CALFED Surface Storage Investigations Progress Report

OVERVIEW

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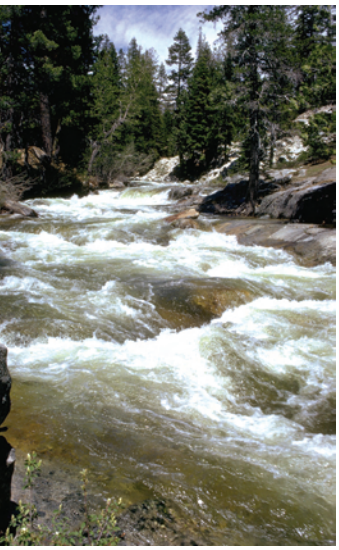
CALFED Surface Storage Investigations
Progress Report

OVERVIEW

November 2010



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This Progress Report Overview briefly summarizes the CALFED Bay-Delta Program (CALFED) Surface Storage Investigations Progress Report (Progress Report). The Progress Report in its entirety and other reference documents can be found on the accompanying CD and online at www.water.ca.gov/storage.

Background of the CALFED Surface Storage Investigations ..... Pages 1 & 2
The Department of Water Resources continues to participate in the study of four surface storage projects that could provide broad benefits, such as water supply, water quality, and ecosystem restoration benefits.

Water Management Challenges and Changing Conditions ..... Pages 3 & 4
The challenges to water management include climate change, declining ecosystems, drought and water supply reliability, water quality, flood risk, population growth, and uncertainties related to water management in the Sacramento-San Joaquin Delta.

North-of-the-Delta Offstream Storage Investigation .....Pages 5 through 7
The North-of-the-Delta Offstream Storage Investigation includes state and federal feasibility studies to formulate offstream surface storage opportunities in the Sacramento Valley.

Upper San Joaquin River Basin Storage Investigation ..... Pages 8 through 10
The Upper San Joaquin River Basin Storage Investigation includes state and federal feasibility studies to increase water storage in the upper San Joaquin River watershed.

Los Vaqueros Expansion Investigation ..... Pages 11 through 13
The Los Vaqueros Expansion Investigation includes local, state, and federal feasibility studies to increase storage in Los Vaqueros Reservoir.

Shasta Lake Water Resources Investigation ..... Pages 14 through 16
The Shasta Lake Water Resources Investigation includes federal feasibility studies, in consultation with the state, to increase water storage in Shasta Lake.

Potential Effects of New Delta Conveyance and Climate Change ..... Pages 17 & 18
Preliminary analysis was conducted for this Progress Report to show how potential new Delta conveyance and climate change may affect the surface storage projects

2009 Comprehensive Water Package and Bond ..... Pages 19 & 20
The 2009 Comprehensive Water Package and Bond will affect the surface storage feasibility studies and the implementation of potential storage projects in several ways.

Next Steps and Schedule ..... Pages 21 & 22
The feasibility studies have major milestones to complete, including new requirements stemming from the 2009 Comprehensive Water Package. Draft Feasibility Reports and environmental documentation are expected in late 2011.

Partnerships and Outreach ..... Page 23
The investigations will include extensive collaboration and outreach as the feasibility studies continue.

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Director's Message

The CALFED Bay-Delta Program (CALFED) surface storage investigations represent a new era in surface storage planning, where projects are conceived to support multiple objectives that combine ecosystem restoration and water quality improvements with more traditional purposes of water supply reliability, hydropower, and flood protection. These projects would include aquatic and riparian ecosystem restoration in the Delta and its tributaries, improved drinking and habitat water quality, and greater water supply reliability for California's growing population and diverse economy. Consistent with the 2009 Comprehensive Water Package, the storage project formulations presented in this Progress Report would provide significant public benefits, including ecosystem restoration, water quality, flood protection, emergency response, and recreation.

Our existing water resources infrastructure is strained to meet competing demands and existing objectives for water supply, flood protection, environmental protection, water quality, hydropower, and recreation. The California Water Plan Update 2009 presents 27 resource management strategies and a blueprint for sustainable and integrated water management, while recognizing that the management of water is characterized by uncertainty and vulnerability due to climate change and changing ecosystem needs. The resource management strategies include implementation of the CALFED surface storage investigations to increase water storage statewide as a means to improve ecosystems, increase water supply reliability, provide hydropower generation and recreation opportunities, and prepare for future droughts, floods, and climate change. Further, the Delta Vision Blue Ribbon Task Force and the 2009 Comprehensive Water Package legislation both recognized the value and need for additional storage along with improved conveyance for sustainable management of the Sacramento-San Joaquin Delta (Delta) through the co-equal goals of restoring the Delta ecosystem and creating a more reliable water supply for California.

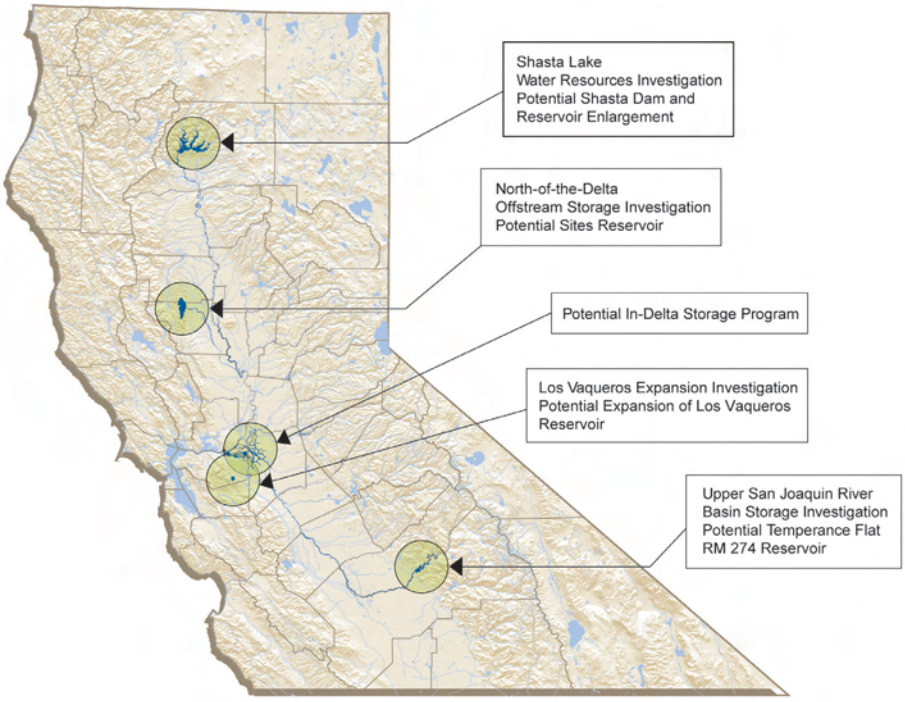
Since the release of previous surface storage investigation planning documents, the planning, biological, and regulatory conditions have changed significantly, including updated Biological Opinions for delta smelt and salmon, Delta pumping constraints, new water legislation, Bay-Delta Conservation Plan and Delta Habitat Conservation and Conveyance planning, and climate change effects. The investigations have been adapting to these changes and integrating new information into the feasibility studies and environmental review. The plan is to complete the draft Feasibility Reports and environmental compliance documentation in late 2011. In the meantime, this Progress Report is an update on how surface storage could be configured and operated under various future conditions and illustrates how potential projects would provide flexibility to achieve water management objectives in an uncertain future.

Mark W. Cowin
Director, Department of Water Resources

Background of the CALFED Surface Storage Investigations

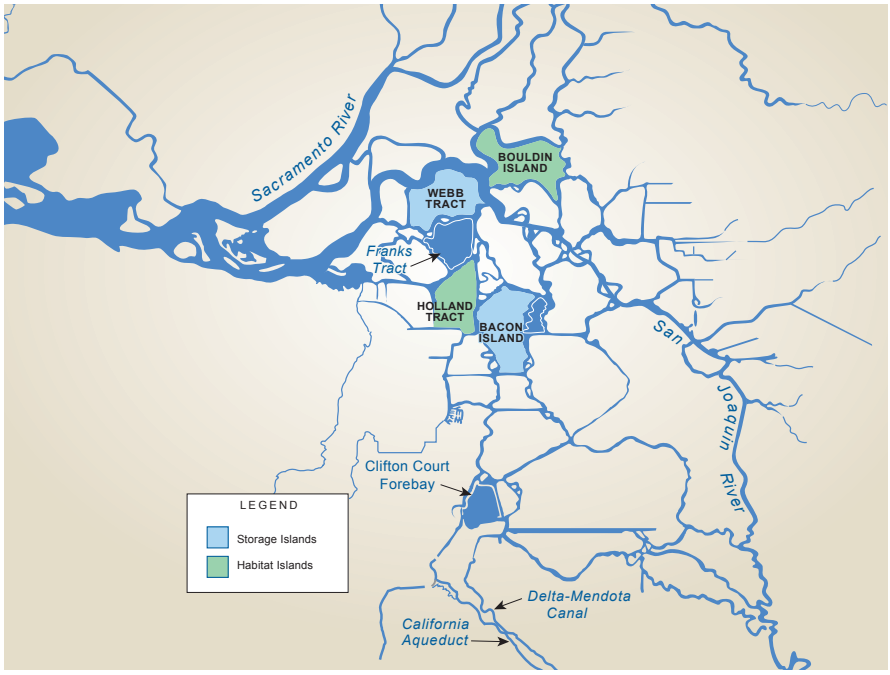
This Progress Report presents an overview of the status and new analyses conducted for the CALFED Bay-Delta Program (CALFED) surface storage investigations. CALFED identified five potential surface storage studies in the CALFED Preferred Program Alternative for consideration during Phase 1 of CALFED implementation the: North-of-the-Delta Offstream Storage (NODOS) Investigation, Upper San Joaquin River Basin Storage Investigation (USJRBSI), Los Vaqueros Expansion (LVE) Investigation, Shasta Lake Water Resources Investigation (SLWRI), and In-Delta Storage Program. CALFED surface storage investigations are being carried out by the California Department of Water Resources (DWR), the U.S. Department of the Interior Bureau of Reclamation (Reclamation), Contra Costa Water District (CCWD), and other local water interests. The general locations of the initial alternatives considered by the investigations are illustrated in Figure 1. DWR's participation in the In-Delta Storage Program (Figure 2) was suspended in July 2006 when state funding for the program ended. DWR's participation in the SLWRI is limited due to California Public Resources Code 5093.542 and state funding for the program ended in 2005.

