee improvements. Some landowners may be willing to contribute land or easements for ecosystem restoration.

Water user and private contributions are also beneficiary payments, but most beneficiary payments are paid by beneficiaries when benefits are received. They are used to make bond payments, including interest, and to cover ongoing operations and maintenance costs. Important beneficiary payments include:

User fees and assessments. Water user revenues may be used to help pay for Delta conveyance, ecosystem projects, levee improvements, and governance. Water users benefit from Delta conveyance through water supply reliability and water quality. User revenues may contribute to ecosystem costs if water users benefit because species recovery is accomplished faster or at less cost. Water users benefit from levee improvements that increase the reliability of water supply and improve water quality. Ecosystem water will not be purchased with water user revenues. Fees or assessments will be charged only for services received based on benefits received and the cost of services provided. User fees and assessments should not exceed benefits. The amount and form of user fees and assessments might be negotiated when the cost and benefits of Delta Vision programs are estimated more accurately.

Water utility charges. The Delta Vision Strategic Plan contemplates that the State Water Project (SWP) will be managed by a new water supply utility. This utility would charge water users and other beneficiaries for water and other services. These charges would continue to recover costs of construction, operations and maintenance of the SWP. In addition, some costs of Delta Vision strategies might be recovered by the utility. Such costs may include Delta conveyance, improvement or maintenance of levees that protect water supply conveyance, water quality projects, and ecosystem projects that help water supply reliability. In the short run, the form of charges for services might be constrained by existing contracts.

CVP water charges. The Central Valley Project (CVP) may continue to exist in its current form or future governance could be different. Under existing practices some of the CVP share of costs would be repaid through water rates set by Reclamation.

Assessments for flood protection. Revenues to cover a share of costs for Delta levee improvements would probably be collected from local reclamation districts who would charge assessments to Delta property owners. Revenue collection from protected property might be based on a conventional cost allocation approach, but estimation of separable costs and benefits may be complicated and somewhat ambiguous. New reimbursement criteria should be developed for Delta Vision levees that provide for payment for cost of services that is directly tied to cost of improvements and benefits received by property owners and others. More development of a simplified yet equitable approach may be justified.

Federal payments. Federal funds might provide for some repayment or payment of ongoing operations and maintenance (O&M) costs. In general, most federal programs do not cover ongoing O&M costs. Still, some potential sources for funding exist for agricultural conservation, non-point pollution and fisheries restoration, for example, and these should be pursued.

Local government and private. The local government contribution for purposes other than flood control will probably be limited. Private contributions for ecosystem could be significant depending on current tax laws, private land uses and water use practices. Local financing and beneficiary payments should be related to local net benefits. Conservation banking, mitigation banking and carbon offset payments could cover a significant share of wetland restoration costs. These cost shares might be obtained through cost-sharing agreements or easements with private landowners.

Public benefits. Public benefits from public goods do not provide a revenue stream that can be used for repayment. However, public benefits should be counted in a finance plan, especially if they provide justification for GO bonds, and they should be monitored as the project proceeds.

1. The Financing Challenge

Financial planning for a complex, multi-purpose program normally includes allocating costs to purposes, assigning responsibility for the purposes to beneficiary groups including the State or nation as a whole, planning for financial tools to provide funds when needed for capital and ongoing costs, and repayment. Purposes that may apply to the Delta Vision Strategic Plan are water supply reliability, water quality, flood control, fish and wildlife, environmental enhancement, hydropower, recreation and navigation. Financial planning determines the amount of funds required over time, normally by year, and selects financing tools that will cover costs as they are incurred. Repayment determines how beneficiaries will provide funds over time to recover capital costs including interest and the ongoing costs.

The scope and scale of the Delta Vision financing challenge is not fully known, but the strategy needs to encompass significant costs for alternative conveyance (\$4 to \$10 billion), Delta ecosystem projects (about \$2.5 billion), levee improvements (\$4 to \$20 billion), and surface and groundwater storage costs. Other costs may include costs of the CDEW Plan, operating costs of the California Delta Ecosystem and Water Council, science costs, costs of other governance changes, and other administration, operations, maintenance, monitoring and evaluation, repair and capital replacement costs. New storage costs are not considered in this document in any detail because they are being considered in other processes or they are undefined. There may be new costs associated with new export strategies in the Delta. These costs are not included because the new strategies are undefined. Additional costs associated with increased water use efficiency are also not considered here.

This report suggests that the scope of the Delta Vision financing strategy be expanded to include feedback loops whereby economic performance and financial opportunities can change the scale, design, or operation of projects and activities to be funded. Adaptive management with costs and benefits in mind will be needed to realize the goals and purposes of the Delta Vision process.

2. Conventional Approach and Issues

Cost allocation and finance for multi-purpose water development projects has a long and storied history. The procedures and issues of cost allocation have been extensively studied in the context of water resources development and game theory. The conventional approach is important in that it shows how costs and benefits affect collaboration. Also, this approach may be required as a basis for federal cost sharing.

The conventional approach usually starts with a preferred project (or package of projects), its cost, and a list of participants or beneficiaries. The challenge of cost allocation is to find a distribution of cost among participants such that all participants agree on the project and the cost shares, and the shares cover the entire cost.²

In summary, the solution requires the following conditions.

1. Each participant's cost share must be at least as large as their separable cost.

² Federal procedures require a cost allocation among purposes. The discussion using participants is easier to understand.

2. Each participant's total cost share must be less than their benefit.

Separable cost is the cost caused by the addition of the participant to the project; it is the cost they impose on the project cost. If a participant imposes more cost on the project than they pay, other participants will seek to exclude them from the project. The separable cost can be interpreted as the minimum cost of service for the participant in a voluntary collaboration.

Separable costs include single-purpose project features whose costs are easy to identify and assign. Many separable costs, however, are not so easy to calculate. For each participant, a new project must be designed that provides no benefit to the participant but the same level of benefit to all other participants. The difference in cost between this new project design and the original project is the separable cost.

