4/30
Finance W.G.



# I) Introduction

The purpose of this case study is to identify potential funding principles for the CALFED Bay Delta Program ( Program ) long-term solution ( Solution ). The potential funding principles discussed in this report are intended to apply to the integrated Preferred Alternative, which includes all Common Components. Although the Preferred Alternative has not been selected, the funding principles might apply to any of the three proposed Phase II alternatives under consideration. There may be additional funding principles beyond those contained in this case study. One use of the case study may be to identify additional funding principles that should be considered in developing the Financial Strategy.

Phase II of the CALFED process is designed to look at the Solution at the programmatic level. The Programmatic approach determines the level of detail that will be available for purposes of formulating the Financial Strategy. Given this fact, the Financial Strategy for Phase II will focus on concepts and ranges rather than specific numbers and dollar amounts. Specific amounts are important, but they are to be determined in the pre-feasibility and project-specific analyses rather than Programmatic analysis.

One of the most basic principles is that benefits will form the basis for determining which groups participate in paying for the Solution. If a group receives a benefit, the initial assumption is that they will pay for some portion of the Solution. Benefits will be described as clearly as possible, although the ability to quantify ranges or dollar values of benefits will be limited during the programmatic phase. Generally, benefit description can be at three levels: (i) conceptual description, (ii) quantifiable performance measures, or (iii) dollar value of benefit. Most benefits will be described in conceptual or performance measure terms in Phase II.

The table below provides examples of the three levels of detail for benefits. The Solution will create some benefits that can be quantified to a greater level of detail than others within the same benefit area will. For example, avoided treatment cost is not the only benefit of water quality actions, although it might be the only one that can be evaluated in dollar terms. An important concept illustrated by the case study is that each aspect of the Solution creates benefits for multiple interest groups.

| Benefit Area | Conceptual Description | Quantifiable Measure | Dollar Range |
|---|---|---|---|
| **Ecosystem** | Improve ecosystem | Ecosystem targets | Not Applicable |
| **Water Quality** | Reduce constituents | Ranges of reduction for specific constituents | Ranges of avoided treatment cost |
| **System Integrity** | Restore key levees | Standards to be met and extent of program | Ranges of dollar values of property protected |
| **Water Supply** | Opportunities for new supply and reliability | Ranges of AF new supply or increased reliability | Ranges of dollar value of new supply or reliability |

Other issues such as the ability to obtain revenues from a source, ability to pay, and other practical concerns may be considered and may result in a deviation from the fundamental benefits approach. Such exceptions need to be considered on a case by case basis.

### *A) Overview of Case Study Alternative*

This section presents an overview of the actions associated with the case study. These actions can be broken into two categories: specific actions and programmatic actions. Specific actions are those actions that are both named and promised in the alternative (e.g., convert x land into y habitat). Programmatic actions are categories of actions that will take place where the Program does not specify which specific actions will take place (e.g., ecosystem restoration using adaptive management). A detailed list of the actions included in the case study is included as Appendix A.

The case study is designed primarily to meet the four program goals Ecosystem Restoration, Water Supply Reliability, Water Quality, and System Integrity. The case study is conceptually consistent with CALFED draft alternative 3. The following four paragraphs summarize how the case study addresses the Program s four major objectives.

The **Ecosystem Restoration objective** is addressed by: (1) a major habitat restoration program in and above the Delta (including both specific actions and an adaptive management program), (2) improvements in flow and diversion timing patterns (made possible by new storage, efficiency improvements, water purchases, and the construction of multiple export intakes), (3) improvements in diversion screening, (4) increased flexibility in the location of diversions (made possible through the construction of multiple export intakes), and (5) improvements in water quality.

The **Water Supply Reliability objective** is addressed by: (1) new storage elements, managed partly for increased out-of-stream supply, (2) construction of the dual Delta transfer facility to allow more efficient and more frequent movement of water across the Delta, and (3) the water efficiency and water market elements.

The **Water Quality objective** is addressed by: (1) specific actions and programs designed to improve water quality within the Delta and in the tributaries to the Delta, and (2) the construction of a dual transfer facility to improve export water quality.

