

SHASTA LAKE WATER RESOURCES INVESTIGATION

EXECUTIVE SUMMARY

The primary purpose of this Initial Alternatives Information Report is to describe the formulation of initial alternatives to address planning objectives of the Shasta Lake Water Resources Investigation (SLWRI).

BACKGROUND

The Shasta Dam and Reservoir Project was completed in 1944 by the United States Department of the Interior, Bureau of Reclamation, Mid-Pacific Region (Reclamation), and serves the purposes of flood control, irrigation water supply, municipal and industrial (M&I) water supply, hydropower generation, fish and wildlife conservation, and navigation. The 602-foot-high Shasta Dam (533 feet above streambed) and 4.55-million-acre-foot (MAF) reservoir are located on the upper Sacramento River in Northern California, about 9 miles northwest of the City of Redding.

As a result of increases in demands for water supplies and attention to ecosystem needs in the Central Valley of California, in 2000, Reclamation reinitiated a feasibility-scope investigation to evaluate the potential of enlarging Shasta Dam. The SLWRI is being conducted under the general authority of Public Law 96-375 (1980).

Major existing projects that influence the SLWRI include Reclamation's Central Valley Project (CVP), the State of California's State Water Project (SWP), and the United States Army Corps of Engineers (Corps) Sacramento River Flood Control Project. In addition, two ongoing programs in the Central Valley significantly influence the SLWRI: the Central Valley Project Improvement Act and California Bay-Delta Program (responsible for implementing the CALFED Bay-Delta Program).

PROBLEMS AND NEEDS

The primary study area for the SLWRI encompasses Shasta Dam and Reservoir; inflowing rivers and streams, including the Sacramento River, McCloud River, Pit River, and Squaw Creek; and the Sacramento River downstream to about the Red Bluff Diversion Dam (RBDD). Because of the potential influence of a modified Shasta Dam on other programs and projects, primarily in the Central Valley, an extended study area also includes the Sacramento River and San Joaquin River watersheds, including the Sacramento-San Joaquin Delta. Major identified water and related resources problems and needs in the primary study area include the following:

- **Anadromous Fish Survival** – Due to a number of environmental factors, the population of chinook salmon has declined in the Central Valley. To address this problem on the Sacramento River, various actions have been undertaken ranging from establishing minimum flow requirements in the river to making structural changes at Shasta Dam. However, a residual need still exists for effective actions to benefit salmon, especially in dry and critically dry years.

- **Water Supply Reliability** – Demands for water in California exceed available supplies. As the population of the Central Valley grows, the ability to maintain a healthy and vibrant industrial and agricultural economy will become increasingly difficult as the demand for adequate water supply becomes more acute.
- **Other Resources Needs** – Other identified problems and needs include the growing demands for new energy sources in California; the need for restoring environmental values in the Shasta Lake area and downstream along the Sacramento River; and the need for additional flood control along the upper Sacramento River.

STUDY OBJECTIVES AND MISSION STATEMENT

Identified problems and needs in relation to the study authority were translated into primary and secondary (opportunity) planning objectives:

- **Primary Objectives** – The SLWRI will formulate alternatives specifically to address the following:
 - Increase the survival of anadromous fish populations in the Sacramento River, primarily upstream from the RBDD.
 - Increase water supplies and water supply reliability for agricultural, M&I, and environmental purposes to help meet future water demands, with a focus on enlarging Shasta Dam and Reservoir.
- **Secondary Objectives** – To the extent possible through pursuit of the primary planning objectives, the SLWRI will include as opportunities features to help accomplish the following:
 - Preserve and restore ecosystem resources in the Shasta Lake area and along the upper Sacramento River.
 - Reduce flood damages along the Sacramento River.
 - Develop additional hydropower capabilities at Shasta Dam.

Based on identified problems and needs, relationships to other programs and projects, and Federal planning guidance, the following Mission Statement was developed:

To develop an implementable plan primarily involving the enlargement of Shasta Dam and Reservoir to promote increased survival of anadromous fish populations in the upper Sacramento River and increased water supply reliability, and to the extent possible through meeting these objectives, include features to benefit other identified ecosystem, flood control, and related water resources needs.