The joint cost is the share of project cost that cannot be readily assigned to any participant. It is the total cost less the sum of all participants' separable costs. Each participant's cost share is their separable cost plus their share of the joint cost. The cost allocation problem requires that each participant's total cost share is less than their benefit, but there is no single, "correct" way to allocate joint costs among participants. One cost allocation method, called Separable Costs Remaining Benefits (SCRB) allocates the joint cost among participants according to their share of benefits (estimated in dollars) that remain after separable costs are paid. The SCR method is the preferred approach for federal projects to satisfy the "Economic And Environmental Principles And Guidelines For Water And Related Land Resources Implementation Studies (P&Gs)." The method provides a feasible solution as long as each participant's benefit exceeds their separable cost and total benefits exceed total costs. The minimum cost share for each is their separable cost and the maximum cost share is their benefit.

In SCR, the importance of economic benefits increases with joint costs. If all costs are joint costs, then SCR allocates costs in proportion to benefits. This is important in that Delta Vision programs may have a large joint cost; there are few separable costs to allocate to one beneficiary. The amount of cost to assign may be ambiguous based on cost information. If all costs are joint costs, physical or monetary benefits information might be better used to allocate costs.

In any case, there may be no feasible cost allocation for a project, usually because total benefits are less than total costs. In other cases, a participant's separable cost is more than their benefit. Often, there is a go-it-alone alternative that one or more participants find more attractive. They are not willing to pay the cost they add to the project and the other participants are unwilling to cover it.

There are some useful variants to the standard cost allocation game theory model. In one variant, one or more of the participants has veto power (political and/or legal). If they are not included then there can be no project at all. In this case, participants may choose to pay some of the separable costs of other participants as long as the project is better for them than the go-it-alone option. A subsidy can be defined as a situation in which one participant pays some of the separable cost of another. If some participants have veto power then a subsidy may be required to realize a project that has a positive net benefit.

In another variant, some or all participants may be required to accept some minimum level of cost allocation. The feasibility of the project and its cost allocation are affected by the mandatory minimum cost shares. A third variant allocates joint costs using a physical measure of benefits rather than the dollar value. This variant only works for allocation across one physical benefit

(such as water supply or power production); it is sometimes used for sub-allocations, such as among water supply contractors within a service area.

There are four types of issues that may confound the application of the conventional cost allocation approach to Delta Vision strategies.

Public Goods Issue

For economics, “public goods” means that the goods have non-use benefits and benefits that are expensive or impractical to charge for. Non-use benefits are the willingness to pay of Californians and U.S. citizens for improvements that they do not use. Much economic literature documents that people value some natural resources even though they do not expect to use them or even see them. Conventional examples include endangered species and ecosystem restoration. In the economics lexicon, use benefits are consumptive use or non-consumptive use. Some types of non-consumptive uses such as scenic quality have benefits that are impractical or expensive to charge for.

Other types of public goods associated with water supply have been proposed. The public enjoys reduced water shortage in ways that are not reflected in water utility costs and revenues. Water supply reliability may have economic benefits at the State level through economic activity and through price effects; for example, by reducing costs of agricultural products. Reduced water shortage costs, use benefits and non-use benefits are recognized economic benefits at the State and national level. The other types are probably not national benefits and they would be debatable at the State level.

The benefits of public goods, and any resulting cost allocation, can be hard to measure, potentially ambiguous and subject to disagreement. Often the dollar amount of public benefit can be estimated as the cost of achieving the same physical benefit by some other means.

Baseline Issue

The conventional cost allocation approach is generally consistent with the CALFED Beneficiary Pays principle. A cost allocation should be at least as large as the cost the beneficiary imposes and no larger than the benefit received.

The baseline issue confounds application of the conventional approach and the beneficiary pays principle. Benefits must be defined by reference to some baseline condition that would exist without the project. When participants cannot agree on the baseline, they will not agree on how benefits should be measured. They may desire “credits” or “debits” for their own or other’s past actions or damages. For example, a beneficiary may claim that benefits received should be counted as compensation for past losses. A common baseline issue involves whether ecosystem improvements should be counted as enhancement or mitigation. Some baseline issues involve the forecast of future conditions, so they are empirical. Other baseline issues involve value judgments that cannot be resolved based on objective analysis or information.

Science Issues

The forecast of benefits is often uncertain. Uncertainty can involve economic, technical or policy issues. The connections between a project or activity, the ecosystem response, and the associated economic benefits are especially uncertain. Changes in fish and wildlife populations resulting

from ecosystem projects are often very difficult to measure, and estimating them before a project is implemented is even more difficult. This is especially true for anadromous fish such as salmon. The quality and certainty of economic benefits information is no better than the quality and certainty of the physical benefits information.

There are also science issues associated with water quality benefits, levee improvement benefits, and the other benefits. There is relatively less debate associated with water supply benefits, but even here, experts can disagree.

Political Issues

Political issues can lead to gaming that, although to be expected, is outside of the traditional cost allocation and financing process. In particular, the general public has a say through the political process, including the likelihood that an initiative vote will be required for some projects. If so, then the general public is a participant with veto power. For other participants, there is potential to affect public opinion to obtain the desired outcome. The political process may propose packages that are not economical or they may include non-economic components (separable costs more than benefits). The outcome could be the status quo; that is, no action at all.

These issues are not insurmountable. Public goods benefits issues can be analyzed and negotiated. Baseline issues must be resolved by negotiation. Science issues can be resolved, especially if contingencies can be provided based on performance measures. Political issues may be overcome based on thoughtful legislation and public provision of balanced information.

The next section considers a variety of actions that can be used to increase the economic feasibility of a project and its cost allocation and finance.

3. Characteristics of a Flexible Financing Strategy

The conventional cost allocation approach demonstrates how financial feasibility of a collaboration is related to economic considerations. A feasible project must have benefits that exceed costs, the benefits for each beneficiary must exceed their cost share, and the contribution by each participant must be at least as large as the cost they impose on the project.

Benefit and cost estimates are forecasts that are subject to large risks and uncertainties. Participants must weigh probabilities of outcomes including, perhaps, the probabilities that other participants will provide their cost shares as planned. With uncertainty, there is no exact level of expected benefits or costs that determines the participation decision. Rather, the probability of success is increased by expectations of larger benefits and decreased by expectations of larger costs. A better project is likely to be associated with a common perception that other participants can and will provide their cost shares as planned. Assurances may be used to reduce uncertainty associated with benefits or cost shares.

Economic benefits of water supply reliability, environmental restoration and flood control often accrue to many people. If some benefits are ignored then some potential sources of financing cannot be justified. Sometimes, a nexus between benefits and new financing sources can be realized. A flexible finance strategy includes the identification and quantification of new benefits and beneficiaries, and the development of corresponding revenues.