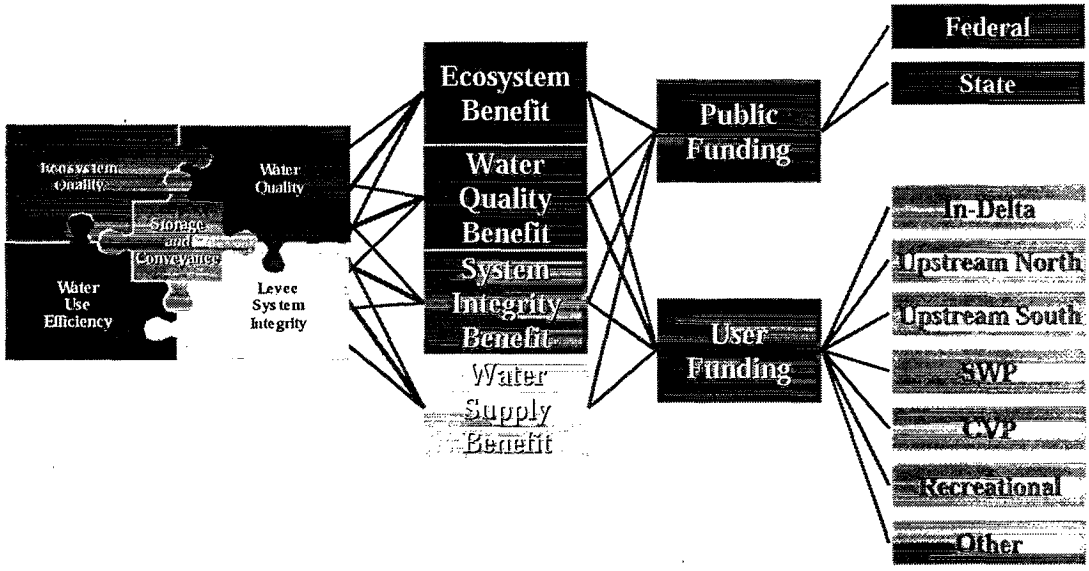
The **System Vulnerability objective** is addressed by programs to: (1) protect and upgrade existing levees, and (2) upgrade emergency response to levee failure.

Features of the integrated case study alternative include:

- habitat restoration in and above Delta
- flow and diversion timing changes
- diversion screening
- diversion location flexibility
- pollutant source control
- mine drainage remediation
- watershed protection programs
- new beneficial use protection regulations
- standardized water transfer rules
- water reclamation program
- urban water conservation program
- agricultural water efficiency program
- refuge water efficiency program
- targeted levee repair/upgrade program
- levee emergency response program
- long-term levee maintenance program
- isolated conveyance 15000 cfs with screened intake
- through Delta: screened intake on Sacramento river
- 1 maf storage north of Delta
- 0.2 maf conjunctive use north of Delta
- 0.2 maf in Delta storage on island(s)
- groundwater storage program within Kern fan
- all storage operated for local uses, export, and ecosystem

## II) Benefits

This section of the case study summarizes the benefits that accrue to each resource area from the integrated Solution. Benefits for each resource area are derived from multiple actions within the Solution. This critical concept is illustrated in the graphic below. Equitable distribution of costs requires comprehensive consideration of the effects of the entire Solution. Looking at individual actions or Solution Components is misleading without the recognition that Component actions benefit multiple resource areas, and each resource area benefits from many actions in multiple Program Components.




Each benefits section addresses the benefits that are created in that resource area by each component of the overall Solution. The question being answered within each resource area for each component is, What does this component do for this resource area?

### *A) Ecosystem Benefits*

Ecosystem benefits are created through the restoration and enhancement of the ecosystem. Ecosystem benefits derive from:

1) Ecosystem Restoration Component
   (a) Protecting and enhancing existing habitat with new or expanded maintenance programs
   (b) Providing additional habitat through land acquisition for new refuges
   (c) Controlling introduced species by improving border inspections and ballast water release regulations
   (d) Providing new or improved recreational facilities
   (e) Enhancing fish population may reduce future catch limitations for certain species

2) System Integrity Component
   (a) Modifying levee protection and maintenance practices to improve riverine and riparian habitat at channel edges
   (b) Strengthening levees which protects existing and new habitat by reducing risk of levee failures
   (c) Increasing ability to respond to levee emergencies
   (d) Providing new habitat in floodways and setback levees

3) Storage and Conveyance Components
   (a) Modifying flow regimes to provide flows more amenable to ecosystem needs using existing and new storage facilities (increased critical flows and better temperature control)
   (b) Expanding diversion timing and location flexibility with new facilities reducing entrainment
   (c) Increasing reliability of water for refuges dependent on exports from the Delta
   (d) Installing fish screens at diversions reduces direct mortality
   (e) Providing new recreational opportunities at storage facilities