RESOURCES MANAGEMENT MEASURES

A resources management measure is a feature or activity that addresses a specific planning objective. About 35 management measures were identified to address the primary objectives of the SLWRI and nearly 30 measures were identified to address the secondary planning objectives. Of the management measures for the primary planning objectives, seven were selected to be considered further for potential inclusion in alternative plans. Five measures to address the secondary objectives also were identified to be added, if possible and appropriate, to alternative plans. **Table ES-1** summarizes the 12 water resources management measures carried forward to address the primary and secondary planning objectives.

**TABLE ES-1
RETAINED MEASURES TO ADDRESS PLANNING OBJECTIVES**

Primary Planning Objectives	Resources Management Measure	
Anadromous Fish Survival	Restore Spawning Habitat	Restore abandoned gravel mines along the Sacramento River.
	Modify TCD	Make additional modifications to Shasta Dam for temperature control.
	Enlarge Shasta Lake Cold Water Pool	Enlarge Shasta Dam and Reservoir to increase the cold water pool in the lake to benefit anadromous fish.
	Increase Minimum Flows	Modify the storage and/or release operations of Shasta Dam and Reservoir to benefit anadromous fish.
Water Supply Reliability	Increase Conservation Storage	Increase conservation storage space in Shasta Reservoir by raising Shasta Dam.
	Reoperate Shasta Dam	Increase the effective conservation storage space in Shasta Reservoir by increasing the efficiency of reservoir operation for water supply reliability.
	Perform Conjunctive Water Management	Develop conservation groundwater storage near the Sacramento River downstream from Shasta Dam.
Secondary Planning Objectives	Resources Management Measure	
Ecosystem Restoration	Restore Shoreline Aquatic Habitat	Construct shoreline fish habitat around Shasta Lake.
	Restore Tributary Aquatic Habitat	Construct instream fish habitat on tributaries to Shasta Lake.
	Restore Riparian Habitat	Restore riparian and floodplain habitat along the upper Sacramento River.
Flood Damage Reduction	Modify Flood Control Operations	Update Shasta Dam and Reservoir flood management operations.
Hydropower	Modify Hydropower Facilities	Modify existing/construct new generation facilities at Shasta Dam to take advantage of increased head.
Key: TCD – temperature control device		

CONCEPT PLANS

Twelve concept plans were formulated from the management measures in **Table ES-1**. Because a vast array of potential measure combinations and sizes exists, the approach was not to develop an exhaustive list of concepts. Instead, the purpose of this phase of the formulation process was (1) to explore an array of different strategies to address the primary planning objectives, constraints, and criteria, and (2) to identify concepts that may warrant further development into initial alternatives and then detailed alternative plans. These concepts were intended to promote discussion and provide a background for the formulation of initial alternatives and alternative plans in the remainder of the feasibility study, with input from participating agencies, stakeholders, and the public.

The concept plans were formulated to represent the range of potential actions for addressing the objectives of the SLWRI. First, two sets of concepts were developed that focus on a single primary planning objective: anadromous fish survival (AFS) or water supply reliability (WSR). Second, a set of concepts was developed that includes a mixture of measures to address both primary and secondary objectives, termed combined objective (CO) concepts. The concept plans are highlighted below and summarized in **Table ES-2**.

Each concept plan includes raising Shasta Dam by 6.5, 18.5, or 200 feet. Consequently, each concept would likely include some degree of physical modification to the temperature control device (TCD) and hydropower facilities at Shasta Dam, and revision of reservoir operating guidelines for water supply, flood control, and/or fisheries. The degree and details of these measures will be evaluated in future studies.

Concepts Focused on Anadromous Fish Survival – The three AFS concepts focus primarily on anadromous fish survival in the upper Sacramento River, but each contributes somewhat to water supply reliability. In developing these concepts, it was important to determine (1) how each measure addressing anadromous fish survival could be combined, and (2) how their potential benefits compared. Consequently, the various dam raises were not a significant factor because progressively higher raises would be expected to produce proportionally greater benefits to anadromous fish. Accordingly, each concept plan includes raising Shasta Dam 6.5 feet and enlarging the reservoir by 290,000 acre-feet, but the concepts differ in how the additional storage would be used to benefit anadromous fish.