Figure 1. Location of Potential Surface Storage Projects



Since the release of the most recent study documents, existing and likely future conditions in each investigation's study area and throughout the state have changed. There are significantly greater water management challenges and opportunities in California now than when these feasibility studies were initiated. These water management challenges include declining ecosystems and water quality, greater impacts of droughts and floods, pumping constraints in the Sacramento-San Joaquin Delta (Delta), climate change impacts and adaptation strategies, and sea level rise estimates, and current programs to help address these issues. Programs to help address these challenges include the 2009 Comprehensive Water Package legislation,

Figure 2. In-Delta Storage Program. Delta Wetlands Properties and Semitropic Water Storage District continue the study of in-Delta storage using private funding. The proposed project includes two storage islands and two habitat islands.



2008/2009 Biological Opinions (BO) for delta smelt and salmon, Bay-Delta Conservation Plan (BDCP), and Delta Habitat Conservation and Conveyance Program (DHCCP).

New water management challenges and opportunities are being considered and incorporated into the surface storage investigations. DWR prepared this Progress Report to summarize for the newly appointed California Water Commission, the public, and project stakeholders how the surface storage investigations are being modified to adapt to these new conditions.

The plan is to complete, by late 2011, the public review drafts of the Feasibility Reports and draft National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA)-compliant Environmental Impact Statements (EIS)/Environmental Impact Reports (EIR) for the investigations.

In the meantime, this Progress Report serves as an update for the investigations. For the report, new analysis was conducted on how potential projects could be operated and benefits achieved under the operations criteria recommended by the 2008/2009 BOs. Preliminary analysis was also conducted on how the benefits of potential projects could be affected by climate change and Delta conveyance measures being considered by the BDCP/DHCCP. *New analyses conducted for the report are for illustrative purposes only; more comprehensive analyses will be conducted for the draft Feasibility Reports and EIS/EIRs to determine preferred alternatives for each investigation.*

Characterization of Potential Benefits Provided by Surface Storage Projects

The CALFED surface storage projects are being configured to provide the following types of benefits:

- *Ecosystem improvements /restoration*
- *Environmental water quality improvements*
- *Flood control*
- *Emergency response*
- *Recreational purposes*
- *Water supply and water supply reliability*
- *Municipal and industrial water quality improvements*
- *Hydropower generation*
- *Flexible generation*

The benefits presented in this Progress Report are those attributed to the potential surface storage projects. Future programs, projects, and operations—such as new Delta conveyance—may affect these benefits.

Water Management Challenges and Changing Conditions

California faces a number of unprecedented water resources management challenges. Drought impacts have been intensified by reduced water supplies and a growing population. Fish populations (Figure 3), ecosystems, and water quality continue to decline, particularly in the Delta and its tributaries. The Delta is in crisis and as the hub of California's water delivery system, the Delta faces many challenges. Water deliveries from the Delta have been reduced because of court decisions and new regulations designed to protect critical species and habitat; therefore, there is uncertainty about how water will be conveyed through the Delta and how the Delta of the future will look. North to south water conveyance through the Delta relies on Delta levees remaining intact. One or more Delta levee failures—made more likely under a sea level rise scenario—with the existing method of Delta conveyance could severely impact water deliveries.

Further, climate change is altering precipitation patterns, reducing snowpack (Figure 4), causing sea level rise, and increasing the potential for both long drought periods and floods (i.e., more variable precipitation). As a result, the statewide water management system needs to be reevaluated in light of climate change.

Finally, the current system is aging—the State Water Project (SWP) is more than 35 years old, the federal Central Valley Project (CVP) is more than 50 years old, and some locally-managed inter-regional projects are 75-100 years old. These facilities were designed when the human population was considerably smaller and before current environmental laws. Upgrades are needed today to serve a larger and more diverse group of users and uses.

Figure 3. Fish Trends Depicting Delta Pelagic Organism Decline, 1967-2005 (Natural Resources Agency, 2007)

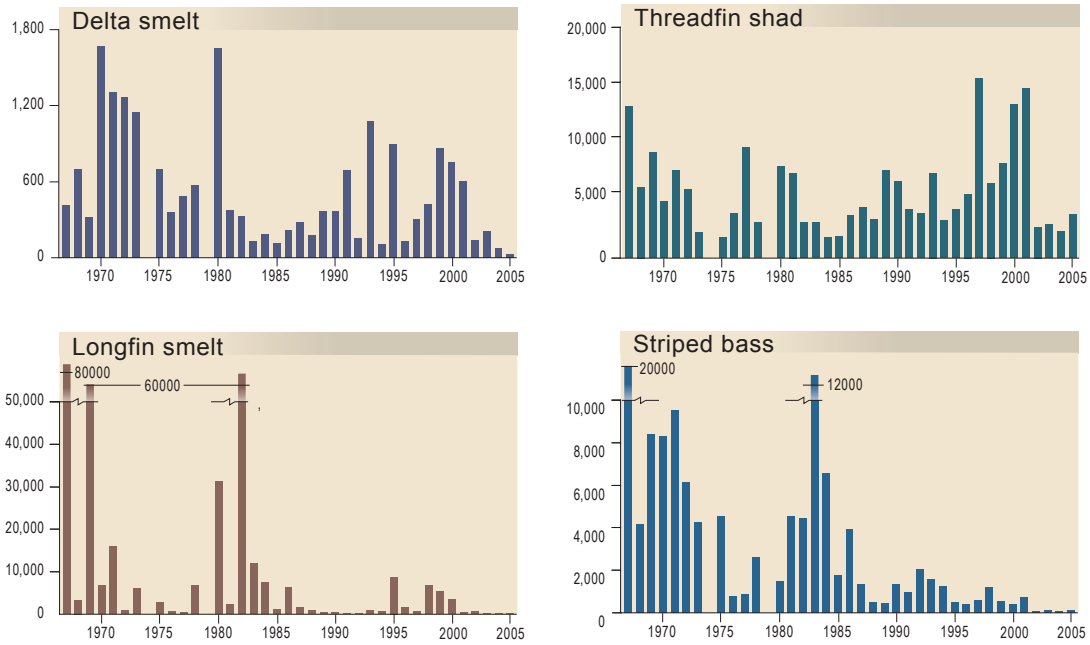
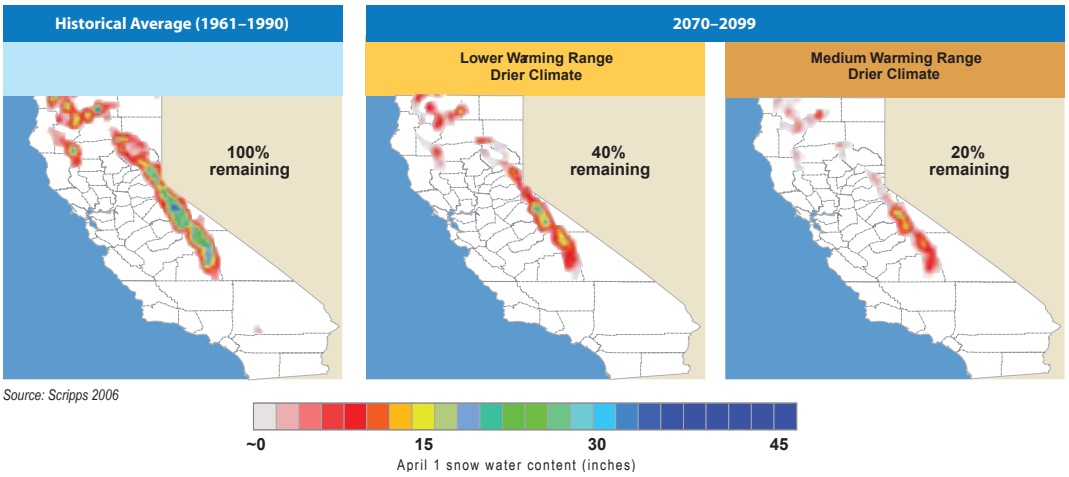


Figure 4. Decreasing California Snowpack (Scripps, 2006)



Source: Scripps 2006

For more than 50 years, Californians have been able to meet water demands primarily through an extensive network of water storage and conveyance facilities, groundwater development, and, more recently, by improving water use efficiency and conservation practices (DWR, 2009). California's local, state, federal, and regional water projects work together to meet the needs for the quantity, quality, timing, and location of water uses. California's climate and hydrology make storage of water essential because precipitation and water use are unevenly distributed, geographically and temporally. Surface storage reservoirs play a critical role in helping meet the multiple needs of municipal and industrial (M&I), agricultural, and environmental uses in different geographical regions when water is needed.

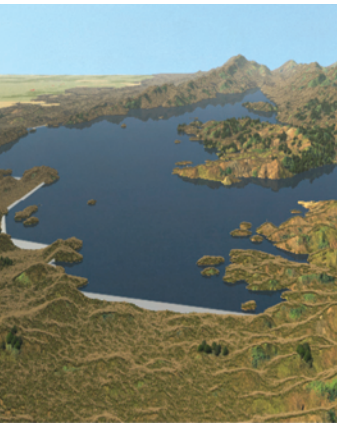
Management of California's water resources has reached a critical point. Our existing water resources infrastructure is strained to meet competing demands and existing objectives for water supply, environmental protection, water quality, flood protection, hydropower, and recreation. The strains on the system will only increase with a changing climate, and conflicts between competing interests will be even greater as ecosystems are further strained and supplies become less reliable.

The Delta Vision Blue Ribbon Task Force, CALFED, 2009 Comprehensive Water Package legislation, Delta Stewardship Council, and California Water Commission recognize the value and need for additional storage and improved conveyance in the context of our strained water system. The California Water Plan Update 2009 draws a similar conclusion. Active CALFED surface storage investigations are evaluating opportunities to help meet water management objectives related to droughts, floods, and climate change, and improve aquatic and riparian ecosystems, water quality, hydropower and flexible generation, and recreation.

Unique ways reservoir storage can contribute to addressing statewide and regional water management challenges and provide operational flexibility to meet needs for people and the environment:

- *Managing the timing of water supply and water use (seasonally and year-to-year to meet drought needs)*
- *Managing environmental water flows, timing, and temperature in river systems*
- *Managing the quality of water for different purposes, including temperature*
- *Promoting conjunctive use of surface water and groundwater*
- *Providing emergency water supply*
- *Collecting flood flows to protect resources from damage*
- *Providing flexible generation, which can quickly ramp up or down to shape wind and solar generation to meet electrical demands and allow for reliable operation of the grid*
- *Adapting to loss of snowpack storage*
- *Enhancing regional self sufficiency*

North-of-the-Delta Offstream Storage Investigation



State, federal, and local partners are evaluating the feasibility of offsteam storage north-of-the-Delta in the northern Sacramento Valley to improve water supply and water supply reliability, increase the survival of anadromous fish and other aquatic species, improve Delta water quality, and provide flexible generation benefits to integrate renewable energy generation into the electric grid.