4) Water Use Efficiency Component
   (a) Reducing mismatch of supply and demand for Delta diversions, placing less strain on fisheries

5) Water Quality Component
   (a) Reducing toxics and other pollutants flowing into the Delta that are ecosystem-limiting factors
   (b) Reducing water use on critical drainage lands may reduce demand on Delta

### *B) WATER SUPPLY BENEFITS*

Water Supply benefits are created by reducing the conflict among beneficial uses, leading to increased reliability, improved ability to transport water through the Delta, and the potential for enhanced supply opportunities. Water Supply benefits derive from:

1) Ecosystem Restoration Component
   (a) Overall program of restoring long-term ecosystem health leading to reduced ecosystem vulnerability and reduced ecosystem-related restrictions on diversions

2) System Integrity Component
   (a) Strengthening levees reducing risk of levee failures resulting in diversion shutdown
   (b) Increasing ability to respond to levee emergencies

3) Storage and Conveyance Components
   (a) Increasing channel capacity through the Delta to decrease diversion limitations

(b) Increasing storage capacity to provide greater drought resistance and higher reliability
(c) Increasing diversion capacity to allow greater retention of high flows
(d) Expanding diversion timing and location flexibility with new conveyance facilities reducing diversion limitations
(e) Installing fish screens at diversions reducing restrictions relating to direct fish mortality
(f) Providing new water supply opportunities to local communities by creating new storage
(g) Building new storage facilities may provide new power generation facilities or enable more flexible use of existing power generation facilities

4) Water Use Efficiency Component
   (a) Increasing opportunities for water transfers
   (b) Reducing mismatch of supply and demand for Delta diversions, increasing reliability

5) Water Quality Component
   (a) Increasing Delta water quality resulting in more flexible diversion opportunities
   (b) Improving mixing abilities of water purveyors due to higher quality Delta water

### *C) SYSTEM INTEGRITY BENEFITS*

1) Ecosystem Restoration Component
   (a) Reducing flood risks by acquiring land for habitat in combination with floodways
   (b) Creating new levees as part of setback levee habitat program

2) System Integrity Component
   (a) Strengthening levees reducing risk of levee failures
   (b) Increasing ability to respond to levee emergencies
   (c) Reducing subsidence through cooperative programs
   (d) Regulating activities that are detrimental to levees such as boat wakes

3) Storage and Conveyance Components
   (a) Increasing channel capacity through the Delta increases flood capacity
   (b) Increasing storage capacity to provide additional flood reservation
   (c) Increasing diversion capacity to allow use of facilities for flood management

4) Water Use Efficiency Component
   (a)

5) Water Quality Component
   (a)

### *D) WATER QUALITY BENEFITS*

1) Ecosystem Restoration Component
   (a) Creating wetlands that can contribute to improved water quality
   (b) Modifying flows for ecosystem that improve overall water quality
   (c) Reducing mine drainage detrimental to ecosystem

2) System Integrity Component
   (a) Strengthening levees reducing risk of levee failures that could degrade water quality
   (b) Increasing ability to respond to levee emergencies that could degrade water quality

3) Storage and Conveyance Components
   (a) Increasing channel capacity through the Delta provides better circulation in the Delta
   (b) Providing isolated conveyance avoids detrimental effects of Delta on drinking water quality
   (c) Increasing storage capacity to provide additional flows at critical times
   (d) Increasing diversion capacity to allow greater retention of high flows upstream for later release

4) Water Use Efficiency Component
   (a) Improving water quality for recreational users
   (b) Reducing drainage from critical lands that degrade water quality in the Delta

5) Water Quality Component
   (a) Instituting programs to limit important constituents that degrade water quality
   (b) Monitoring important constituents relating to water quality

# III) Principles

This section on Principles is divided into three parts. The first part of this section discusses the Program Solution Principles. The second section is a list of general financial principles that can apply at the overall program level. The Program Solution Principles form the foundation for these general financial principles. These additional principles are intended to supplement the Solution Principles as they apply to the Financial Strategy. The third section provides principles that relate to the use of public and private funds for each component area.