- **AFS-1 – Increase Cold Water Assets with Shasta Operating Pool Raise (6.5 Feet)** – This concept focuses on increasing the pool of cold water in Shasta Lake to maintain cooler water temperatures in the upper Sacramento River. It consists of raising Shasta Dam 6.5 feet (raising the gross pool by 8.5 feet, and enlarging total storage in the reservoir by 290,000 acre-feet to 4.84 MAF). AFS-1 also includes increasing the minimum operating pool at Shasta by 290,000 acre-feet to ensure a larger seasonal carryover storage volume for use the following year. In addition, this concept includes further investigation of and potential modifications to the TCD at Shasta Dam to achieve efficient use of the expanded cold water pool.

**TABLE ES-2
COMPARISON OF CONCEPT PLANS**

Concept Focus		Anadromous Fish Survival (AFS)			Water Supply Reliability (WSR)				Combined Objectives (CO)				
		AFS-1	AFS-2	AFS-3	WSR-1	WSR-2	WSR-3	WSR-4	CO-1	CO-2	CO-3	CO-4	CO-5
Measures													
Shasta Dam Raise (feet)		6.5	6.5	6.5	6.5	18.5 ¹	200	18.5 ¹	6.5	18.5 ¹	18.5 ¹	6.5	18.5 ¹
<i>Anadromous Fish Survival</i>	Enlarge Shasta Lake Cold Water Pool	X	-	-	-	-	-	-	-	-	-	-	-
	Increase Minimum Flows	-	X	X	-	-	-	-	-	-	X	-	-
	Restore Spawning Habitat	-	-	X	-	-	-	-	X	X	X	X	X
	Modify TCD	Changes to the existing TCD likely would be part of any alternative that included physically modifying Shasta Dam.											
<i>Water Supply Reliability</i>	Increase Conservation Storage	-	-	-	X	X	X	X	X	X	X	X	X
	Reoperate Shasta Dam ²	-	-	-	X	X	X	X	X	X	X	X	X
	Perform Conjunctive Water Mgmt.	-	-	-	-	-	-	X	-	-	-	X	X
<i>Secondary Objectives</i>	Restore Aquatic and/or Riparian Habitat	-	-	-	-	-	-	-	-	-	-	X	X
	Modify Flood Control Operations	Changes to flood control operations and hydropower facilities likely would be part of any alternative that included physically modifying Shasta Dam; degree and details will be determined in future studies.											
	Modify Hydropower Facilities												
Accomplishments													
<i>Contribution to Primary Objectives</i>													
Aquatic Habitat (acres) ³		-	170	320	-	-	-	-	150	150	320	150	150
Average Annual Salmon Increase		860	370	370	410	1,110	10,620	1,020	370	1,110	980	410	1,020
Water Supply Reliability (1,000 acre-ft/year) ⁴		Incidental	20	20	72	125	703	146	72	125	90	89	146
<i>Contribution to Secondary Objectives</i>													
Ecosystem Restoration ⁵ (acres)		-	-	-	-	-	-	-	-	-	-	>500	>500
Flood Control Benefits ⁶		-	-	-	-	-	Major	-	Minor	Minor	Minor	Minor	Minor
Hydropower Generation (GWh /year)		51	32	32	15	44	2,250	44	15	44	61	12	44
Cost													
First Cost (\$million)		282	282	292	282	408	5,250	459	292	418	418	356	483
Annual Cost (\$million)		19	19	20	19	28	383	32	20	29	29	25	34
Unit Cost ⁷ (\$/acre-foot)		-	270	270	270	225	550	220	265	220	230	260	220
Key: GWh/year – gigawatt hours per year		TCD – temperature control device											

Notes:

- ¹Precise raise to be determined in continuing investigations.
- ²Potential for marginal increase in water supply reliability through reservoir reoperation. Magnitude to be determined in further evaluations.
- ³Includes habitat increase through restoring spawning and rearing areas and through increasing minimum flows consistent with the Anadromous Fish Restoration Program (AFRP).
- ⁴Increased water supply yield based on drought year conditions with Banks Pumping Plant at 6,660 cfs.
- ⁵Includes restoring riparian and wetland floodplain habitat along Sacramento River and resident fish habitat around Shasta Lake; acreages to be determined in future studies.
- ⁶All plans that include enlarging Shasta Reservoir can provide incidental flood control benefits. A potential exists for marginal increases in flood control through reservoir reoperation (to be determined in future studies). Larger increases in storage in Shasta Lake have the potential for significant benefits.
- ⁷Based on portions of annual cost potentially creditable to water supply reliability divided by increase in water supply reliability.

- **AFS-2 – Increase Minimum Anadromous Fish Flow with Shasta Enlargement (6.5 Feet)** – This concept focuses on increasing minimum seasonal flows for anadromous fish in the upper Sacramento River. The concept consists of raising Shasta Dam 6.5 feet and enlarging Shasta Reservoir by 290,000 acre-feet. The additional storage would be dedicated to helping increase seasonal minimum flows in the upper Sacramento River, to the extent possible, consistent with recommendations in the January 9, 2001, Federal Final Restoration Plan for the Anadromous Fish Restoration Program (AFRP). This concept also could result in a slightly larger cold water pool, and provide incidental benefits to water supply reliability.
- **AFS-3 – Increase Anadromous Fish Flow and Restore Aquatic Habitat with Shasta Enlargement (6.5 feet)** – This concept focuses on increasing anadromous fish habitat in the upper Sacramento River through stream flow increases and aquatic habitat restoration. Similar to AFS-2, this concept includes raising Shasta Dam 6.5 feet and increasing seasonal fish flows in the upper Sacramento River. In addition, this concept includes acquiring, restoring, and reclaiming one or more inactive gravel mining operations along the upper Sacramento River to create additional aquatic and floodplain habitat to benefit anadromous fish. This concept also could result in a slightly larger cold water pool, and provide incidental benefits to water supply reliability.

Concepts Focused on Water Supply Reliability – Four concepts were formulated that focus on the primary objective of water supply reliability while also benefiting anadromous fish. Unlike the formulation strategy for the three AFS concepts, the most important factor for the WSR concepts was the magnitude of a potential enlargement of Shasta Dam and Reservoir. Accordingly, three of the four concepts below were formulated based on different dam raise options, while the fourth includes conjunctive water management.

- **WSR-1 – Increase Water Supply Reliability with Shasta Enlargement (6.5 feet)** – The focus of this concept is on increasing water supply reliability while contributing to increased anadromous fish survival, consistent with the 2000 CALFED Record of Decision (ROD). Similar to concept AFS-2, this concept consists of raising Shasta Dam 6.5 feet, and enlarging the total storage space in the reservoir by 290,000 acre-feet. However, the additional storage would be operated for water supply reliability, as under existing operational guidelines, helping to reduce estimated future shortages through increasing drought and average year water supply reliability. The increased pool depth and volume could also contribute to maintaining seasonal water temperatures for anadromous fish on the upper Sacramento River.
- **WSR-2 – Increase Water Supply Reliability with Shasta Enlargement (18.5 feet)** – This concept focuses on the likely greatest practical enlargement of Shasta Dam and Reservoir consistent with the goals of the CALFED ROD for the primary purpose of increasing water supply reliability. It consists of raising Shasta Dam 18.5 feet (raising the gross pool by 20.5 feet, and enlarging the total storage space in the reservoir by 636,000 acre-feet to 5.19 MAF). This concept would help reduce estimated future shortages by increasing drought and average year water supply reliability. The increased pool depth and volume also could contribute to maintaining seasonal water temperatures for anadromous fish on the upper Sacramento River.