While several alternatives are under study, an example 1.8 million acre-feet Sites Reservoir project formulation was analyzed for the purposes of this Progress Report that provides a broad range of potential benefits. The project features and inundation area are shown in Figure 5. The estimated capital cost is $3.62 billion (in 2007 dollars; Reclamation, 2008a).

Benefits could be accomplished by the example Sites Reservoir project formulation directly by releases from the new reservoir and indirectly by providing significant system flexibility such that other reservoir operations can be modified. Benefits achieved by the example Sites Reservoir project formulation would include public benefits, as defined by the 2009 Comprehensive Water Package (see pages 19 and 20), and non-public benefits, including water supply and water supply reliability, M&I water quality, and flexible generation to integrate renewable power. Potential benefits provided by the Sites Reservoir project are illustrated in Figure 6.

Figure 5. Sites Reservoir Inundation Area and Project Features

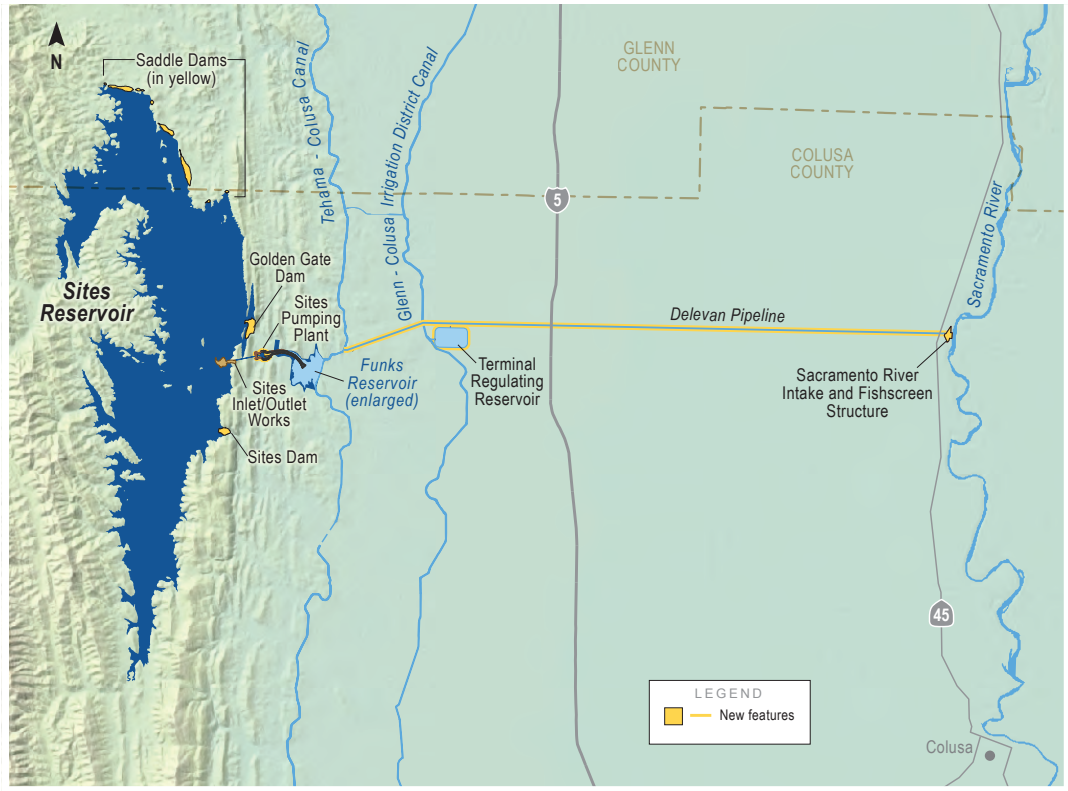
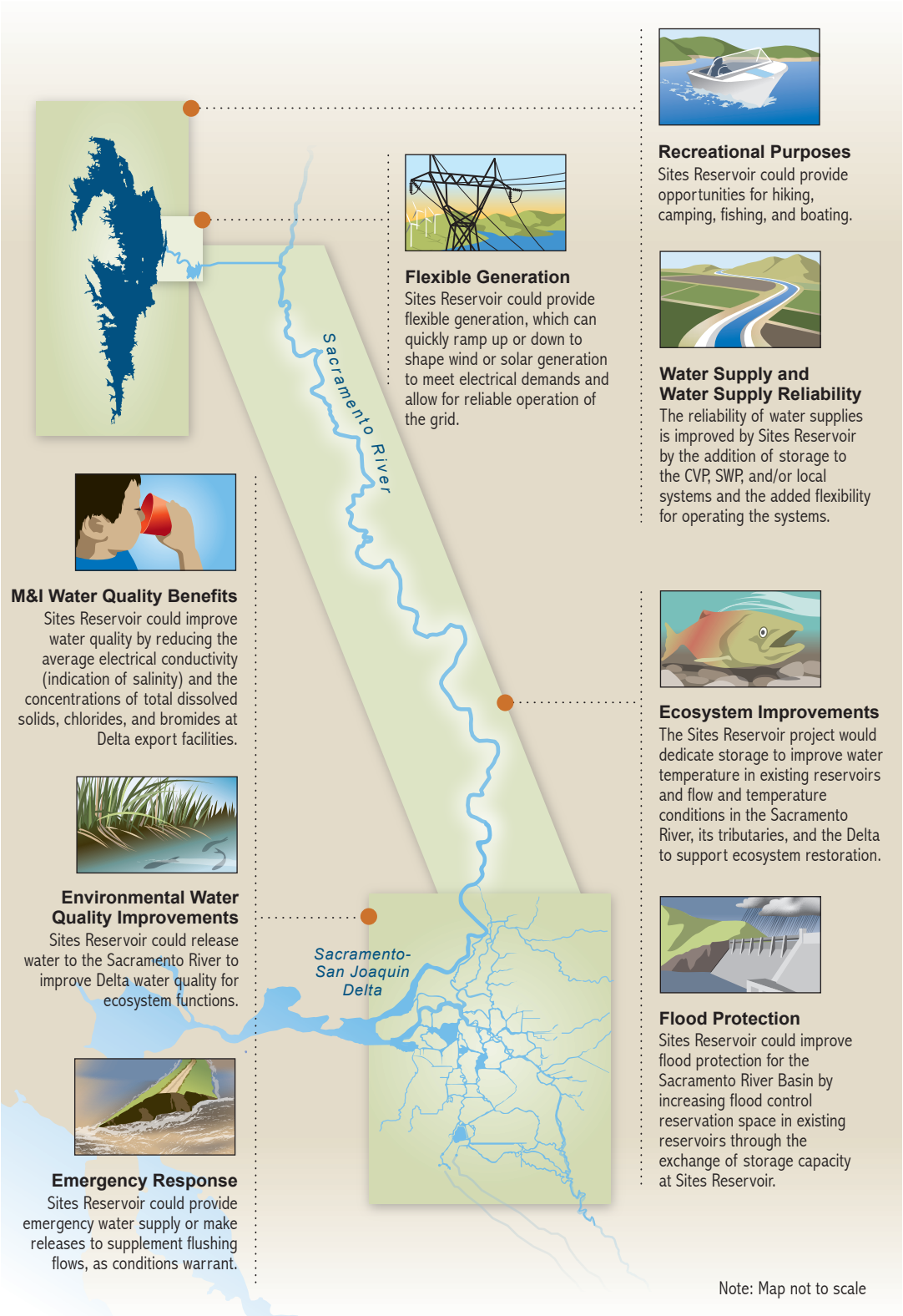


Figure 6. Summary of Potential Benefits of the Example Sites Reservoir Project



NODOS Planning Objectives

Primary Objectives

- ***Increase water supplies*** *to meet existing contract requirements, including improved water supply reliability, and provide greater flexibility in water management for agricultural, environmental, and M&I users*
- ***Increase the survival of anadromous fish populations*** *in the Sacramento River, as well as the survivability of other aquatic species*
- ***Improve drinking water quality*** *in the Delta*

Secondary Objectives

- *Potentially* ***provide flexible generation benefits*** *to facilitate reliable operation of statewide power grid with an ever increasing percent of wind and solar generation*
- ***Develop additional recreational opportunities*** *in the project area*
- ***Create incremental flood-damage reduction opportunities*** *in support of major Northern California flood-control reservoirs*

Box 1
Definitions:

Long-Term:
the average quantity for the period of Oct. 1922 - Sept. 2003.

Driest Periods:
the average quantity for the combination of periods May 1928 - Oct. 1934, Oct. 1975 - Sept. 1977, and Jun. 1986 - Sept. 1992.

The example Sites Reservoir project formulation has the potential to benefit anadromous fish and other aquatic species by the following:

- Increasing flows for anadromous fish migration and providing cooler water for fish habitat through integrated operations with Shasta Dam
- Reducing Sacramento River diversions at the Glenn-Colusa Irrigation District Canal and the Tehama-Colusa Canal
- Providing supplemental flows to the Yolo Bypass to sustain habitat for fish
- Reclaiming inactive gravel mining sites along the Sacramento River near the primary study area to create valuable aquatic and floodplain habitat
- Replenishing gravel suitable for spawning in the Sacramento River
- Improving instream aquatic habitat favorable for spawning
- Improving adjacent shoreline habitat

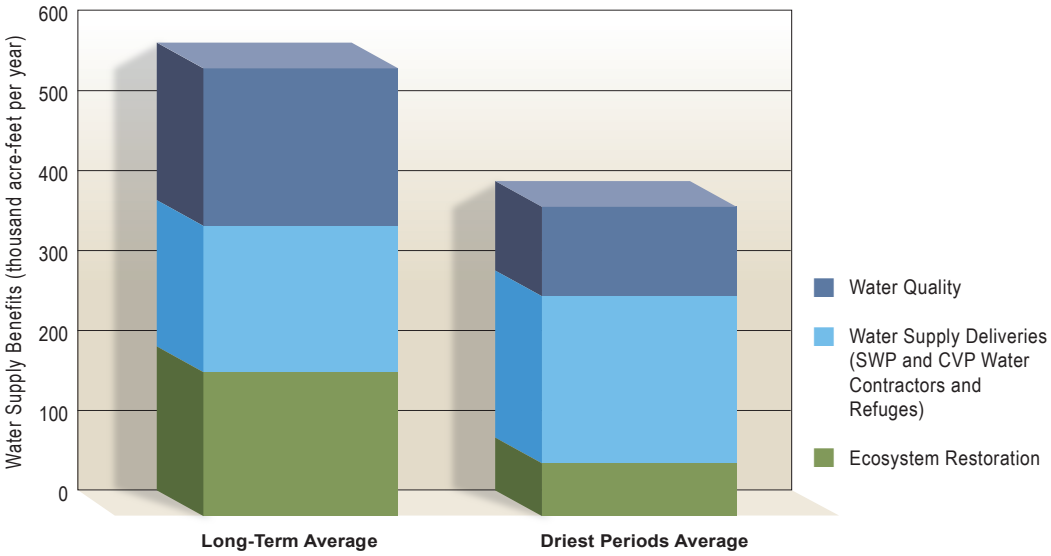
For illustrative purposes, modeling was conducted for the example Sites Reservoir project formulation. Water supply benefits for the example project formulation are summarized in Table 1 and illustrated in Figure 7. Ecosystem restoration benefits are reported as the change in releases to Delta outflow that occur as a result of ecosystem restoration actions.