There may be opportunities for incremental changes that increase costs while increasing benefits more, or to decrease costs substantially while reducing benefits very little. These opportunities may substantially improve the financial feasibility of a project through the perception of improved net benefits.

There is opportunity to improve the chance of success by increasing expected benefits, reducing expected costs, increasing participation, and by reducing risks and uncertainties using assurances. The Delta Vision process is at a point where these considerations should clearly shape many details of the program. The exact Delta conveyance configuration, the location and size of storage projects, the location and nature of ecosystem projects, and the qualities of levee improvements are still to be determined. A cost allocation, assigning responsibility and planning for financing and repayment amounts would be premature. Rather, this Delta Vision finance strategy emphasizes analysis and processes that will foster a more economically attractive future for the Delta.

A. Improve cost-effectiveness and efficiency

A component is cost-effective if it costs less but provides at least the same benefit. Cost-effectiveness analysis (CEA) is used to ensure that there is no wasted expenditure. CEA is not concerned with the purpose of an expenditure or the amount of benefit. Rather, it is focused on reducing costs of achieving an objective.

Economic efficiency involves the level of physical and economic benefit as well as its cost. A component is efficient if its benefits exceed its costs, and it is most efficient if the benefits exceed costs by the largest possible margin. Benefit-cost analysis (BCA) is used to judge economic efficiency. Efficiency is harder to judge than cost-effectiveness because the economic value of the benefit must be estimated.

The Delta Vision finance strategy includes both CEA and BCA. CEA is recommended where a specific objective (or set of objectives) is set, or where economic benefits are impractical to measure. BCA is recommended where the physical level of benefit is yet to be determined or there is a desire to maximize benefits and the benefit can be measured in economic terms. In general, CEA is likely to be suitable for ecosystem components, BCA is likely to be suitable for water supply components, and some of both are likely to be suitable for water quality and flood control components.

The Delta Vision process should encourage flexibility in its planning. Projects and programs that are not cost-effective or efficient (costs exceed benefits) should be revised or removed. Full consideration of economic efficiency may require changes to State and federal laws. For example, State law encourages the Delta to be maintained in a condition similar to existing conditions. One recent analysis found that “it is economically optimal for the state to not upgrade all 34 Delta islands examined, mostly due to the high cost of levee upgrades that produce little improvement in levee reliability. These results are in agreement with a 1989 report from the California Water Resources Center by Samuel H. Logan, which assessed the cost-effectiveness of a Department of Water Resources upgrade plan for the Delta. Logan found that upgrading all Delta levees was not economically justifiable.”³ If Delta land uses must be maintained regardless of the economics of

³ Suddeth, R., J. F. Mount and J. R. Lund. 2008. Levee Decisions and Sustainability for the Delta. Technical Appendix B to the Public Policy Institute of California report, Comparing Futures for the Sacramento-San Joaquin Delta, August.

doing so, policy-makers should be aware that such policies may create an economic and financial burden on the State and may reduce the chance for successful implementation of a Delta package.

Cost-effectiveness of levee maintenance is an ongoing concern of the Delta Protection Commission. "Where efficiencies of scale would result in cost savings and levee systems of two or more reclamation districts provide protection to the same area, the State and other regulatory agencies should consider approval of requests made by reclamation districts for such consolidation . . . A "clearinghouse" for material suitable for levee maintenance should be created . . . To lower levee maintenance costs, streamlined permitting systems for authorization of dredging for levee maintenance and rehabilitation work, should be instituted."⁴

In conveyance, cost-effectiveness considerations might affect several attributes of the conveyance system including its location, capacity, type (open canal versus piping), configuration, types of environmental protections and mitigations, and other factors. For ecosystem projects, costs of alternatives for achieving the same benefits should be compared where possible.

B. Understand and develop federal cost share potential

The nation has an interest in the Delta that is codified in federal laws and policies and expressed through ongoing investment in the Delta. Most expenditure involves the federal CVP and federal project levees which are maintained and improved by the U. S. Army Corps of Engineers (USACE). There are many more federal programs that could provide financing for parts of the Delta Vision agenda.

Reclamation and COE law and policy

Reclamation has a federal interest through the CVP, but more generally through federal laws which enable federal participation for authorized purposes which are water supply, water quality, hydropower, fish and wildlife, flood control, navigation and recreation. The federal government can participate through financing and cost sharing.

Various Reclamation laws provide cost-sharing requirements for non-federal interests for Reclamation projects. The total minimum non-federal contributions for construction costs of water resource projects are generally as follows:

- Municipal water supply: 100%
- Agricultural water supply: 100%
- Hydropower: 100%
- Fish and Wildlife: 25% of allocated separable costs
- Recreation: 50% of allocated separable costs
- Flood Control: 35%
- Water Quality: varies (infrequently utilized)

These requirements are not up-front cost sharing. Rather, they represent the share of construction cost that is expected to be eventually repaid by each purpose. In practice, the amount eventually

⁴ DPC. Land Use and Resource Management Plan for the Primary Zone of the Delta — Levees.
<http://www.delta.ca.gov/plan/levee.asp>

paid by irrigators is limited according to ability to pay. The residual above ability to pay is generally repaid from power revenues if available.

The USACE participates primarily through federal project levees. Ecosystem restoration involving federal levees is also important. Federal levees account for about a third of levees in the Delta including most of the lower Sacramento and San Joaquin Rivers, and levees around Grand, Ryer, Sutter, Merrit Islands, and Hasting and Stewart Tract, among others. These levees are intended to provide protection to federal standards. Most maintenance is provided by State or local funds.

There is potential to expand the extent of federal levees in the Delta. The CVP clearly benefits from Delta levees by protection of through-Delta water conveyance. The loss of non-project levees in an earthquake or other event could harm CVP water supply and other CVP purposes. The Delta Protection Commission has recommended that “The overall citizenry of California and the United States that benefits from the state and federal water projects, commerce and navigation, travel, production of crops, recreation, and protection of fish and wildlife habitat should also pay a substantial portion of the cost of maintaining the Delta levees . . . Support on-going U.S. Army Corps of Engineers studies and programs that could provide funding, flood protection, and environmental restoration on Delta islands”⁵

ESA and Habitat Conservation Plans

The ESA clearly provides that the conservation of endangered species is a national goal and should be a priority of federal agencies. The Cooperative Endangered Species Conservation Fund provides land acquisition grants to support habitat conservation plans (HCPs). In 2007, in California, the Coachella Valley Fringe-toed Lizard HCP received \$1,542,000 for 480 acres, the San Diego County Multiple Species Conservation Plan received \$23,103,592 for 8,000 acres, and the San Joaquin Multi-Species HCP received \$7,000,000 for 2,000 acres. This source of funding should be available for ecosystem projects following completion of approved plans.