- **WSR-3 – Increase Water Supply Reliability with Shasta Enlargement (High Level) –** This concept focuses on providing the greatest potential increase in water supply reliability through the largest feasible raise of Shasta Dam. It consists of raising Shasta Dam about 200 feet and enlarging the total storage space in the reservoir by 9.3 MAF to 13.9 MAF. This concept would significantly reduce estimated future shortages through increasing drought and average year water supply reliability. The increased pool depth and volume would greatly contribute to maintaining seasonal water temperatures for anadromous fish on the upper Sacramento River. It could also provide major flood control and hydropower benefits. However, local area socioeconomic, cultural, and environmental conditions would be impacted significantly by this concept.
- **WSR-4 – Increase Water Supply Reliability with Shasta Enlargement (18.5 feet) and Conjunctive Water Management –** This concept focuses on increasing water supply reliability of the CVP and SWP through a combination of conjunctive water management and enlargement of Shasta Dam and Reservoir, consistent with the goals of the CALFED ROD. This concept is similar to WSR-2, but includes a conjunctive water management component consisting primarily of contract agreements between Reclamation and certain Sacramento River basin water users. These agreements would focus on exchanging additional surface supplies in normal water years for reduced deliveries (reliance on groundwater supplies) in dry and critically dry years. The increased pool depth and volume also could contribute to maintaining seasonal water temperatures for anadromous fish in the upper Sacramento River.

Concepts Focused on Combined Objectives - Five concept plans were formulated to represent a reasonable balance between the two primary objectives, while also including components to address the secondary objectives, as appropriate. Two dam raise options were considered for the five CO concepts: 6.5 feet and 18.5 feet. CO concepts are summarized below.

- **CO-1 – Increase Anadromous Fish Habitat and Water Supply Reliability with Shasta Enlargement (6.5 feet) –** This concept seeks to address both primary planning objectives. For anadromous fish survival, it consists of raising Shasta Dam 6.5 feet to increase the cold water pool, and restoring inactive gravel mines and floodplain habitat along the upper Sacramento River. For water supply reliability, it consists of dedicating additional storage to that purpose, and revising flood control operations to benefit water supply reliability by managing floods more efficiently. The concept also includes further investigation and potential modifications to the existing TCD at Shasta Dam for enhanced temperature management.
- **CO-2 – Increase Anadromous Fish Habitat and Water Supply Reliability with Shasta Enlargement (18.5 feet) –** This concept addresses both primary planning objectives by raising Shasta Dam 18.5 feet to increase the cold water pool for anadromous fish and increase water supply reliability. This concept is similar to CO-1, but with a larger dam raise.

- **CO-3 – Increase Anadromous Fish Flow/Habitat and Water Supply Reliability with Shasta Enlargement (18.5 feet)** – This concept addresses both primary planning objectives through a combination of measures. It consists of (1) raising Shasta Dam 18.5 feet, (2) modifying the TCD at Shasta Dam to make efficient use of the expanded cold water pool, (3) restoring inactive gravel mines and floodplain habitat along the Sacramento River, (4) dedicating a portion of the enlarged reservoir storage to increase minimum flows for anadromous fish, consistent with the objectives of the AFRP, and (5) revising the operational rules for flood control to benefit water supply reliability by managing floods more efficiently.
- **CO-4 – Multipurpose with Shasta Enlargement (6.5 feet)**- The goal of this concept is to address both primary planning objectives by raising Shasta Dam 6.5 feet, as identified in the CALFED ROD, in combination with various features to address the secondary objectives. The features are similar to those described for CO-1, with the addition of conjunctive water management. To address the secondary objectives, CO-4 also includes constructing fish habitat in the Shasta Lake area, and restoring one or more riparian habitat areas between Redding and Red Bluff on the Sacramento River.
- **CO-5 – Multipurpose with Shasta Enlargement (18.5 feet)** – This concept also addresses both primary planning objectives by enlarging Shasta Dam 18.5 feet, consistent with the objectives of the CALFED ROD, in combination with various features to address the secondary objectives. Primary features are similar to CO-4, except Shasta Dam would be raised 18.5 feet, enlarging the reservoir by 636,000 acre-feet.

