2. Alternatives Analysis

2.1 Introduction

This chapter summarizes the process used to develop the alternatives for the Sites Reservoir Project (Project). A detailed description of this comprehensive and iterative process is contained in Appendix 2A Alternatives Screening Process. This chapter also describes the No Project (California Environmental Quality Act [CEQA]) and No Action (National Environmental Policy Act [NEPA]) Alternatives and their relationship and similarity to Existing Conditions, as well as a summary of the action alternatives that are evaluated in detail. Additional description of the action alternatives that are evaluated in detail is contained in Chapter 3 Description of the Sites Reservoir Project Alternatives.

2.1.1 Project Objectives and Purpose and Need Statement

As described in Chapter 1 Introduction, the project objectives, and the statement of purpose and need have not changed materially since the 2001 Notice of Preparation (NOP), issued by the Department of Water Resources (DWR), and the 2001 Notice of Intent (NOI), issued by the Bureau of Reclamation (Reclamation). However, this Environmental Impact Report/Environmental Impact Statement (EIR/EIS) elaborates on the objective and purpose stated in the 2001 NOP and NOI related to providing storage and operational benefits for water quality and other programs. The Authority and Reclamation also are considering a set of secondary project objectives and purposes.

The primary objectives, and purpose and need for the Project are to provide surface water storage north of the Delta in order to:

- Enhance water management flexibility in the Sacramento Valley.
- Increase reliability of California water supplies.
- Provide storage and operational benefits for programs to enhance water supply reliability, both locally and State-wide, benefit Delta water quality, and improve ecosystems by providing:
  - Net improvements in ecosystem conditions in the Sacramento River system and Delta
  - Net improvements in water quality conditions in the Sacramento River system and Delta
  - Net improvements in State-wide water supply reliability for agricultural and urban uses to help meet water demands during drought periods and emergencies, or to address shortages due to regulatory and environmental restrictions
  - Net improvements in water supply reliability for fish protection, habitat management (including refuges), and other environmental water needs

The secondary objectives for the Project are to:

- Allow for flexible hydropower generation to support the integration of renewable energy sources
- Develop additional recreation opportunities
- Provide incremental flood damage reduction opportunities

2.2 Approach to Alternatives Analysis

The range of alternatives for the Project was developed through the consideration of previous analyses of reservoir alternatives, including potential environmental effects and comments received during the scoping process for this EIR/EIS, and through screening the range of possible alternatives by comparing their ability to meet the Project Objectives and Purpose and Need Statement.

This section describes the range of possible alternatives identified in (1) previously completed CALFED Bay-Delta Program (CALFED) EIS/EIR and Integrated Surface Storage Investigation studies and (2) the scoping process for this EIR/EIS and a summary of the comparisons of the alternatives with the Project Objectives and Purpose and Need Statement, which resulted in the range of alternatives considered in this EIR/EIS. Discussion of the relationship of the CALFED EIS/EIR to this EIR/EIS is included in Chapter 1 Introduction.

Additional information regarding the alternatives screening process is included in Appendix 2A Alternatives Screening Process.

2.2.1 Pre-CALFED Reservoir Alternatives

Multiple alternatives related to north-of-the-Delta offstream storage reservoirs have been developed and evaluated since 1930 in studies completed by DWR and local agencies, as described in Chapter 1 Introduction. The range of alternatives previously evaluated included reservoirs that have been constructed (e.g., Black Butte Reservoir on Stony Creek) and numerous reservoirs that have not been constructed, including the following:

- Sites Reservoir (Stone Corral and Funks creeks)
  - 1957 DWR Bulletin No. 3 (referred to as Golden Gate Reservoir)
  - 1964 DWR Bulletin No. 9 (several small reservoirs on Stone Corral and Funks creeks)
- Newville Reservoir (North Fork Stony Creek)
  - 1957 DWR Bulletin No. 3 (referred to as Golden Gate Reservoir)
  - 1978 DWR Bulletin No. 76
- Colusa Reservoir (Willow, Logan, Hunters, Funks, and Stone Corral creeks)
  - 1978 DWR Bulletin No. 76
- Glenn Reservoir (Stony Creek)
  - 1978 DWR Bulletin No. 76
- Dippingvat and Schoenfield Reservoirs (on Red Bank Creek)
  - 1957 DWR Bulletin No. 3 (referred to as Golden Gate Reservoir)
- Paskenta Reservoir (Thomes Creek)
  - 1957 DWR Bulletin No. 3 (referred to as Golden Gate Reservoir)
- Dutch Gulch Reservoir (Cottonwood Creek)
  - 1978 DWR Bulletin No. 76
- Tehama Reservoir (Cottonwood Creek)
  - 1978 DWR Bulletin No. 76