Table 1. Summary of Potential Water Supply Benefits (Yield) of the Example Sites Reservoir Project Formulation

Potential Beneficiary	Delivered Water Benefits (TAF/year)	
	Long-Term Average[1]	Driest Periods Average[1]
Ecosystem Restoration	180	66
Water Supply Deliveries (SWP and CVP Water Contractors and Refuges)	183	209
Water Quality	197	112
Total	**560**	**387**

TAF = thousand acre-feet Notes: 1. See Box 1 (at left) for definition

Figure 7. Summary of Potential Long-Term Average and Driest Periods Water Supply Benefits of the Example Sites Reservoir Project



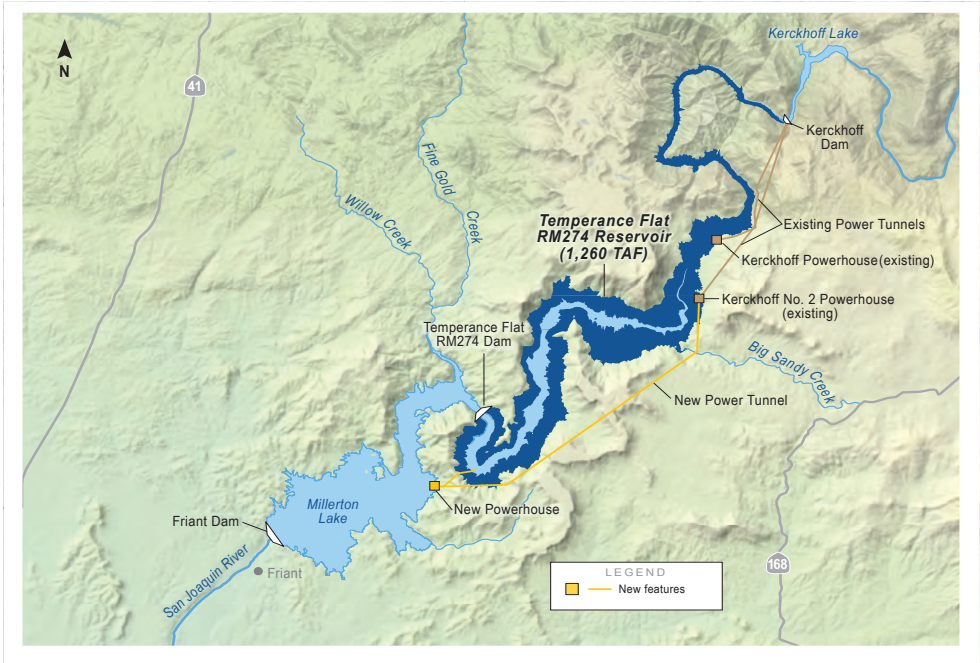
Upper San Joaquin River Basin Storage Investigation

Federal, state, and local water interests are studying potential storage projects in the upper San Joaquin River watershed to expand water storage capacity; improve water supply reliability and operational flexibility of the water management system for agricultural, urban, and environmental uses; and enhance San Joaquin River water temperature and flow conditions to support anadromous fish restoration efforts.

Based on the planning objectives, coordination among the study team members, and review of comments received during the public scoping process, initial alternatives were developed and evaluated in multiple stages, as detailed in the Initial Alternatives Information Report (IAIR) (Reclamation, 2005a) and Plan Formulation Report (PFR) (Reclamation, 2008b). For the purposes of this Progress Report, an example Temperance Flat Reservoir project formulation at river mile (RM) 274 was analyzed that would provide up to 1,260 thousand acre-feet (TAF) of additional storage. Major project features of the example project formulation are illustrated in Figure 8. As formulated in the PFR, the estimated capital cost is approximately $3.36 billion dollars (in 2006 dollars; Reclamation, 2008b).

Temperance Flat Reservoir could be operated under a variety of scenarios to provide potential benefits for a range of different purposes. Benefits could be accomplished by the example Temperance Flat Reservoir project formulation through direct releases from the new reservoir and Millerton Lake to the San Joaquin River to improve river conditions and through operations integration with the SWP and CVP. Potential benefits provided by the example Temperance Flat Reservoir project are illustrated in Figure 9.

Figure 8. Temperance Flat Reservoir Inundation Area and Major Project Features



USJRBSI Planning Objectives

Primary Objectives

- ***Increase water supply reliability and system operational flexibility*** *for agricultural, M&I, and environmental purposes in the Friant Division, other San Joaquin Valley areas, and other regions*
- ***Enhance water temperature and flow conditions in the San Joaquin River*** *from Friant Dam to the Merced River in support of restoring and maintaining naturally reproducing and self-sustaining anadromous fish*

Secondary Objectives

- ***Improve San Joaquin River water quality***
- ***Improve the quality of water supplies*** *delivered to urban areas*
- ***Improve management of flood flows*** *at Friant Dam*
- ***Provide flexible generation*** *allowing for the integration of renewable generation into the electric grid, preservation of energy generation, and improved energy management*
- ***Preserve and increase recreation opportunities*** *in the study area*

Figure 9. Summary of Potential Benefits of the Example Temperance Flat Reservoir Project

Note: Map not to scale

Benefits achieved by the example Temperance Flat Reservoir project formulation can be characterized as public benefits, as defined by the 2009 Comprehensive Water Package (see pages 19 and 20), and non-public benefits, including water supply and water supply reliability, M&I water quality, and flexible generation.

Water supplies developed with the example formulation of Temperance Flat Reservoir could be used for a variety of purposes; the amount of water supply to be provided for each purpose has not yet been determined. For this report, the operations of Temperance Flat Reservoir were analyzed with a water supply focus. These benefits and their distribution will be further evaluated in the Feasibility Report. Water supply benefits for the example project formulation are summarized in Table 3 and illustrated in Figure 10.

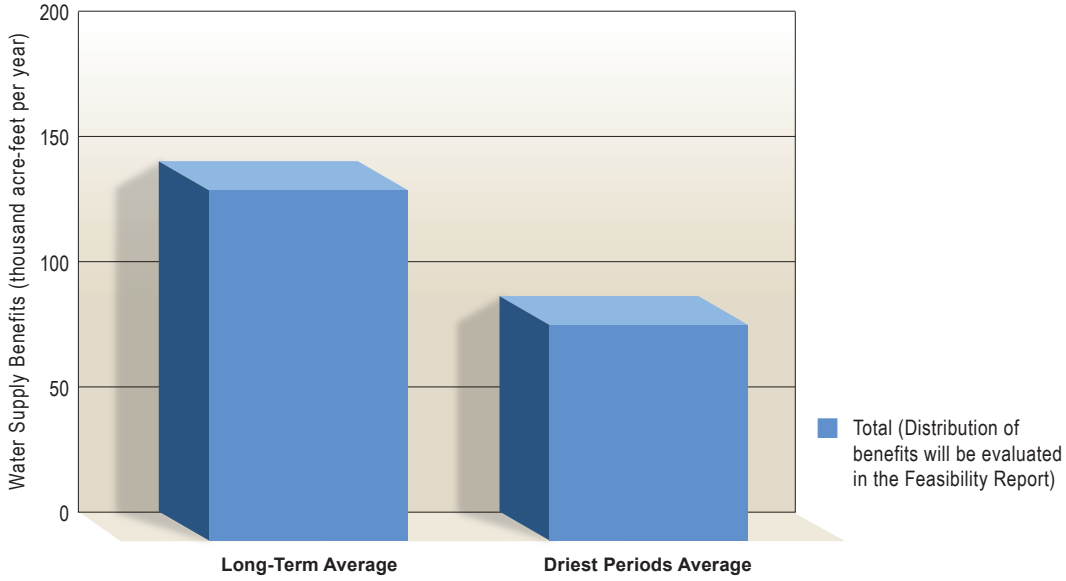
Table 3. Summary of Potential Water Supply Benefits (Yield) of the Example Temperance Flat Reservoir Project Formulation

Potential Beneficiary	Delivered Water Benefits (TAF/year)	
	Long-Term Average[1]	Driest Periods Average[1]
Ecosystem Restoration	Amount TBD[2]	Amount TBD[2]
Water Supply Deliveries (SWP and CVP Water Contractors)	Amount TBD[2]	Amount TBD[2]
Water Quality	Amount TBD[2]	Amount TBD[2]
Total	140	86

TAF = thousand acre-feet TBD = to be determined as part of project formulation

Notes: 1. See Box 1 on page 7 for definition
2. Water supplies developed could be used for a variety of purposes. For this report, the operations of the reservoir were analyzed with a water supply focus.

Figure 10. Summary of Potential Long-Term Average and Driest Periods Water Supply Benefits of the Example Temperance Flat Reservoir Project



Los Vaqueros Expansion Investigation

The LVE Investigation is studying opportunities to expand Los Vaqueros Reservoir to provide environmental benefits for the Delta and improve water supply reliability and water quality for San Francisco Bay Area water users. An expansion of Los Vaqueros Reservoir has been thoroughly studied for many years. These analyses are described in detail in the IAIR (Reclamation, 2005b) and the Final EIS/EIR (Reclamation and CCWD, 2010).