## *A) SOLUTION PRINCIPLES*

The Program Solution Principles require the following of the long-term solution:

- Reduce conflicts
- Implementable
- Equitable
- Durable
- Affordable
- Minimize redirected impacts

Of the six, the four discussed below are the most relevant for discussion in the context of the Financial Strategy. The remaining two - minimizing redirected impacts and reducing conflicts - although affected by the Financial Strategy, have not been addressed here. Their evaluation is to be considered elsewhere in the Program.

### 1) Affordability

The affordability Solution Principle has. The first relates to Program justification, and can be summarized as requiring that the Solution be among the least expensive ways that achieve Program objectives. The second relates to the availability of financial resources, and requires that sufficient funding must be available to enable implementation.

For purposes of the case study, benefits are assumed to exceed costs on an aggregated basis. In this version of the case study benefits are described in conceptual terms, so a benefit/cost ratio analysis is not possible. With respect to the availability of funding, the a priori assumption is that when benefits exceed costs, funding can be found. The case study is intended to facilitate discussion of the information that will be necessary in order to reach the conclusion in Phase II that the Solution is affordable.

### 2) Equity

For the Financial Strategy, the concept of equity relates to distribution of costs and benefits among financial participants. Achieving equity can be defined in a number of ways.

The most basic definition relates to finding a distribution that is acceptable to those involved. Acceptability does not necessarily imply an ideal or efficient distribution. It is a practical test, and is likely to be determined through negotiation rather than calculation.

There are a number of theoretical constructs that would attempt to improve on the concept of acceptability. These definitions of equity seek to improve the quality of the distribution by increasing the combined total level of perceived benefits, or by rationalizing the process of determining the distribution instead of relying on negotiation.

The definition of equity will continue to be defined over the course of Phase II, and this case study may assist in such definition in BDAC work groups and elsewhere.

3) Durability

Durability is primarily an assurance issue. For the Financial Strategy, the key durability issue is to consider the stability, flexibility, and longevity of revenue sources that are identified relative to the components. Within the assurance area, there are other aspects of durability that are not directly related to the Financial Strategy.

Durability in the finance context means that the characteristics of the revenue sources should match the needs of the component actions in question. For example, a short-term fixed revenue source should not be identified for purposes of a component that requires a long-term flexible revenue source.

An example of this issue that has been repeatedly discussed is the need for a reliable source of funding for future ecosystem activities. This issue is really twofold. There is the issue of identifying a reliable funding source for planned annual programs and O&M costs. There is also the potential need for future capital funding that exceeds initial estimates based on results of the adaptive management program, but is essential for the ecosystem program to proceed successfully.

The second of these two, the possible need for increased future capital funding, is more properly addressed by the assurance plan. This is because it is more in the nature of a contingency plan than a need to identify current revenue sources.

The first issue, stable funding for annual costs, is appropriately addressed as part of the Financial Strategy. These annual costs include the annual Operation and Maintenance costs related to habitat activities, as well as annual programs such as the purchase of water for ecosystem purposes. They also include the recurring costs of programs for monitoring and evaluating the success of the program, and for adaptively managing the ecosystem program over time.

The problem arises from the fact that traditional State and federal funding cannot be assured in the same way that user funding can. This is due to the annual appropriations process, the results of which can be difficult to predict. The annual appropriations process is also less effective for future costs that may not yet be fully understood. For this reason, user funding or a more predictable public funding source might be indicated for future annual program and O&M expenditures.

There may be a number of issues like the concept of durability that are both finance and assurance issues.

4) Implementability

The Implementability Solution Principle requires that the Financial Strategy consist of elements that can reasonably be expected to be put into place as designed. This requires consideration of practical real-world factors such as politics, existing conditions, and legal issues. Within the Program this issue has been interpreted as primarily related to the institutional and assurance implementation structure. Practical implementation issues relating to finance have been captured in the discussion of affordability.

### *B) General Principles*

This second part of the Principles section is a list of principles has been developed to guide the development of the overall Financial Strategy. Although the actual allocation of the Solution costs to specific parties will not occur in Phase II, these principles can form the framework within which future financial and cost allocation decisions will be made.

1) The beneficiaries of the long-term solution will generally bear the costs of the actions that produce those benefits, except in cases where clear cost responsibility can be assigned to others and to assign costs to beneficiaries would not be equitable.

2) The Financial Strategy should take a comprehensive view of the benefits and financial contributions of all those involved in the Delta solution as a way of achieving overall equity.