2.2.2 CALFED Reservoir Alternatives

The CALFED Program began in 1995 after several federal, State, and local agencies signed the Bay-Delta Framework Agreement in December 1994 (CALFED, 2000a). The CALFED Program initiated the evaluation of expanded surface water storage in the Sacramento and San Joaquin valleys as part of a long-term comprehensive plan to restore the ecological health and improve water management to protect beneficial uses in the Delta and the Delta watershed. The CALFED Program identified the need for up to 3.0 million acre-feet (MAF) of additional surface water and/or groundwater storage in the Sacramento Valley, 2.0 MAF in or near the Delta, and 0.5 MAF each of surface water storage and groundwater storage in the San Joaquin Valley to meet environmental and water supply needs. These values were consistent for each of the four alternatives evaluated in detail in the CALFED EIS/EIR.

During preparation of the CALFED EIS/EIR, the CALFED Program initially identified 52 potential surface storage locations[1] but retained only 12 reservoir locations statewide for further study (CALFED, 2000b). The screening criteria indicated a preference for offstream over onstream surface water storage to avoid redirected impacts on aquatic species in the primary tributaries of the Delta.

Following completion of the screening analysis, and concurrent with the preparation of the CALFED EIS/EIR, the CALFED Program and DWR with technical assistance from Reclamation, initiated the Integrated Storage Investigation in 1997 to develop information to be considered in the evaluation of surface water storage projects in the CALFED EIS/EIR. The Integrated Storage Investigation considered expansion of the Central Valley Project's (CVP) Shasta Lake; expansion of the Contra Costa Water District's Los Vaqueros Reservoir; implementation of the In-Delta Storage Program on four Delta islands that would pump water to and from the Delta channels as needed or would connect in-Delta storage to the export facilities in the south Delta; implementation of the Upper San Joaquin River Basin Storage Investigation to expand water storage; and implementation of the North-of-the-Delta Offstream Storage (NODOS) Investigation to expand water storage in a new offstream reservoir on the west side of the Sacramento Valley. The results of the screening analysis conducted in the Integrated Storage Investigations between 1997 and 1999 were considered in the Implementation Plan of the CALFED EIS/EIR.

Specific reservoir locations were not analyzed in the CALFED EIS/EIR. Instead, the CALFED EIS/EIR assumed a range of potential land use changes based upon construction of a new reservoir at the previously proposed Sites or Colusa locations and at the Newville location in the Sacramento Valley along with expansion of Shasta Lake; Montgomery Reservoir location in the San Joaquin Valley; construction of in-Delta new reservoirs on several islands and the expansion of Los Vaqueros Reservoir in the Delta; and development of 1,500 acres for groundwater storage in the Sacramento and San Joaquin valleys. Except for the land use analysis, all other resource analyses in the CALFED EIS/EIR assumed a generalized increase in storage without specifying the location of the new or expanded facilities (CALFED, 2000a).

Based on information in the Final CALFED EIS/EIR and the concurrent CALFED Implementation Plan, the CALFED ROD recommended expansion of Shasta Lake and Los Vaqueros Reservoir, construction of a new in-Delta storage facility, and continued studies for the NODOS Project and the Upper San Joaquin River Basin Storage Investigation (CALFED, 2000c). The CALFED ROD indicated that the NODOS

[1]The results of this inventory are presented in the March 7, 1997 draft report, *CALFED Bay-Delta Program Storage and Conveyance Component Inventories* (CALFED, 1997). The inventory includes 51 potential surface water storage sites. Subsequently, the August 2000 *CALFED Initial Surface Water Storage Screening Report* (CALFED, 2000b) added the San Luis Reservoir Enlargement to the list of potential sites.

Project could enhance water management flexibility and water supply reliability in the Sacramento Valley, improve fish survival, and improve water quality. As such, DWR and Reclamation continued to evaluate the NODOS Project as a separate surface water storage project while maintaining their involvement in the other four surface water storage projects listed above.

2.2.3 Reservoir Alternatives Analyzed between 2000 and 2013

Following the CALFED ROD, DWR and Reclamation initiated development of an EIR/EIS and continued to analyze potential locations for a reservoir on the west side of the Sacramento Valley. Alternatives previously considered for new surface water reservoirs on the west side of the Sacramento Valley and alternatives identified during the 2001–2002 EIR/EIS scoping process (see Appendix 36B Scoping Report) were considered.