Other federal programs

Many other federal laws and programs might provide assistance with Delta Vision financing. Some examples are provided below. More details and analysis should be provided in conjunction with the CDEW Plan.

The Federal Aid in Wildlife Restoration Act, also known as the Pittman-Robertson Wildlife Restoration Act, is administered by the U.S. Fish and Wildlife Service (USFWS). Funds are currently provided to California Department of Fish and Game. The State Wildlife Grant Program, also administered by USFWS, provides funds for the development and implementation of programs that benefit wildlife and their habitat, including species that are not hunted or fished.

The Land and Water Conservation Fund provides matching grants for acquisition or development of lands that support outdoor recreation. California Department of Parks and Recreation accepts applications for matching grants for the Land and Water Conservation Fund. In 2006, of 60 California applications, 13 were recommended to the National Park Service (CDPR, 2007) for total funding of \$1.275 million.

⁵ DPC. *ibid*

The Nonpoint Source Water Pollution Control program, administered by the U. S. Environmental Protection Agency (USEPA), provides funds for implementation of nonpoint source pollution control programs. Funds are provided to States and the states then pass the funds down to appropriate entities. Each project must provide a 40% state/local match. The Targeted Watershed Grants program, also administered by the USEPA, supports both on-the-ground and educational activities relating to the prevention, reduction, and elimination of water pollution.

The Sport Fish Restoration Act, administered by the U.S. Fish and Wildlife Service, reimburses States for qualified expenses for the management, conservation, and restoration of fisheries. It provides Federal aid to the States for management and restoration of fish having a connection with sport or recreation in the marine and fresh waters of the United States. In addition, amendments to the Act provide funds to the states for wetlands restoration, among other uses. The program is a cost-reimbursement program. The state applies for reimbursement for up to 75 percent of the project expenses. The state must provide at least 25 percent of the project costs from a non-federal source.

U. S. Department of Agriculture farm conservation programs are used in California to provide funds to assist irrigation water conservation, to provide technical assistance for conservation, to reduce erosion and improve water quality, and to provide incentives for wetlands conservation, among other purposes. Programs include the Environmental Quality Incentives Program (EQIP) for water conservation cost sharing; the Wetlands Reserve Program and the Grasslands Reserve Program. Total budget appropriation for conservation-related programs recently exceeded \$4.5 billion per year nationwide.

New federal authorizations and appropriations

Existing federal programs and appropriations are likely to provide only a fraction of federal funding needed for Delta Vision programs. New federal authorizations involve changes to federal laws. The State and other Delta Vision interests could actively work with California's representatives to obtain new federal authorizations and appropriations for funding for Delta Vision projects. Other ecosystems around the nation; the Chesapeake Bay and the Florida everglades system being notable examples, have received federal legislation and appropriations specific to their protection. The national importance of the Delta ecosystem might justify similar legislation.

C. Seek new participants and revenue sources

The Delta Vision financing strategy includes recognition of new benefits and beneficiaries and associated financing opportunities. In Delta conveyance, a variety of potential benefits have been recognized but are not generally quantified. For example, economic benefits of salinity reductions have been quantified, but benefits of reduced concentrations of other important water quality constituents such as disinfection by-product precursors have not. Additional understanding and development of water quality benefits would help to identify beneficiaries and the form of benefits.

The potential for new sources of financing for certain ecosystem restoration actions is believed to be especially promising. Ecosystem restoration could generate revenues through conservation and mitigation banking, and by sequestering carbon and reducing carbon emissions. Reduced energy use through water conservation might also be used to claim CO2 offsets.

Conservation and mitigation banking.

Mitigation and conservation banking could provide important funds to help ecosystem restoration. Conservation and mitigation banking has been available in California since the 1990s. There were 48 conservation banks in the State in 1998.⁶ “A conservation bank generally protects threatened and endangered species habitat. Credits are established for the specific sensitive species that occur on the site. Conservation banks must be approved by the wildlife agencies, such as the Department of Fish and Game and the U.S. Fish and Wildlife Service. Mitigation banking is the same concept as conservation banking, but is specifically for wetland restoration, creation, and enhancement undertaken to compensate for unavoidable wetland losses.”⁷ Under a 2006 multi-agency Memorandum of Understanding a statewide multi-agency team effort recently developed mitigation banking templates. Fish and Game Code Section 1851 requires CDFG to report to the legislature biennially regarding mitigation banking. There were 22 mitigation banks in 2007 representing over 1,300 wetland acres. Prices are set through private transactions and are not readily available. However, prices may be large enough to cover a significant share of land acquisition and development costs for some ecosystem projects.

Carbon offsets

Established carbon markets are readily available and are increasingly accepted by State and federal authorities. On the Chicago Climate Exchange (CCX), CFI contracts, each representing 100 metric tons of CO₂ equivalent are traded.⁸ A seller can develop carbon offsets to be sold on the exchange. The amount of offset is verified by an independent third participant and can be sold only after the offset has occurred. The offset can be developed based on “sequestration . . . or reduction of GHG emissions” The CCX has detailed guidelines for agricultural soil carbon sequestering, but the eligible area does not include California. Participants can earn 0.2 to 0.6 metric tons per acre per year.