3) The Financial Strategy should emphasize a high level of coordination among financing sources with a centralized decision-making process.

4) Using economic incentives as a way to encourage implementation of the long-term solution allows more individual choice and should be incorporated into the Financial Strategy when feasible.

5) Users should base their resource use decisions on the full costs and benefits of those decisions. The Financial Strategy should facilitate the ability of users to ascertain the full costs and benefits of their resource use decisions.

6) The Financial Strategy should recognize the dynamic cost nature of an adaptive management program, and allow for periodic consideration of changing cost structures over time.

### *C) Resource Area Principles*

This section discusses principles related to the use of public and user funding to pay for benefits received in the four resource areas. The resource areas are treated separately because the character of each resource area is somewhat different than the others. Separate treatment allows the description of the principle to relate more closely to each type of benefit. A careful review, however, will reveal that there are underlying concepts that are common to all and are derived from the Solution Principles and the General Principles outlined above.

1) Ecosystem Benefits
   (a) Public funds should pay for benefits that have a broad public character, for example:
      (i) Wide geographic scope
      (ii) Diverse groups of people
      (iii) Open access to the public
   (b) Public funds might also be used for items that are difficult to finance from users:

(i) Problematic to assign responsibility
(ii) Not directly related to diversions or other human activity
(iii) Passage of time has made assigning responsibility impractical

(c) User funds should be used for items that:
(i) Have direct connection to diversions or other human activity
(ii) Have a practical need for a more predictable revenue source

2) Water Quality

(a) Public funds:
(i) Control of contaminants causing harm to ecosystem
- direct ecosystem mortality
- ecosystem stress

(ii) Contaminants that have a non-human origin

(b) User funds:
(i) Relating to drinking water quality requirements
(ii) Result of human activity

3) Conveyance and Storage

(a) Public funds:
(i) Portions dedicated to ecosystem purposes
(ii) Public good portions of flood control capacity

(b) User funds:
(i) Portions for water export
(ii) Power generation
(iii) Recreation
(iv) Transfer capacity

4) System Integrity

(a) Public funds:
(i) Public good portion of flood control improvements
(ii) Incremental habitat costs

(b) User funds:
(i) Flood control improvements
(ii) Subsidence of agricultural land
(iii) Increased reliability for diversions

5) Water Use Efficiency

(a) Public funds:
(i) Incentives for actions that are not locally cost-effective

(b) User funds:
(i) Actions that are locally cost-effective
(ii) Compliance with MOU s and laws
(iii) Relate to voluntary transfers
(iv) Relate to critical drainage problem lands

The possible implications of this set of principles can be illustrated by discussing the types of actions that would be assigned to the public and user funding sources, respectively.

Using this set of guidelines, public funding could be used for:

- Habitat acquisition and restoration
- Mine drainage remediation
- Watershed protection programs
- Beneficial use regulations
- Standardizing water transfer rules
- Refuge water efficiency program

User funding could be used for:

- Flow and diversion timing changes
- Diversion screening
- Additional diversion locations
- Water Reclamation programs
- Urban water conservation
- Agricultural water conservation

Public and users could share costs of:

- Pollutant source control
- Levee programs
- Isolated conveyance facilities (assuming some ecosystem capacity)
- Delta conveyance modifications
- Storage facilities

# IV) Appendix A

## A) *Case Study: Action Elements*

1) 1. Ecosystem Restoration (Represents all restoration activity, including CVPIA, etc.)

### a. *Specific commitments*

(a) i. Enhance existing habitat
(b) ii. Convert existing land uses to habitat
  (i) (1) Create meander zones
  (ii) (2) Enhance vegetation on levees
  (iii) (3) Levee setbacks
  (iv) (4) Buffer habitat on the inside of levees
  (v) (5) Convert agricultural land to managed wetlands
  (vi) (6) Convert Delta land to shallow habitat
(c) iii. Screen certain local intakes
(d) iv. Alter flow and temperature patterns to provide net fishery benefits. Flow benefits generated through combination of rules (changed flow/X2 standards) and market mechanisms.

### b. *Programmatic commitments*

(e) i. Set long term restoration goals and objectives
(f) ii. Create a mechanism designed to meet long-term goals and objectives through restoration activities, while allowing discretion as to the means.
(g) iii. Establish monitoring and evaluation process

2) 2. Water Quality. Includes requirements and programs from other agencies, e.g., CVRWQCB

### a. *Specific commitments*

(a) i. Undertake specific pollutant source control actions (agricultural and urban)
(b) ii. Mine drainage remediation programs
(c) iii. Environmental water quality standards
(d) iv. Delta salinity standards to protect Delta agriculture.