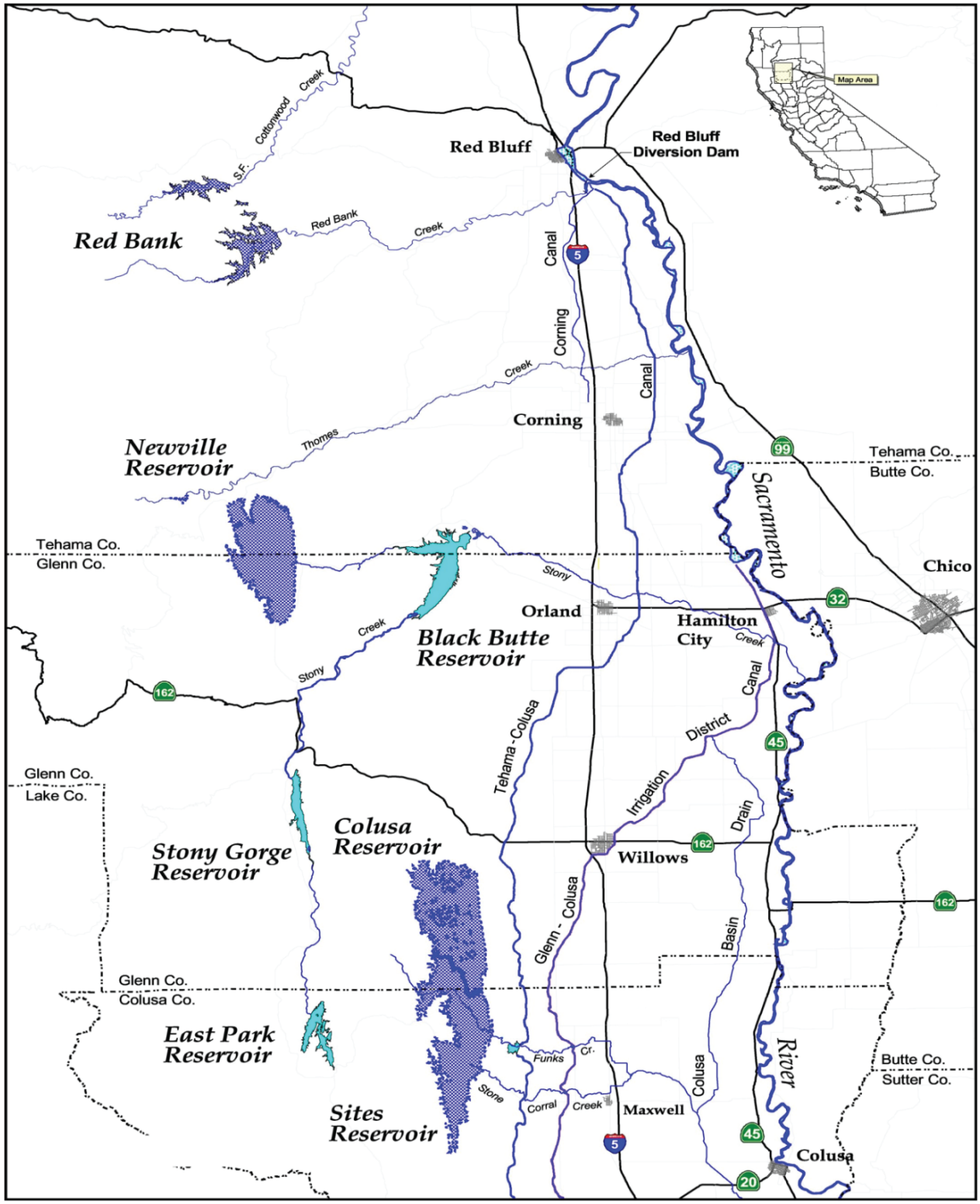
2.2.3.1 Reservoir Alternatives Analyzed in the Surface Water Storage Investigation

An initial screening process was conducted for the west Sacramento Valley reservoir alternatives evaluated in detail in the Surface Water Storage Investigations reports (CALFED, 2000d; DWR, 2006). The results of the analysis identified the following four alternatives to be considered in more detail (Figure 2-1):

- **Red Bank Alternative (Dippingvat and Schoenfield Reservoir):** The Red Bank Alternative was proposed to include facilities located approximately 17 miles west of the City of Red Bluff in Tehama County. This project would include a 0.104-MAF Dippingvat Reservoir on South Fork Cottonwood Creek, and a 0.25-MAF Schoenfield Reservoir on Red Bank Creek. The primary source of water would be from South Fork Cottonwood Creek, with water diverted from Dippingvat Reservoir to Schoenfield Reservoir. Two small dams and reservoirs, Lanyan and Bluedoor, would be located on small tributaries of Red Bank Creek and would be part of the conveyance from Dippingvat to Schoenfield. Dippingvat Reservoir would be an onstream storage facility used for short-term storage and diversion; Schoenfield is considered to be an offstream storage facility. This alternative location was designed to allow water stored in Schoenfield Reservoir to be released down Red Bank Creek directly into the Tehama-Colusa Canal Intake. The Red Bank Alternative was conceived to provide an alternative water supply to the Tehama-Colusa Canal which would not require operation of the then-Red Bluff Diversion Dam during critical fish passage periods.