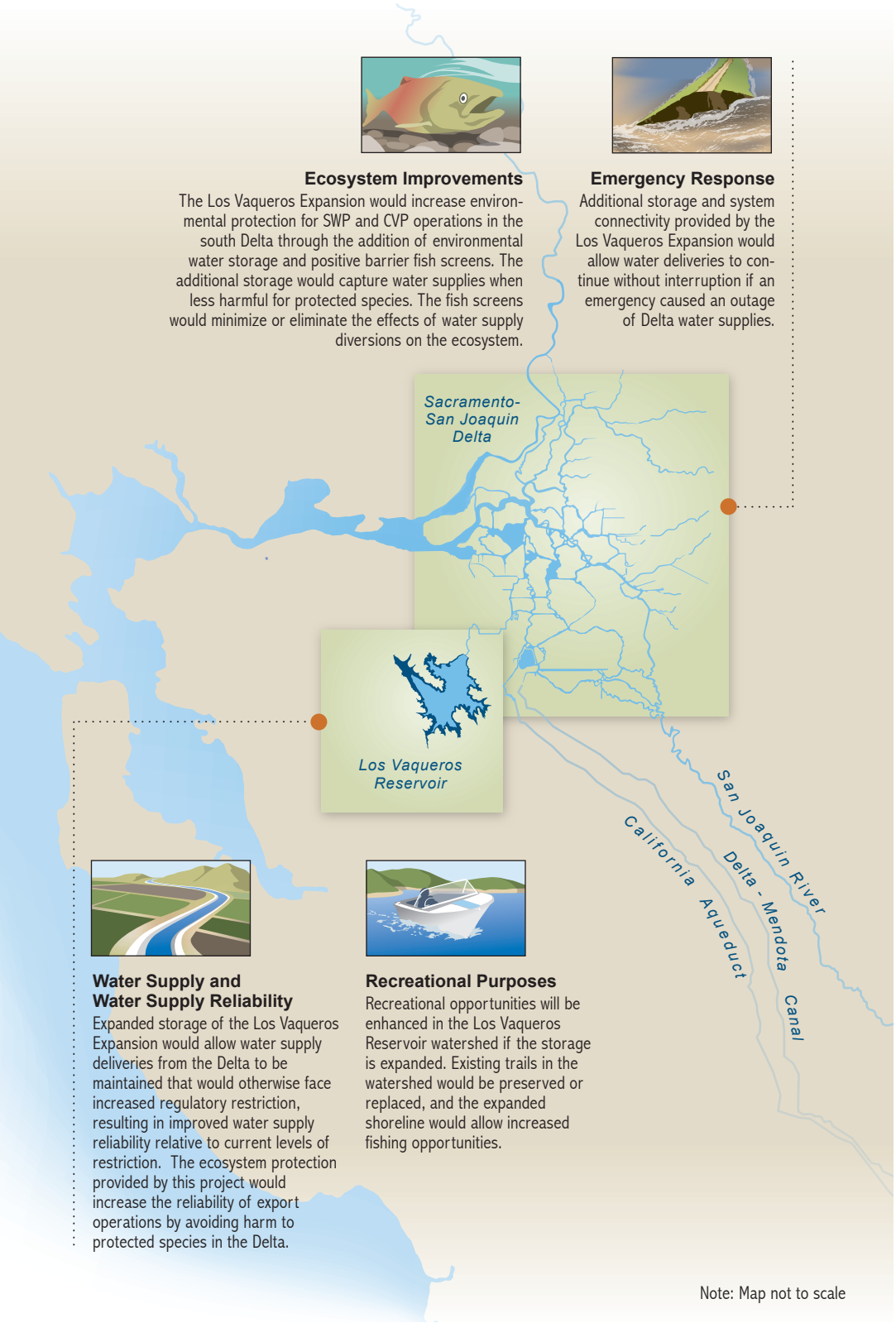
The CCWD Board certified the Final EIR and approved Alternative 4 (expansion to 160 TAF) on March 31, 2010. CCWD is moving forward with design and construction of the 160 TAF expansion in the near term; construction is scheduled to begin in 2011. With additional funding, local, state, and federal partners may choose to continue to study the feasibility of a 275 TAF (total) alternative in the context of other Delta initiatives to improve Delta conveyance and better protect Delta fisheries, including long-term programs being explored in the BDCP.

For the purposes of this Progress Report, an example project formulation, expansion of Los Vaqueros Reservoir from 160 TAF to 275 TAF was analyzed. Total capital cost for a similar project formulation (expansion from current 100 TAF to 275 TAF) is $985 million (in 2008 dollars; Reclamation and CCWD, 2010). Figure 11 illustrates the inundation area and major project features of the example project formulation.

Benefits achieved by the example enlarged Los Vaqueros Reservoir can be characterized as public benefits, as defined by the 2009 Comprehensive Water Package (see pages 19 and 20), and non-public benefits, including water supply and water supply reliability and M&I water quality. Potential benefits provided by the project are illustrated in Figure 12.

Figure 11. 275 TAF Los Vaqueros Expansion Inundation Area and Project Features

Figure 12. Summary of Potential Benefits of the Example 275 TAF Los Vaqueros Expansion Investigation



LVE Planning Objectives

Primary Objectives

- ***Develop water supplies for environmental water management*** *that support fish protection, habitat management, and other environmental water needs*
- ***Increase water supply reliability for water providers within the San Francisco Bay Area****, to help meet M&I water demands during drought periods and emergencies or to address shortages due to regulatory and environmental restrictions*

Secondary Objective

- ***Improve the quality of water deliveries to M&I customers in the San Francisco Bay Area,*** *without impairing the project's ability to meet the environmental and water supply reliability objectives stated above*

The increased storage and positive barrier fish screens of the Los Vaqueros Expansion Investigation could be used to create simultaneous improvements for the Delta ecosystem and Delta water supply reliability. The improved fish screens can be used to minimize take of endangered species in the south Delta without reducing water supply deliveries. Available water supply in the Delta can be safely diverted to storage in Los Vaqueros Reservoir, and then delivered to CVP and SWP contractors in the San Francisco Bay Area when the water supply is needed, resulting in improved water supply reliability. Water supply benefits for the example project formulation are summarized in Table 5 and illustrated in Figure 13.

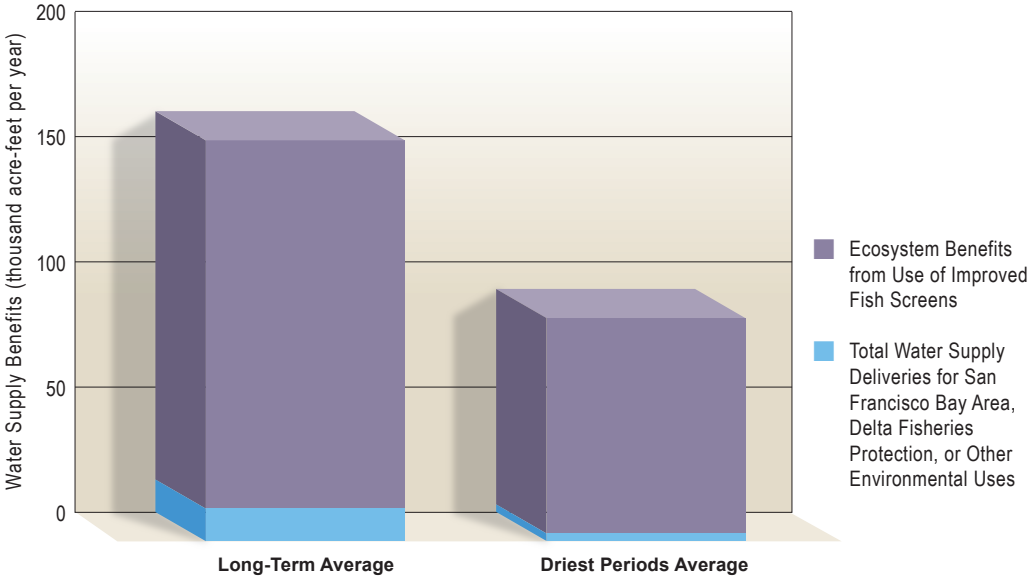
Table 5. Summary of Potential Water Supply Benefits of the Example Expanded Los Vaqueros Project Formulation

Potential Beneficiary	Delivered Water Benefits (TAF/year)	
	Long-Term Average[1]	Driest Periods Average[1]
Total Water Supply Deliveries	13	3
Ecosystem Benefits[2]	147	86

TAF = thousand acre-feet

Notes: 1. See Box 1 on page 7 for definition
2. These water deliveries through improved fish screens would be made in lieu of diversions at the CVP and SWP export facilities.

Figure 13. Summary of Potential Long-Term Average and Driest Periods Water Supply Benefits of the Example Expanded Los Vaqueros Reservoir



Shasta Lake Water Resources Investigation

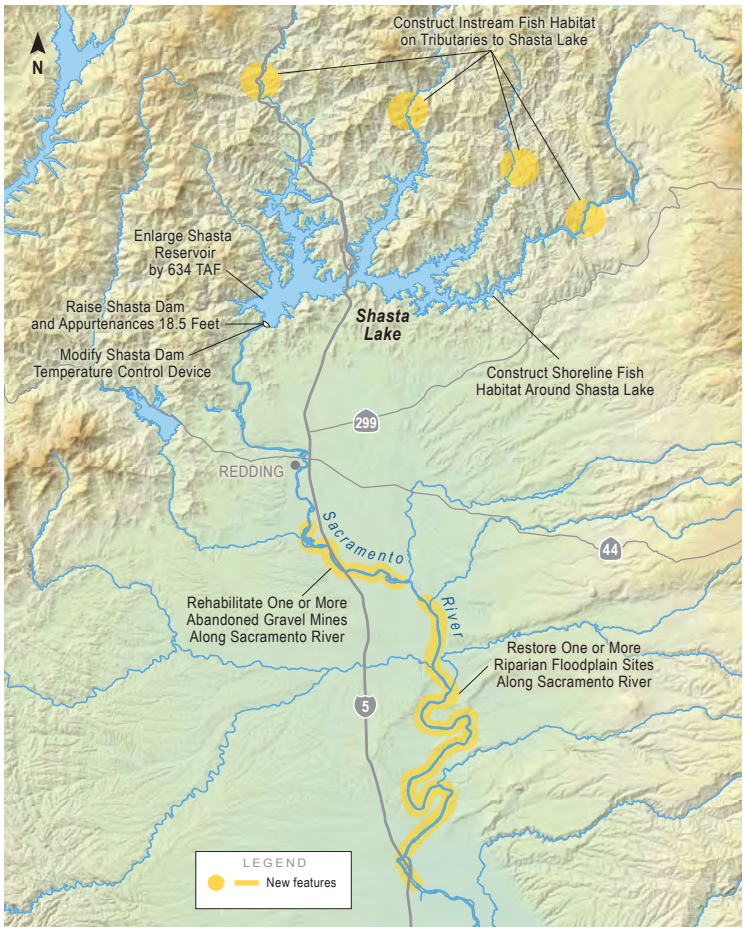
The SLWRI includes studies of the feasibility of enlarging the existing Shasta Dam and Lake, located on the upper Sacramento River near the city of Redding. Reclamation is leading the investigation in consultation with DWR and local water interests and stakeholders.