Conversion of farmed Delta islands with peat soils to natural wetlands or waterbodies could provide two types of offsets. The Delta subsides at a rate of 1 to 3 inches a year, mostly in the form of carbon dioxide releases.⁹ The amount of CO₂ emissions from farmed Delta islands is 2.5 to 6.5 tons per acre per year. When the land is converted to cattails or tules, this loss is stopped and dead plant material accumulates in the form of new peat soil. The USGS has been measuring carbon sequestration on an experimental plot on Twitchell Island for about 15 years. The additional CO₂ sequestered by cattails or Tules is another 12 to 20 tons per acre per year.¹⁰

The price of a CFI contract has been as high as \$7.00 and as low as \$3.00 per ton year. Using high and low ranges, potential revenue per acre is \$43 to \$185 per acre per year. Costs of management of the new wetland would have to be considered. Important costs for growing and transplanting tules might be required. Also, the future carbon price is very uncertain. Still, it appears that CO₂ offsets might repay a significant share of Delta island acquisition and wetland restoration costs. A net revenue of \$100 per acre per year is worth about \$1,500 to \$2,000 per

⁶ http://ceres.ca.gov/topic/banking/banking_report.html

⁷ <http://www.dfg.ca.gov/habcon/conplan/mitbank/>

⁸ <http://www.chicagoclimatex.com/content.jsf?id=821>

⁹ USGS Delta Subsidence in California the Sinking Heart of the State.
<http://ca.water.usgs.gov/archive/reports/fs00500/fs00500.pdf>

¹⁰ Miller, Robbin, 2008. USGS.

acre in net present value terms as compared to the cost of land which may be \$2,500 to \$6,000 per acre.¹¹

Carbon offsets could also be used to help finance water conservation. Energy savings are significant, especially in the south coast. An acre-foot of water delivered to the south coast requires roughly 3,000 kwh of electricity. The amount of CO₂ emissions associated with this delivery depends on the mix of energy sources used. One study estimated 877 pounds per megawatt-hour based on 52% hydro, 16% coal, 19% system purchases and 13% SCE exchange.¹² At this rate, each AF not delivered to the south coast avoids the release of 1.3 tons of CO₂ to the atmosphere. This is probably conservative in that the marginal power source on the grid is likely to include more natural gas and other fossil fuels. It appears that revenues from CO₂ offsets would not pay a large share of urban water conservation costs. Revenues of \$6 to \$20 an acre-foot are small relative to typical costs of water conservation practices.

Private and voluntary contributions.

Contributions from landowners can help pay costs of ecosystem projects. Landowners can sometimes reduce their estate taxes by donations of fee simple or land easements. Recent and ongoing changes to estate tax laws may substantially change the incentive to provide donations. Under current estate tax laws, the top estate tax credit has been increasing and the estate tax is repealed for 2010. The tax is reinstated in 2011 to 2013. Estates of \$1 million or less will not be taxed. Under this regime, incentives to donate land or easements may continue after 2010, but estate tax laws could change in ways that profoundly affect the economics of land or easement donations.

New User Fees and Assessments.

Fees and assessments for Delta purposes are not new. CVP water users pay a restoration fee originally mandated by the federal Central Valley Project Improvement Act. New user fees and assessments have been proposed for other water users since at least the State Water Resource Control Board's (SWRCB) Draft decision D-1630.

Water users are understandably reluctant to accept user fees or assessments. There are concerns that there will be little or no services received or corresponding benefit, that fees may increase over time, and that costs of improvements needed for measurement and other compliance costs may be excessive. This finance strategy proposes that these concerns can be answered to the satisfaction of water users so that user fees and assessments will be a viable revenue source. Water users and others will need to develop a common understanding about the relationship between fees and assessments, costs of services and benefits received as part of the larger package of projects, costs, financing and assurances.

A fee or assessment based on water removed from the Bay-delta system may be used. This charge could require more accurate measurement for many users. Alternatively, these fees could be assessed as a flat rate based on amount of water right or acreage irrigated. Proceeds would be

¹¹ Net present value depends on interest rate and payback period. Current land values are from California Chapter American Society of Farm Managers and Rural Appraisers. 2007. 2007 Trends in Agricultural Lands and Lease Values. Page 41.

¹² Poseiden Resources. 2008. Response to State Land Commission's Letter Dated December 17, 2007. Draft Lease Agreement to PRC 8727.1 for the proposed use of the existing intake and outtake channels . . . January 22.

used to pay for services that benefit water users; in particular; water supply improvements and ecosystem projects that help the ecosystem and water supply reliability recover faster.

Other fees or assessments may be based on amount of water conveyed around or exported from the Delta. Measurement of this water is not much of an issue. Proceeds would be used to pay for services that benefit these water users. Such services may include Delta conveyance, improvement or maintenance of levees that protect water supply conveyance, water quality projects, and ecosystem projects that help public trust resources affected by exports.

The legal form of fees or assessments to be developed is unknown. Special assessments are normally based on the value of benefits conferred on property. Legal feasibility and issues involving user fees and assessments are not addressed by this document.

Assessments for Delta Levees.

The Delta Levee Subventions Program provides financial assistance to local agencies for the maintenance and rehabilitation of non-project Delta levees through the Delta Levees Maintenance Subventions Program. The State reimburses local agencies for the part of the costs to maintain and improve non-project and project levees guided by Program procedures. In general, no cost is reimbursed until the local agency has spent an average of \$1,000 per mile for all of its nonproject and eligible project levees. Up to seventy-five percent of costs are reimbursed thereafter.

In levee improvements, non-conventional benefits and beneficiaries may include navigation and recreation. The Delta Protection Commission has recommended that “New programs of determining assessments on mineral leases and other beneficiaries should be evaluated by reclamation districts.”¹³ New reimbursement criteria should be developed for Delta Vision levees that provide for payment for cost of services that is directly tied to cost of improvements and benefits received by property owners and others. More development of a simplified yet equitable approach may be justified.

D. Financing contingencies and assurances should be tied to key uncertainties

Assurances will be an important part of the finance plan. There will be risks and uncertainties, and some participants are in a better position to accept risks than others. In the past, the State, federal government and water users have all accepted some risk associated with the SWP and CVP.

Assurances shift risk from one participant to another. Often, there is a promise that either some minimum standard will be provided in the future, or repayment will be reduced or suspended. For example, federal ability-to-pay analysis allows repayment to be reduced if a farm-level budget analysis justifies it. Assurance of performance can also be increased by building redundancy into the system. Creating extra capacity and more than one means of accomplishing objectives will increase cost, but will allow the system to meet the joint goals of flexibility and assurances. The more economically feasible the project, the more opportunity there is to provide assurances that can be backed by expected benefits.