INITIAL ALTERNATIVES

The 12 concept plans described above were compared against four general criteria: (1) completeness, (2) effectiveness, (3) efficiency, and (4) acceptability. A summary of this comparison is included in **Table ES-3**. Based on this comparison, and the ability of plans to address both primary objectives, the required No-Action plan and five initial alternatives were identified for further consideration in the SLWRI. The five initial alternatives are essentially starting points to be used to further formulate detailed plans for evaluation and consideration in the feasibility report and supporting documentation. For example, future detailed alternative plans could include other sizes of raising Shasta Dam (with a likely maximum limit of 18.5 feet) or other measures to help restore the anadromous fishery, should further study demonstrate the potential for their efficient and effective implementation. Initial alternatives include the following:

- **No-Action (No Federal Action)** - Under the No-Action plan, the Federal Government would take no action toward implementing a specific plan to help increase anadromous fish survival opportunities in the upper Sacramento River nor help address the growing water reliability issues in the Central Valley of California through the assistance of Shasta Dam and Reservoir.

**TABLE ES-3
SUMMARY COMPARISON OF CONCEPT PLANS**

Concept Plans	Comparison Criteria				Recommendation Status and Relative Ranking
	Completeness	Effectiveness	Efficiency	Acceptability	
AFS-1	Low	Very Low	Very Low	Very Low	Enlarging Shasta for the sole purpose of increasing the cold water pool is not recommended for further consideration as a stand-alone plan. Only one primary objective addressed. Very high cost for meeting single objective. Same conclusion for any size raise with similar component measures and intent.
AFS-2	Moderate	Low	Low	Low	Enlarging Shasta primarily to increase winter/spring river flows for anadromous fish is not recommended for further consideration as a stand-alone plan. Very high costs for marginal increases in fish survival. Same conclusion for any sized project with similar component measures. However, potential operational changes to increase fish survival are recommended for further study as part of any plan considered.
AFS-3	Moderate	Low	Low	Low	As with AFS-2, not recommended for further consideration as a stand-alone plan. High costs for marginal increases in fish survival. However, potential for increased fish habitat downstream from Keswick Dam recommended for further assessment and possible inclusion in future plans.
WSR-1	Very High	Low	Moderate	High	Enlarging Shasta primarily for water supply reliability from 6.5 feet to about 18.5 feet is recommended for further development primarily because (1) consistent with goals of the CALFED ROD, (2) high cost-efficiency compared to other new sources, and (3) provides significant incidental benefits to anadromous fish and secondary study objectives.
WSR-2	Very High	Moderate	Very High	High	Recommended for further development for reasons similar to WSR-1. Also, enlarging Shasta to maximum extent possible without major relocations maximizes cost-efficiency.
WSR-3	Low	High	Low	Low	Not recommended for further consideration. High social and environmental impacts in Shasta Lake area. Very high implementation cost.
WSR-4	High	Moderate	Very High	High	Enlarging Shasta to maximum extent possible without major relocations and including conjunctive water management component is recommended for further development. Consistent with goals of the CALFED ROD, and believed to be highly cost-efficient.
CO-1	High	Moderate	Moderate	High	Not recommended for further consideration as a stand-alone plan. Major components are redundant with WSR-1 and CO-2, which are recommended for further development.
CO-2	High	High	High	High	Enlarging Shasta to maximum extent possible without major relocations and including features to increase anadromous fish habitat is recommended for further development. Recommended primarily because this plan is (1) consistent with goals of the CALFED ROD, (2) highly cost-efficient, and (3) addresses most of the planning objectives.

TABLE ES-3 (CONT.)