Based on the planning objectives, coordination among the study team members, and review of comments received during the public scoping process, a No-Action Alternative and five alternatives are under study, including 6.5, 12.5, and 18.5-foot raises of Shasta Dam.

For the purpose of this Progress Report, an example 18.5-foot Shasta Dam raise project formulation was analyzed that increases the capacity of the reservoir by 634 TAF and focuses on a broad range of potential benefits. Total capital cost for the example project formulation is approximately $942 million (in 2006 dollars; Reclamation, 2007).

Figure 14 illustrates the major project features of the example 18.5-foot Shasta Dam raise alternative project formulation. Potential benefits provided by the project are illustrated in Figure 15.

Figure 14. 18.5-foot Shasta Dam Raise Alternative Project Features



SLWRI Planning Objectives

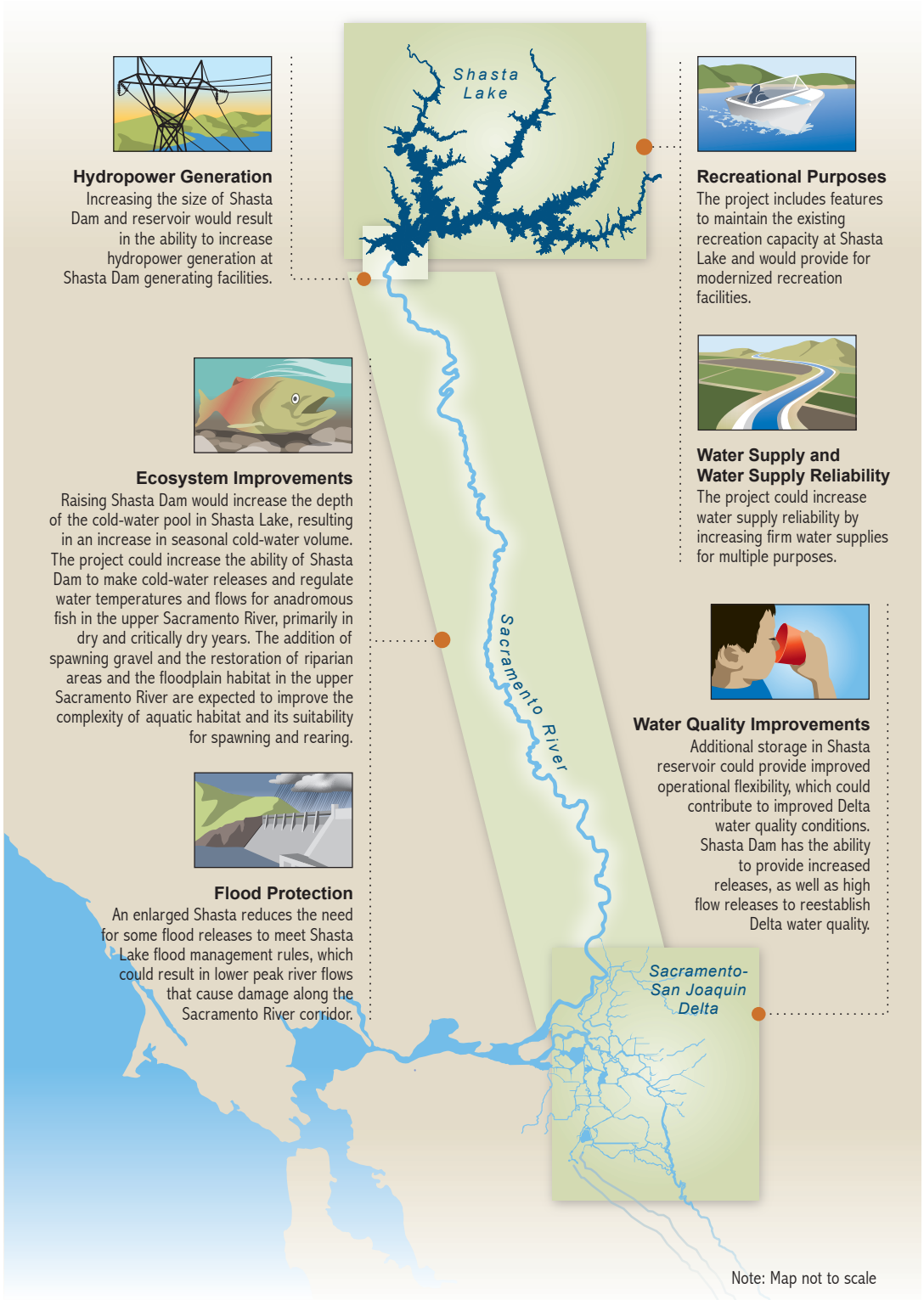
Primary Objectives

- ***Increase the survival of anadromous fish populations*** *in the Sacramento River, primarily upstream from the Red Bluff Diversion Dam*
- ***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

- ***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*
- ***Preserve and increase recreation*** *opportunities at Shasta Lake*
- ***Preserve and improve water quality*** *conditions in the Sacramento River downstream of Shasta Dam and the Delta*

Figure 15. Summary of Potential Benefits of the Example 18.5-foot Shasta Dam Raise



Potential benefits achieved by the example enlarged Shasta Reservoir can be characterized as public benefits, as defined by the 2009 Comprehensive Water Package (see pages 19 and 20), and non-public benefits, including water supply and water supply reliability, and hydropower generation.

For illustrative purposes, water supply modeling was conducted for the example 18.5-foot Shasta Dam Raise alternative project formulation. These benefits and their distribution will be further evaluated in the Draft Feasibility Report. Water supply benefits for the example project formulation are summarized in Table 7 and illustrated in Figure 16.

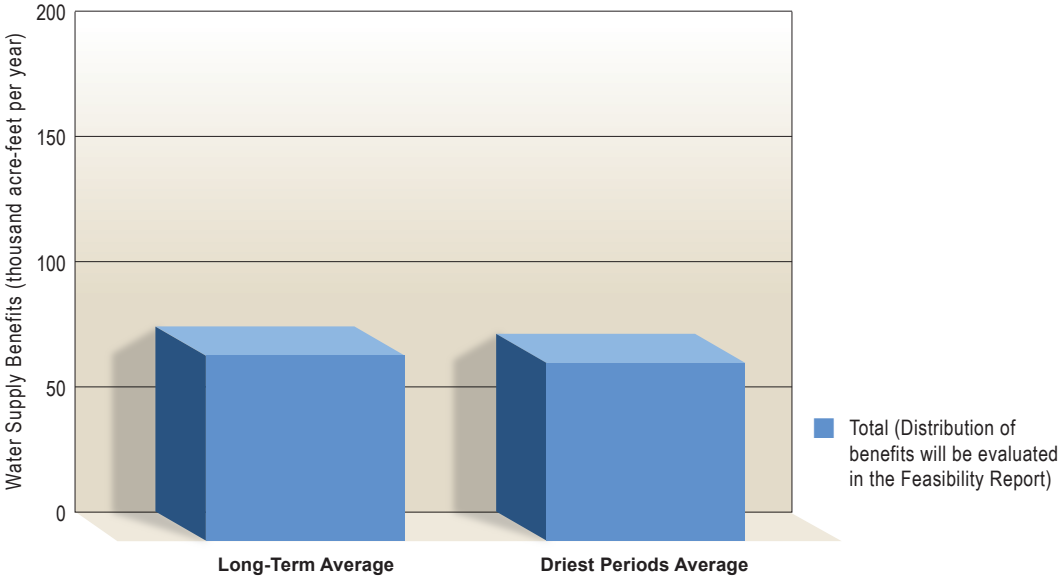
Table 7. Summary of Potential Water Supply Benefits (Yield) of the Example Shasta Dam Raise Alternative Project Formulation

Potential Beneficiary	Delivered Water Benefits (TAF/year)	
	Long-Term Average[1]	Driest Periods Average[1]
Ecosystem Restoration	Proportion TBD[2]	Proportion TBD[2]
Water Supply Deliveries (SWP and CVP Water Contractors)	Proportion TBD[2]	Proportion TBD[2]
Water Quality	Proportion TBD[2]	Proportion TBD[2]
Total	74	71

TAF = thousand acre feet TBD = to be determined as part of project formulation

Notes: 1. See Box 1 on page 7 for definition
2. Water supplies developed could be used for a variety of purposes. For this report modeling convenience, the operations of the reservoir were analyzed with a water supply focus.