¹³ DPC. Land Use and Resource Management Plan for the Primary Zone of the Delta — Levees.
<http://www.delta.ca.gov/plan/levee.asp>

The federal ESA does not provide assurances regarding the recovery of listed species. However, an incidental take permit requires a habitat conservation plan (HCP), and the incidental take permit may be viewed as an assurance for some level of water supply reliability. According to the USFWS:

No Surprises assurances are provided by the government through the section 10(a)(1)(B) process to non-Federal landowners. Essentially, private landowners are assured that if "unforeseen circumstances" arise, the Services will not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed to in the HCP without the consent of the permittee. The government will honor these assurances as long as a permittee is implementing the terms and conditions of the HCP, permit, and other associated documents in good faith.¹⁴

In addition, it may be possible for the State or federal government to provide assurances in the form of new legislation. Such legislation might cap the amount of cost-sharing required for ESA compliance or provide an assurance of some minimum water supply levels.

Another aspect of assurance is the Delta Vision Panel's desire that the co-equal goals be pursued in parallel, i.e., that progress toward both ecosystem revitalization and water supply reliability is achieved. Although outcomes may be difficult to guarantee, program implementation and expenditures can be coordinated. For example, the CDEW could be given financing and expenditure authority that allow it to enforce a linkage among projects and programs that address the two goals.

E. Use incentive structures to reduce costs and increase benefits

Efficiency can be increased by use of voluntary market mechanisms. Water markets can increase the value of through-Delta conveyance. Some water users may be willing to pay a premium for the most reliable conveyance while others would prefer to pay less to obtain water on a less reliable basis.

In the ecosystem area, water rights for ecosystem purposes should be able to be leased on a temporary basis. Ecosystem managers may find that some water provides little or no ecosystem benefit. Managers should be able to trade water with other water users, or the water should be transferable such that proceeds from leasing the water can be used to finance important ecosystem projects.

Land for wetlands restoration may be obtained cost-effectively by use of market incentives. Land easements may be much more cost effective than land acquisitions where the main economic activity on the land can be allowed to continue. The new Delta Conservancy should develop a range of management tools that may be cost-effective in any situation. Positive economic incentives such as "pay for practices" may be cost-effective in comparison to acquisitions or easements.

¹⁴ USFWS. 2008. What is a Habitat Conservation Plan and Incidental Take Permit?
<http://www.fws.gov/ endangered/hcp/hcpplan.html>

F. Tie local financing to local benefits and costs

Local governments and property owners often have limited ability or interest in providing financing or repayment for ecosystem projects that benefit the larger State or nation. However, some benefits of ecosystem projects accrue to local interests. In particular, local economies may be stimulated by project and visitor recreation expenditures, local recreation opportunities may be improved, and local residential property values may be enhanced.

On the other hand, some land use conversions affect local people negatively through loss of the existing economic activity, usually agriculture. To achieve cooperation and even assistance from local governments, it will be important to understand local patterns of benefits and costs and to develop projects that can be consistent with local plans and economies. Care must be taken to assign costs to the groups of people who actually benefit rather than to proxy groups who may not.

G. Coordinate financing strategies with other programs and planning activities

A number of important existing programs have financing and cash flow streams in place that may overlap with elements in the Delta Vision Strategic Plan, and other proposed programs are addressing financing as part of their planning. Vision recommendation nine notes that planned investments must be integrated and consistent to be effective. Financing must be similarly integrated to achieve desired results.

This section lists some of the important related programs. This list does not include all related programs, but rather focuses on relatively large State and federal financing sources.

Some existing or forthcoming initiatives that have or will have financing components are:

- Propositions 84, 1B and 1E. Authorized by voters, State processes for allocating funds developed or in progress.
- Potential new water management bond. Different versions are being discussed by legislators and the administration.
- Bay-Delta Conservation Plan (BDCP). Includes a financing plan component.
- San Joaquin River Restoration Program. Financing of fish flows and habitat are important issues.
- CVPIA Restoration Programs. Ongoing revenue collections; some might be used for Delta Vision projects.
- Levee Subventions Program. Ongoing State funding for Delta levee maintenance.
- Army Corps of Engineers: Various levee and flood management programs.
- Interagency Ecological Program (IEP). Provides science for fish and ecology programs; work might be continued in the new Delta Science and Engineering Board.

The list of related programs and processes and their relation to Delta Vision programs should be expanded and developed further.

5. Financial Tools and Beneficiary Payments

This section describes financial tools and beneficiary payments that could be used to fund the Delta Vision Strategic Plan. For each finance tool and payment method, this section describes its advantages and disadvantages. The description also includes some discussion of the purposes to which each finance tool might apply.¹⁵

Specific assignment of costs to beneficiaries has not been made and should not be implied in this report. Nevertheless, different finance tools clearly pertain to different kinds of benefits and beneficiary groups. The tools are categorized by whether they apply to costs allocated to the State as a whole, costs allocated to the federal government, or costs allocated to localities or specific beneficiary groups. This section does not address or recommend how individual local agencies or beneficiary groups should finance the costs they bear, nor how they should recover costs from their constituents. For example, the finance tools encompass ways that costs could be recovered from, say, SWP contractors as a group, but they do not address how an SWP contractor might spread those costs among its customers or member agencies.

Debt Financing

Many financial tools require debt financing in the form of bonds or securities. Debt financing spreads payments over a time horizon, often in regular amortized portions. Debt is viewed as an equitable way to finance the purchase of capital assets with long useful lives where benefits occur in the future, especially if the benefits will extend beyond the current generation of beneficiaries.

The primary disadvantage of debt financing is the additional cost from interest and debt issuance costs. In addition, debt financing is usually applied only to capital expenditures, and is not usually used to finance on-going O&M costs. Finally, public debt incurred for water-related programs can compete with other public capital investments (such as transportation, school construction, etc.) as a result of debt ceilings or political reluctance to overextend the State's credit.

Pay-As-You-Go Financing

Some financing directly from beneficiary payments is likely. Pay-as-you-go financing refers to financing whereby programs or projects are wholly or partially financed from current revenues generated by taxes, fees, service charges, special funds, and/or special assessments. The most common use of pay-as-you-go financing is to fund current operating, maintenance, and administrative costs for a project or program.

An advantage to pay-as-you-go financing is avoided interest costs. This advantage can be offset by the demand on current revenues imposed by a pay-as-you-go financing approach, particularly if the program or project has a large up-front capital cost. Pay-as-you-go is often not practical for capital investments, but some beneficiaries can finance their capital cost shares or pay a share from reserves.