### b. *Programmatic commitments*

(e) i. Water quality improvement program, based upon specific goals and objectives.
(f) ii. Implement watershed protection programs

(g) iii. Establish monitoring and evaluation process

3) 3. Water Use Efficiency. Categories identical to those used in efficiency workgroup. Transfer element could be broken out if desired.

***a. Programmatic commitments***

(a) i. Standardized rules for water transfers
- (i) (1) Define transferable water
- (ii) (2) Mitigate local third party and environmental impacts
- (iii) (3) Streamline approval process

(b) ii. Water Reclamation
- (i) (1) Define BMP
- (ii) (2) Eliminate institutional barriers to implementation
- (iii) (3) Implementation and monitoring program

(c) iii. Urban Water Conservation
- (i) (1) Define BMP
- (ii) (2) Quantify targets
- (iii) (3) Implementation and monitoring program

(d) iv. Agricultural Water Efficiency
- (i) (1) Define EWMP
- (ii) (2) Definite local planning process
- (iii) (3) Create incentive process
- (iv) (4) Implementation and monitoring program

(e) v. Refuge Efficiency
- (i) (1) Define BMP
- (ii) (2) Create Incentive process
- (iii) (3) Implementation and monitoring program

4) 4. Delta Vulnerability

***a. Specific Commitments***

(a) i. Target levees for maintenance, repair, upgrades

***b. Programmatic Commitments***

(b) i. Establish and implement emergency response program. Includes response to simultaneous multiple failures.

(c) ii. Establish and implement long-term maintenance and subsidence management plan

(d) iii. Seepage flood remediation program (mitigation for isolated system).

5) 5. Conveyance

***a. Specific Commitments***

(a) i. Construct dual conveyance facility.

(b) ii. Size the isolated portion of dual facility from 5,000 cfs to 15,000 cfs.

(i) (1) Screen intake

(ii) (2) Operational rules new rules designed to meet ecosystem needs while simultaneously improving supply reliability. Represents sum of all constraints on operation from all sources.

- (a) Operate to meet any new Delta flow requirements
- (b) Operate to meet existing Delta water quality requirements
- (c) Operate to meet export standards
- (d) Operate in real time to protect fish, etc. near intakes
- (e) Meet all other existing laws, regulations, etc.
- (f) Coordinate project operations with other user and environmental controlled water (market transfers, discretionary environmental supplies, etc.)

(c) iii. Through Delta portion

(i) (1) Screened intake on Sacramento River

(ii) (2) Operational rules as with isolated portion

(d) iv. Coordinated operations of the two facilities

(i) (1) South Delta pumping minimums set to assure protection of South Delta water quality.

(ii) (2) Beyond this level, first priority is isolated system diversions, with second priority south Delta diversions, when isolated diversions curtailed for biological reasons.

***b. Programmatic commitments***

(e) i. Mechanisms to change operational rules as understanding of biological needs changes.

6) 6. Storage Facilities

***a. Specific commitments***

(a) i. Construct offstream storage facility north and south of the Delta.

(i) (1) Operations: Facility operated to benefit local users, export interests, and environment.

- (a) Fill during periods of low environmental impact, e.g., during falling limb of pulse flows

- (b) Water user share of storage operated to boost reliability for local and export uses, e.g., release storage to boost water supplies during dry years
- (c) Environmental share of storage operated to boost environmental flows during key periods, e.g., release storage to support flows during dry years or key seasons.

(b) ii. Access 200,000 acre feet of groundwater space north of the Delta
(i) (1) Operations: pump during dry periods, refill through percolation and in lieu during other periods.
(c) iii. 200,000 acre feet storage in Delta island(s).
(i) (1) Operations: Description similar to upstream storage
(d) iv. Construction of local facilities to maximize groundwater storage potential within Kern Fan (via conjunctive use, percolation, etc.).
(i) (1) Operations: Description similar to upstream storage

***b. Programmatic commitments***

i. Mechanisms to adapt storage operations based upon changing needs of users and changed understanding of environmental needs. Could lead to changed diversion patterns and/or changed discharge patterns in order to meet simultaneously provide environmental protection, restoration, and water supply reliability.