Figure 16. Summary of Potential Long-Term Average and Driest Periods Water Supply Benefits of the Example Shasta Dam Raise Project



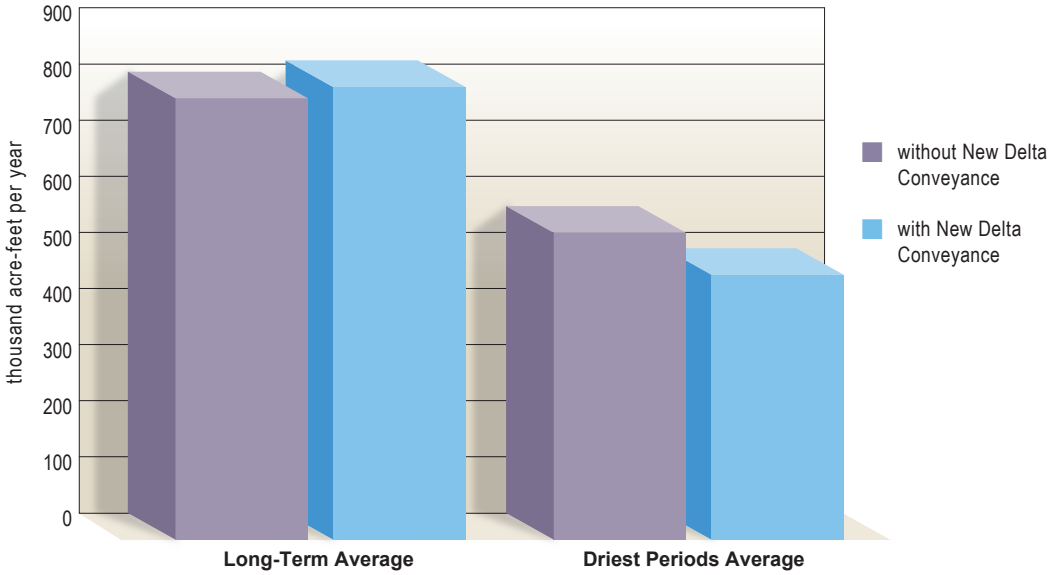
Potential Effects of New Delta Conveyance & Climate Change on the CALFED Surface Storage Projects

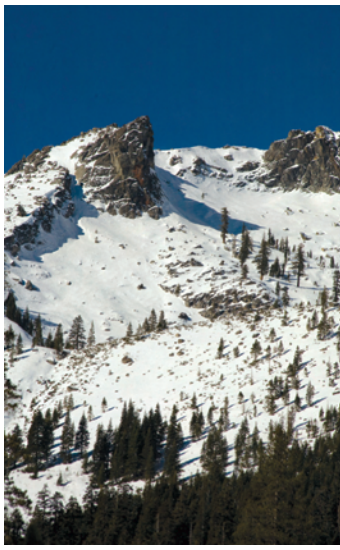
Although future Delta and climate conditions are uncertain, water resources managers, planners, and decision makers need to consider potential future water system operations and conditions with and without new surface water storage projects. Preliminary modeling was conducted for this Progress Report to show how potential new Delta conveyance may affect the surface storage projects. This Progress Report also includes a qualitative discussion on how climate change may impact surface storage projects' abilities to achieve project objectives.

Potential New Delta Conveyance Effects

With potential new Delta conveyance, the planning objectives, design and refinement of alternatives, and operations of the existing and potential surface storage projects would likely be adjusted. For example, potential surface storage projects may not need to be operated to improve water quality for Delta exports because it is assumed that new Delta conveyance operations would provide substantial water quality benefits. For the most part, the surface storage projects could provide the same types of benefits described in the previous sections, but to varying degrees with or without new Delta conveyance. Typically, new Delta conveyance enhances project water supply benefits due to the increased ability to move water supply through the Delta, resulting in improved flexibility for exchange operations with the CVP and SWP systems. Figure 17 illustrates the potential combined water supply yield from all four CALFED surface storage projects operated with and without an assumed new Delta conveyance.

Figure 17. Potential Long-Term and Driest Periods Average Water Supply Yield from the CALFED Surface Storage Projects when Operated with and without Assumed New Delta Conveyance.





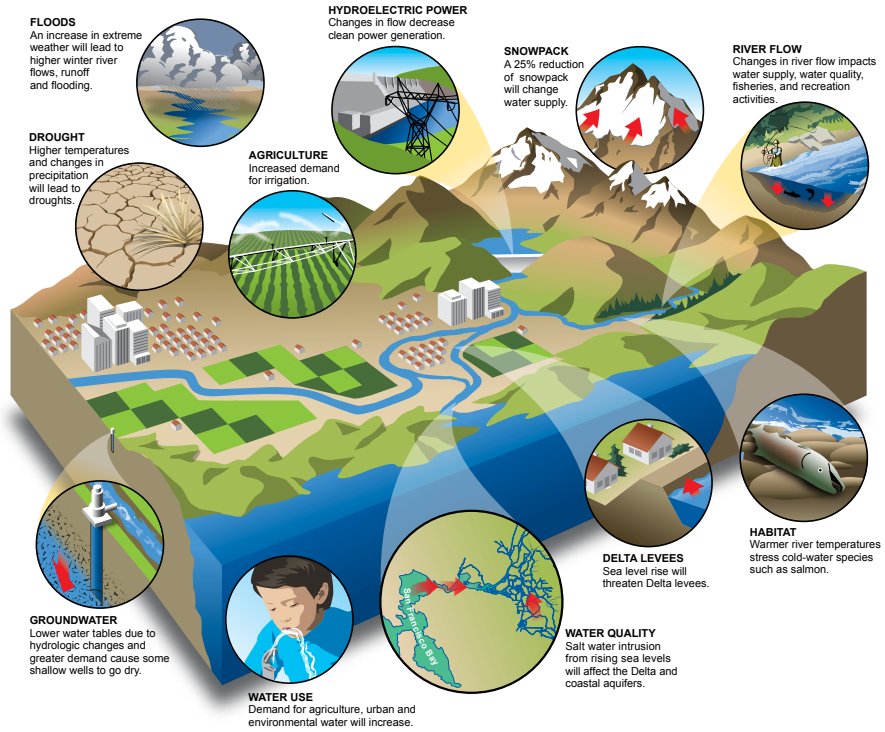
Potential Climate Change Effects

Climate change effects upon California's water resources are being observed and are anticipated to increase over time. Such climate change effects (see Figure 18) would modify future conditions, project operations, and the functional capability of potential surface storage projects.

- Future warming would cause a greater portion of annual runoff to occur during winter and early spring and a lesser portion during late spring and summer.
- Sea level rise would require more water releases from upstream reservoirs to offset seawater intrusion and related effects and manage Delta water quality.
- Carryover storage and cold water pools in system reservoirs would be diminished significantly, causing both system vulnerabilities and adverse environmental effects.
- Higher temperatures would decrease Sierra snowpack storage and change the timing, intensity, and duration of runoff into the Delta, which in turn may affect Delta water quality and diversions.
- Water demands could increase.

Preliminary analysis indicates that additional surface storage would be beneficial, and would help reduce the impacts of climate change on water users. A detailed analysis of climate change effects will be conducted and addressed in the EIS/EIRs and Feasibility Reports.

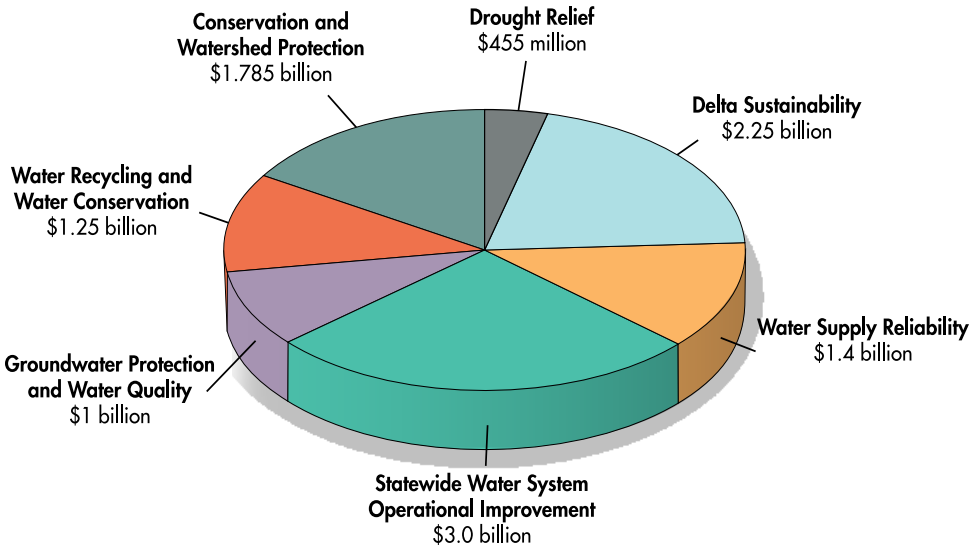
Figure 18. How Climate Change Impacts a Watershed (DWR, 2009a)



2009 Comprehensive Water Package and Bond

The 2009 Comprehensive Water Package will affect the surface storage feasibility studies and the implementation of potential surface storage projects in several ways, such as new planning and coordination for the Delta (e.g., the Delta Plan); the development of flow criteria for the Delta; targets for water use efficiency; criteria for determining the economic benefits of projects; and a bond measure that would include $3 billion for public benefits associated with potential storage projects, if the measure is approved by voters (proposition anticipated for vote in 2012; See Figure 19).

Figure 19. Bond Fund Breakdown. The Safe, Clean, and Reliable Drinking Water Supply Act of 2012 is an $11.14 billion general obligation bond proposal that would provide funding for California's aging water infrastructure and for projects and programs to address the ecosystem and water supply issues in California.



Storage projects approved for state funding would be determined by the California Water Commission. Storage projects eligible for state funding include:

- Storage projects identified in the CALFED Record of Decision
- Groundwater storage and groundwater remediation projects that provide storage benefits
- Conjunctive use and reservoir reoperation projects
- Local and regional storage projects that improve the operation of water systems and provide public benefits

According to the bond proposal, water supply reliability benefits from these projects for urban or agricultural water users would be paid for by the beneficiaries.

Important project dates related to the surface storage investigations per the Safe, Clean, and Reliable Drinking Water Supply Act of 2012 are listed below.