Initial Concepts	Comparison Parameters				Recommendation Status and Relative Ranking
	Completeness	Effectiveness	Efficiency	Acceptability	
CO-3	Moderate	Moderate	Moderate	Low to Moderate	For reasons similar to AFS-2 and AFS-3, enlarging Shasta with significant storage space dedicated to increased winter/spring flows for anadromous fish is not recommended for further consideration as a stand-alone plan at this time. Very high costs for marginal achievement in meeting objectives. However, potential operational changes to increase fish survival are recommended for further study as part of any plan considered.
CO-4	High	Moderate	Moderate	High	Not recommended for further consideration as a stand-alone plan with 6.5-foot raise primarily due to reduced effectiveness and efficiency. Major components are redundant with WSR-1 and CO-5, which are recommended for further development.
CO-5	High	High	High	High	Enlarging Shasta to maximum extent possible without major relocations and including features for conjunctive water management, anadromous fish habitat, and ecosystem restoration is recommended for further development. This plan is (1) consistent with goals of the CALFED ROD, (2) highly cost-efficient, and (3) addresses all SLWRI planning objectives.

- **WSR-1** – Increase Water Supply Reliability with Shasta Enlargement (6.5 feet).
- **WSR-2** – Increase Water Supply Reliability with Shasta Enlargement (18.5 feet).
- **WSR-4** – Increase Water Supply Reliability with Shasta Enlargement (18.5 feet) and Conjunctive Water Management.
- **CO-2** – Increase Anadromous Fish Habitat and Water Supply Reliability with Shasta Enlargement (18.5 feet).
- **CO-5** – Multipurpose with Shasta Enlargement (18.5 feet).

PROJECT MANAGEMENT AND PUBLIC INVOLVMENT

Overall management of the SLWRI is through a Study Management Team that primarily consists of senior management level representatives from Reclamation, the California Department of Water Resources (DWR), California Bay-Delta Authority, and, as the study progresses, other Federal and State agencies. Primary product delivery for the SLWRI feasibility study and report is managed through the Project Coordination Team, which consists of the Reclamation Project Manager and technical support specialists from participating agencies.

Two main outreach elements to assist in coordinating the study efforts have been established, including (1) technical work group communications and (2) public meetings, workshops, and briefings. A series of briefings for several SLWRI technical work groups, and a public workshop, were held in fall 2003 to discuss the study, its objectives, and resources management measures being considered to address the study objectives. A second public workshop was scheduled for summer 2004 to update stakeholders about the study and review the initial alternatives described in this report. Future public meetings will be held at important points in the investigation, including (1) initiation of the environmental scoping process, likely in spring 2005, (2) after development of a detailed set of alternative plans, and (3) after completion of the draft integrated feasibility report. Public input will be an important part of detailed alternative formulation and selection of a recommended plan.

FUTURE ACTIONS

The next major step in the feasibility study process is to further develop the initial alternatives into a set of detailed alternative plans for a feasibility report. The emphasis of upcoming studies will be on hydraulic and hydrologic system modeling, designs and cost estimates, and environmental impact evaluations and documentation. Major emphasis also will be placed on continued communication of study findings with other agencies, identified stakeholder groups, and involved groups and individuals.

DWR is the non-Federal sponsor for the SLWRI. However, participation by DWR and other State agencies in the study is restricted due to California Public Resources Code 5093.542(c). The Code states that except participation of DWR in studies involving the technical and economic feasibility of enlarging Shasta Dam, "...no department or agency of the state shall assist or cooperate with, whether by loan, grant, license, or otherwise, any agency of the federal,

state or local government in the planning or construction of any dam, reservoir, diversion, or impoundment facility that could have an adverse effect on the free-flowing condition of the McCloud River, or on its wild trout fishery.” However, for the SLWRI to move forward effectively, DWR and other elements within the state need to take an increasingly active role in future studies, which may require action by the state legislature. In addition, for each potential project purpose of the SLWRI, a non-Federal sponsor must be willing to share the cost of the purpose and, in the case of any ecosystem restoration features, operate and maintain completed project elements. An important factor in future study efforts will be active participation by the State in the study and identification of specific non-Federal sponsoring interests for the project purposes.

Based on completing a draft feasibility report, which will consist of an integrated Federal decision document and Environmental Impact Statement and Environmental Impact Reports in early 2007, it is estimated that the final feasibility report would be completed in mid-2007. With possible Congressional authorization later that year, detailed project design could be initiated in 2008 or 2009, followed by initiation of construction, acquisition of necessary permits, and minor relocations. The construction period would likely range from 4 to 6 years depending on the plan selected.