¹⁵ This section draws substantially from the summary of financing tools prepared for the CALFED "Draft Finance Options Report" of May, 2004. It does not, however, rely on any specific costs, cost allocation, or financing proposed for the CALFED program.

Under some circumstances, using pay-as-you-go financing for capital costs can result in an inequitable distribution of costs over time. For example, using pay-as-you-go to finance a large, one-time capital investment with a long useful life might unfairly burden current compared to future project beneficiaries. Periodic capital investments that produce a relatively constant stream of benefits over time might be fairly financed using pay-as-you-go.

A. Finance Tools and Payments for Program Costs Allocated to the State

State General Obligation Bonds

State general obligation (GO) bonds are a form of debt financing in which principal and interest are secured by the full faith and credit of the State of California. State GO bonds are general-fund supported debt, repaid primarily through the state's collection of tax revenues. State GO bonds are generally viewed as appropriate for financing costs of programs that provide a broad, statewide benefit and can be used to finance capital costs allocated to the California general public.

State bonding authority requires approval by the California Legislature and the voters and is typically used only for funding capital infrastructure. Repayment is guaranteed in the State Constitution. Recent GO bonds (Propositions 204, 13, 50, 84, and 1E) have provided substantial funding for water-related investments.

Advantages: Bonding authority 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 can force stakeholders to reach agreement on Program plans and targets, it can include funding for many elements to achieve balancing of goals, and voter approval maintains visibility for the Program and public commitment to it.

Disadvantages: Passage by voters is not guaranteed, and additional bond issues would require periodic, concerted efforts by all stakeholders to garner public support. The State's current fiscal situation may make voter passage more difficult. GO bonds must compete with other capital projects and can burden overall state budgets and financing limits. In addition, bonds generally cannot be used for ongoing annual expenses such as long-term management associated with habitat acquisition and restoration.

State General Fund appropriations

General fund (GF) appropriations can be used to pay for California taxpayers' share of costs (including debt service on GO bonds) and could be used to fund their share of capital costs under a pay-as-you-go finance option. This approach is equitable if benefits to sub-groups of the public are generally proportional to and exceed the amount of tax collected.

The State's GF is usually viewed as appropriate for programs providing a broad, statewide benefit.

Advantages: Unlike bond funding, no direct voter approval is required. GF appropriations are flexible as to their use – capital outlays, program support, and ongoing expenses such as land management. GF appropriations provide an immediate source of

funding, focus stakeholders and the public on the next Program phase, and allow for annual legislative review.

Disadvantages: The current State fiscal condition will seriously limit access to GF dollars in the near term. Even in a more stable fiscal time, the reliability of annual GF appropriations is not consistent. Depending on annual appropriations is difficult for program elements and projects that are based on multi-year funding. GF appropriations compete directly with other state budget priorities. Unlike bonding, where repayments to bondholders are made gradually over time, the financial burden on the state treasury and taxpayers would be more immediate.

B. Finance Tools and Payments for Program Costs Allocated to the U.S.

Federal appropriations would be used to pay for the share of capital and non-capital costs allocated to the nation. Once Congress has granted federal authorization for an activity, federal appropriations have broad use and could support many of the program elements. Federal authorizations currently exist for many programs that overlap with and support the goals of several of the Delta Vision programs. These include activities of the U.S. Fish and Wildlife Service, Bureau of Reclamation, Army Corps of Engineers, Department of Agriculture, and other agencies. Federal appropriations tend to be used more to cover capital costs as opposed to O&M expenses.

Advantages: Federal appropriations provide an immediate source of funding and focus a high-level of attention on the Program. Unlike state bond funding, no voter approval is required. Existing federal programs may be available for portions of the funding.

Disadvantages: The federal government does not have a capital budget that assures outlays over many years. Rather, each year Congress appropriates funds principally for the budget for that year. Funding must compete with financial demands from all sectors of the federal budget; there can be no guarantees that funding would be continued on an ongoing basis. Even where federal moneys have been appropriated over a number of years, there is no guarantee that the authorized levels will be appropriated again. Funds that are already appropriated for existing programs may be available, but applications can be expensive and the amount of funds available is generally small compared to Delta Vision needs. New authorizations will require new or revised federal legislation.

Federal appropriations are dependent on federal authorization for a given activity. Federal authorization does not currently exist for some important parts of the Delta Vision agenda. New legislation will be required.

C. Finance Tools and Payments for Program Costs Allocated to Local Water Users

Self-liquidating General Obligation Bonds

Self-liquidating GO bonds are not general fund-supported debt. Rather, they have a non-general fund source of revenue for repayment. The state financed a large portion of the State Water Project (SWP) with self-liquidating GO bonds, and revenues collected from SWP contractors are

being used to repay these bonds. Self-liquidating GO bonds can be used for financing capital costs allocated to water users or other resource users in the Bay-Delta watershed.

This financing tool is most useful for those program elements that have traditionally involved repayment by water and power users (i.e. conveyance and storage).

Advantages: Like state GO bonds, self-liquidating GO bonds can provide considerable funding amounts in the initial years after the bonds are issued, and allow for repayment from future beneficiaries. However, self-liquidating bonds, unlike state GO bonds, do not burden overall state budgets because repayment does not come from the general fund.

Disadvantages: As with state GO bonds, passage by voters is not guaranteed, and additional bond issues would require periodic, concerted efforts by all stakeholders to garner public support. In addition, bonds generally cannot be used for ongoing annual expenses such as for long-term management associated with habitat acquisition and restoration.

State Agency Revenue Bonds

State agency revenue bonds are also not general fund-supported debt. These bonds are issued by various state agencies and secured with revenues collected by the agencies. Currently, the principal sources for financing SWP water supply and conveyance facilities are revenue bonds. The Department of Water Resources may issue state agency revenue bonds and currently has about \$9.4 billion in outstanding state agency revenue bond debt. Revenues collected from SWP contractors primarily service this debt. A new California Water Utility proposed in the Delta Vision Strategic Plan would presumably take over this role, issuing new bonds as needed and collecting water user charges to service the debt.

This financing tool is most useful for those program elements that have traditionally involved repayment by water and power users (i.e. conveyance and storage).