By December 15, 2012: California Water Commission must adopt, by regulation, methods for quantification and management of public benefits

By January 1, 2018: To be eligible for state funding, projects must have:

- All feasibility studies complete and draft environmental documentation available for public review
- Finding by the California Water Commission that the project is feasible, and will advance the long-term objectives of restoring ecological health and improving water management for beneficial uses of the Delta
- Commitments by beneficiaries for not less than 75% of the nonpublic benefit costs share of the project

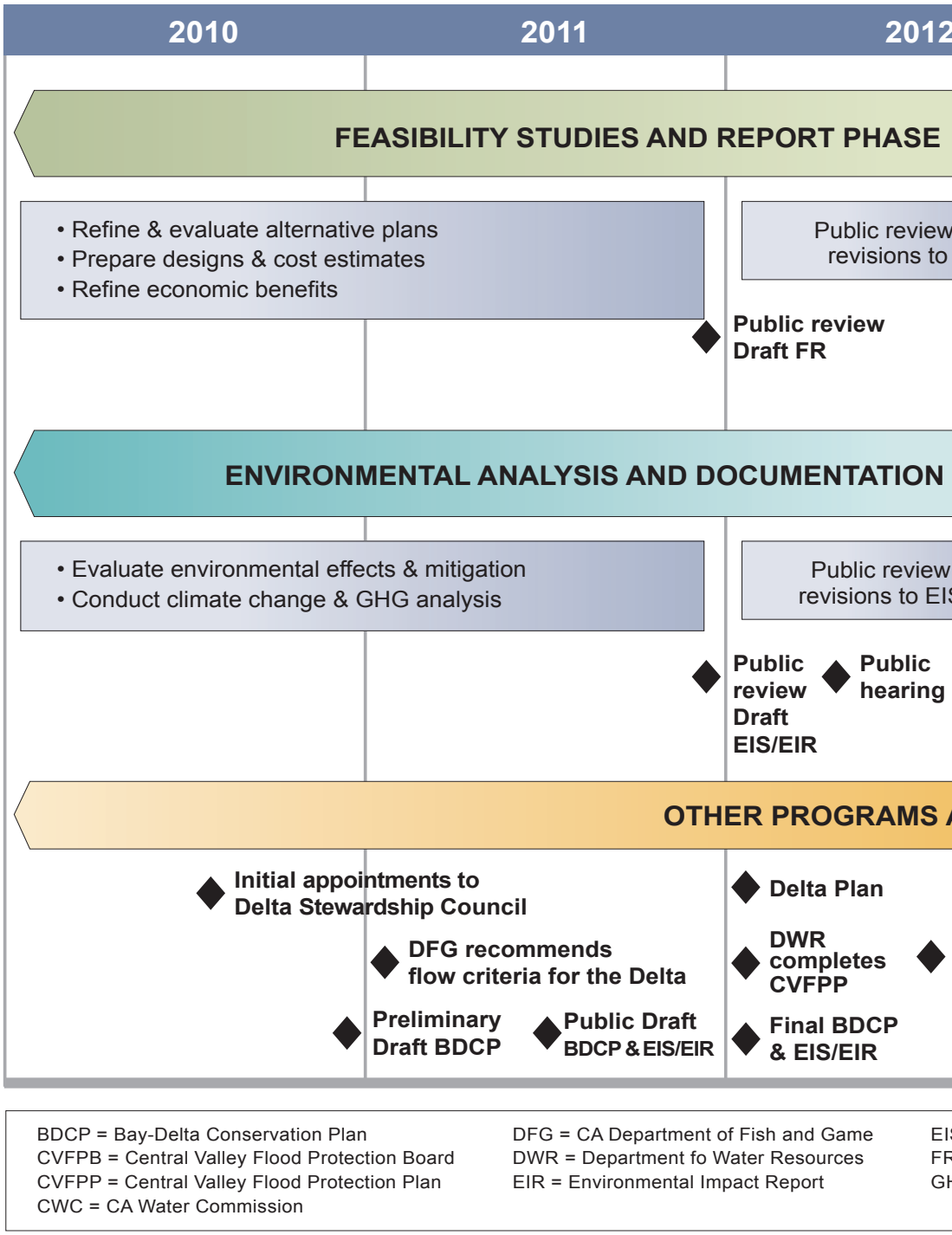
Definition of Public Benefits in the Water Bond

- ***Ecosystem improvements,*** *including changing the timing of water diversions, improvement in flow conditions, temperature, or other benefits that contribute to restoration of aquatic ecosystems and native fish and ecosystems and fish and wildlife in the Delta*
- ***Water quality improvements*** *in the Delta, or in other river systems*
- ***Flood control benefits,*** *including, increases in flood reservation space in existing reservoirs by exchange for existing or increased water storage capacity in response to the effects of changing hydrology and decreasing snow pack on California's water and flood management system*
- ***Emergency response,*** *including, securing emergency water supplies and flows for dilution and salinity repulsion following a natural disaster or act of terrorism*
- ***Recreational purposes,*** *including, those recreational pursuits generally associated with the outdoors*

Bond funds may be used to pay for public benefits associated with eligible storage projects, up to 50% of the project costs. Ecosystem improvements must make up 50% of the public benefits paid for with the bond funds.

Next Steps and Schedule

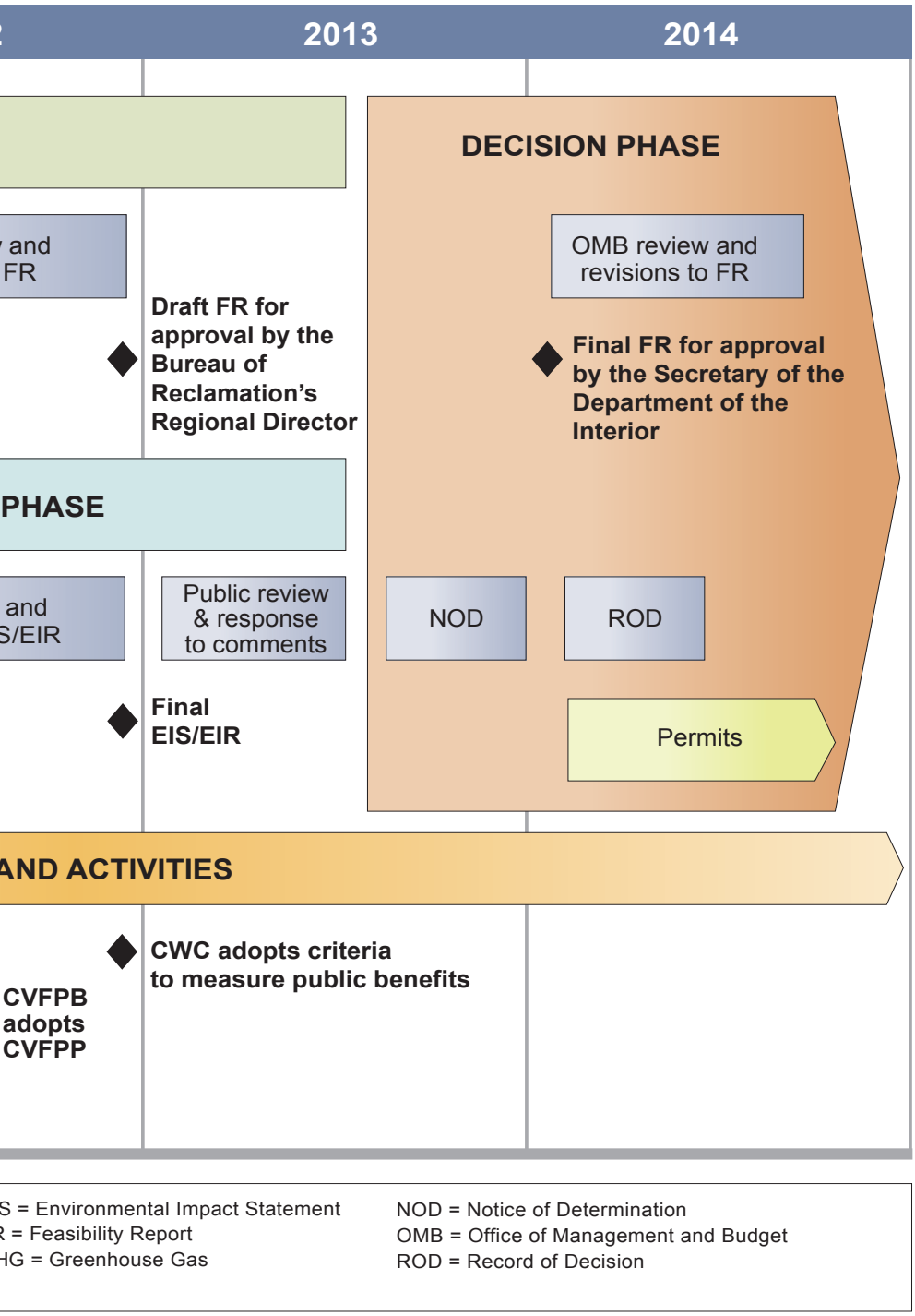
Figure 20. Schedule for the Surface Storage Studies
(Dates are estimated to adequately represent all of the studies)



BDCP = Bay-Delta Conservation Plan
CVFPB = Central Valley Flood Protection Board
CVFPP = Central Valley Flood Protection Plan
CWC = CA Water Commission
DFG = CA Department of Fish and Game
DWR = Department fo Water Resources
EIR = Environmental Impact Report
EI
FR
GH

NEXT STEPS AND SCHEDULE

Figure 20 identifies future milestones for the surface storage investigations. Draft Feasibility Reports and EIS/EIRs will be released for public review in late 2011. The Final EIS/EIRs will be completed in late 2012. The Final Feasibility Reports will be provided for Washington-level review through Reclamation in early 2013.



Partnerships and Outreach

The participation of federal, state, and local agencies and the public will continue to be solicited at key points of the feasibility studies. For example, input has been solicited for the development of project objectives and formulation and evaluation of initial alternative plans through scoping processes, briefings, study area tours, project websites, and mailers. The outreach strategy for the Feasibility Reports and EIS/EIRs includes public meetings/workshops and stakeholder briefings at critical milestones, as well as activities needed to satisfy NEPA and CEQA requirements for public review and comment. Outreach will include public hearings on the Draft EIS/EIRs.

Memorandums of Understanding have been signed between federal, state, and local partners and stakeholders for the planning of the surface storage investigations and study management teams have participated in many different partnership, technical, and outreach groups. Coordination with Native American Tribes has occurred throughout the planning processes, and as the studies proceed, coordination with tribes will continue. Briefings will be provided whenever key milestones are reached and formal consultation will be initiated with tribes when preferred alternatives are identified and the areas of potential effects are determined.

To facilitate public participation, information will be accessible through Internet access to project web sites, at community venues (e.g., public libraries), at public meetings, and by direct request. A postcard announcing the release of draft and final Feasibility Reports and EIS/EIRs will be distributed to each project's mailing list. Interested parties can be added to project mailing lists by visiting the project Web sites.

Where can I get additional information on CALFED Surface Storage Investigations?

- Companion CD
- Online information
  - DWR's surface storage Web site
    http://www.water.ca.gov/storage
  - Reclamation's NODOS Investigation Web site
    http://www.usbr.gov/mp/nodos/index.html
  - Reclamation's USJRBSI Web site
    http://www.usbr.gov/mp/sccao/storage/index.html
  - Reclamation's LVE Investigation Web site
    http://www.usbr.gov/mp/vaqueros/index.html
  - Reclamation's SLWRI Web site
    http://www.usbr.gov/mp/slwri/
  - CCWD's LVE Investigation Web site
    http://www.lvstudies.com/

CD holder

PROGRESS REPORT & OTHER REFERENCE MATERIAL CD

The accompanying CD contains the Progress Report in its entirety and other reference documents.

For printed copies of the Progress Report and Overview document,
call 916-651-9248 or email surfacestorage@water.ca.gov
If you need this publication in an alternate form, contact the Public Affairs Office at 1-800-272-8869.