Advantages: 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. In addition, revenue bonds do not require approval by the voters. Also, because they are backed by contractual repayments, revenue bonds do not compete for general state revenues. Furthermore, because the SWP has a rate structure in which contractors pay only for those facilities benefiting them, this financing mechanism has the advantage of linking financial responsibility to specific groups of beneficiaries.

Disadvantages: Revenue bonds are not backed by the full faith and credit of the State. Therefore, there must be assurances in the financial markets that future water and power revenues would be sufficient to cover payments to bondholders. In addition, bond interest rates may be slightly higher for revenue bonds than for GO bonds.

State Water Project (SWP) contractor charges

SWP contractor charges are beneficiary payments that could be used to pay for a portion of capital and non-capital costs assigned to the SWP. These revenues would service state agency revenue bonds issued by DWR or the California Water Utility.

This financing tool is most useful for those program elements that provide benefits directly to the SWP contractors rather than a broader group of water users; for example, SWP water supply. Under current arrangements, charges are best suited for benefits that are proportionate to quantity of water delivered.

Advantages: SWP contractor charges provide an immediate source of funding, do not require voter or legislative approval, and can be used for capital or non-capital costs. Charges for additional water supply at existing rates would likely be acceptable to water users.

Disadvantages: SWP contractors may be hesitant to raise rates and any changes to SWP rates are subject to negotiation with SWP contractors and contract revisions.

Central Valley Project (CVP) contractor charges

Capital and non-capital costs assigned to the CVP are financed through the annual federal appropriations process and these federal outlays are recovered through CVP contractor revenues, subject to U.S. Bureau of Reclamation's repayment policies and legal requirements.

This financing tool is most useful for those program elements that provide more direct benefits to the CVP contractors rather than a broader group of water users. For example conveyance and surface storage projects have benefits that may be allocated directly to the CVP contractors. Using the contractor charges for these activities may be more efficient than adopting new fees or new contract mechanisms.

Advantages: CVP contractor charges provide an immediate source of funding, do not require voter approval, and can be used for capital or non-capital costs.

Disadvantages: CVP contractors may be hesitant to raise charges, and any changes to CVP rates would be subject to negotiation with CVP contractors. Congressional approval and appropriation for CVP funding is required, and even in cases where federal expenditures are expected to be 100% reimbursable by non-federal entities (i.e., 100% repayment), appropriation is not guaranteed.

Joint Powers Authority (JPA) Revenue Bonds

A joint powers agreement as described by the California Government Code, commencing with section 6500, allows two or more agencies to jointly wield powers that are common to them. No new powers are created; instead the law provides a vehicle for the cooperative use of existing governmental powers. Agencies that may enter into joint powers agreements include the federal and state governments, cities, counties, and public districts. A JPA operating under a joint powers agreement can enter into contracts, employ people, acquire, construct and maintain buildings, improvements and public works, and issue revenue bonds. A JPA is a possible legal mechanism to create a new California Water Utility.

Advantages: JPA revenue bonds can help provide a form of debt financing to federal, state and/or local agencies when CVP or SWP financing alone is not feasible.

Disadvantages: Complex and difficult to administer if creation of a new JPA is required. Individual agencies may prefer to issue bonds independently rather than jointly.

Private Financing

Private financing and beneficiary payments should continue to be a part of the Bay-Delta solution. Here the term “private” is used to include funding or in-kind services by local water agencies and districts, private businesses, foundations, and individuals. Water districts will 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, some districts have made financial contributions to program elements with more diffuse water supply benefits. For example, more than \$30 million in private water agency contributions were made to early ecosystem restoration actions related to the CALFED program.

Private financing could be used to fund a number of the Delta Vision elements.

Advantages: Private financing can provide an immediate source of funding, it does not require voter or legislative approval, and it can be used for capital or non-capital costs. In addition, private financing encourages local involvement and cost-effective solutions to regional problems.

Disadvantages: Although there are exceptions where water districts have made contributions to program elements with broad public benefits, private financing is generally focused on local needs. The capacity of local interests to provide debt financing for capital improvements may be limited.

D. Costs Recovered through a Water User Fee

User fees would be collected from water users to pay for conveyance, ecosystem or flood control programs. Benefit assessments are charged on the basis of benefits received by the fee-payer. Other fees are payment to the government based on a burden, impact or cost imposed by the fee-payer. There is a body of law and precedent that will influence how user fees and assessments can be calculated and assessed. This report does not try to deal with legal aspects of fees or benefit assessments.

User fees may be assessed on the basis of cost of services provided. Separable costs are definitely part of the cost of service, but with joint costs, an allocation of total cost of service could be difficult and contentious. With joint costs and uncertain benefits, the share of conveyance or flood control costs to assign to ecosystem may not be clear. Also, user fees based on cost of services may be rejected if benefits are far less than the cost of service. Clearly, a benefits assessment should be provided with proposals for new fees or assessments.

An important consideration in developing any new fee proposal is establishing a nexus between the amount of the fee, the level of benefit received, and the cost of service. This is especially challenging when there is not general agreement on the existence and value of benefits received or on the amount of separable costs.

If fees were tailored to different water users in an attempt to reflect their specific benefits or costs of service, the fees could be quite complex to develop. They could potentially need to account for quantities diverted, quantity and quality of return flow, location in the watershed, and other factors. In addition, they could be adjusted to account for restoration fees or activities already undertaken by water users. Examples could include credits for CVPIA Restoration Charges and adjustments for past expenditures on, for example, fish screening.

Fees imposed per unit of water diverted would require accurate measurement at all assessed points of diversion. Many small diversions may not have accurate measurement. Either these small diversions would be exempt, or a program to install measurement devices must be implemented, or the fees should be assessed based on acreage, water rights or some other measure.

Advantages: The fee would provide a dependable and ongoing source of revenues. It would probably be based on the amount of water diverted or delivered. A broad-based fee based on diversion within the Bay-Delta watershed could be directed to program elements that provide diffuse and difficult-to-quantity benefits to all water users.

Disadvantages: The administrative and implementation costs of this fee could be high, particularly if the fee were assessed on small diverters. New reporting requirements may be necessary to adequately measure annual diversions. Substantial costs may be required to estimate and document separable costs or cost of service. User fees or assessments are not suited for finance of large capital projects requiring up-front expenditures, but they could potentially be used as a revenue stream to service bond debt. Significant political and legal opposition is likely if the relationship between user fees, benefits and cost of service is not well-documented.