- **Newville Reservoir Alternative:** The Newville Reservoir was proposed to be located upstream from Black Butte Reservoir, approximately 18 miles west of the City of Orland and 23 miles west-southwest of the City of Corning in Glenn and Tehama counties. Alternative reservoir sizes of 1.9 MAF and 3.0 MAF were considered. The 1.9-MAF reservoir would be formed by a dam on North Fork Stony Creek and a saddle dam at Burrows Gap. The 3.0-MAF reservoir would require up to five additional saddle dams and a dike. A small diversion dam and diversion from Thomes Creek would transfer water to the reservoir. Other water source options include Stony Creek and the Sacramento River.

- **Colusa Reservoir Alternative:** The Colusa Reservoir was proposed to be located in north-central Colusa County and south-central Glenn County, approximately 12 miles southwest of the community of Willows and 10 miles west of Maxwell. The 3.0-MAF Colusa Reservoir would include the area inundated by the 1.8-MAF Sites Reservoir (described below) plus the adjacent Logan Creek and Hunters Creek watersheds to the north (known as the Colusa Cell). The Colusa Cell would require four major dams along Logan Ridge in addition to those described for Sites Reservoir: one for Logan



N

0 2 4 6 8 Miles

Legend

Existing Reservoirs

Proposed Reservoirs

FIGURE 2-1
Location of the Four Potential Reservoir Alternatives
Sites Reservoir Project EIR/EIS

- Creek and three for Hunters Creek and its tributaries. Water source and conveyance options for diversion and delivery to offstream storage would be similar to those for Sites Reservoir.
- **Sites Reservoir Alternative (Project):** The 1.8-MAF Sites Reservoir would be located in Antelope Valley, approximately 10 miles west of the town of Maxwell in Glenn and Colusa counties, and would be formed by constructing two major dams on Stone Corral Creek and Funks Creek and nine saddle dams along the southern edge of the Hunters Creek watershed. Diversions from the Colusa Basin Drain (CBD), the Sacramento River, and local tributaries were considered in these previous studies as potential sources of water supply for Sites Reservoir.

2.2.3.2 Alternatives Identified in the 2001-2002 Scoping Process

During the 2001–2002 scoping process, 60 scoping comments were received related to west Sacramento Valley reservoir alternatives, including consideration of Sites and Newville reservoirs; conveyance facilities to provide water into and from the reservoirs; and water sources. Most of the comments specific to Newville Reservoir opposed the Newville Reservoir formulation because of potential impacts on the wildlife and fish habitat, cultural resources, and historical resources at the Newville Reservoir site, and potential impacts on wildlife habitat and cattle along proposed access roads.

Eleven scoping comments were received related to non-reservoir alternatives, such as water use efficiency, conjunctive use, land fallowing, and water recycling. However, these types of alternatives were not necessarily consistent with the Project's objectives and purpose and need statement. These types of alternatives were analyzed in the CALFED EIS/EIR and in subsequent non-storage programs, such as the California Water Action Plan, a 5-year roadmap for a comprehensive and practical approach to water resources management in California (California Natural Resources Agency et al., 2015).

Four scoping comments were received related to expanding Shasta Lake.

2.2.3.3 Reservoir Alternatives Screening Analysis in 2001 through 2006

The four remaining west Sacramento Valley reservoir alternatives (Red Bank, Newville, Colusa, and Sites reservoirs), all located north of the Delta, were compared to screening criteria in a three-step screening process based upon legal considerations under CEQA and NEPA, as summarized below.

The first screening criterion compared the ability of the alternatives to meet the Project Objectives and Purpose and Need Statement to enhance water management flexibility and improve water supply reliability and water quality, reduce water diversions on the Sacramento River during critical fish migration periods and improve ecosystem conditions, provide recreation and flood damage reduction opportunities, and provide hydropower generation flexibility. Each of the four reservoir alternatives is consistent with this first step of the screening process.

The second screening criterion focused on minimizing potential impacts on jurisdictional wetlands and other waters of the U.S., and minimizing potential impacts on sensitive aquatic and terrestrial habitats. Under the second step of the screening process, the Red Bank and Colusa reservoir alternatives were eliminated from detailed analyses because the extent of impacts on wetlands and sensitivity habitats would be greater than under the Sites and Newville reservoir alternatives (refer to Appendix 2A Alternatives Screening Process). Potential impacts on wetlands and sensitive habitats at the Sites and Newville reservoirs appeared to be relatively similar at the level of detail considered in the second step of the screening process.

The third screening criterion was focused on minimizing impacts and providing benefits. The screening involved a more detailed review of flood management opportunities; potential effects on cultural, aquatic, and terrestrial biological resources; potential effects on jurisdictional wetlands and other waters of the U.S.; and energy use and greenhouse gas emissions related to pumping of water into the reservoir. Under the third step of the screening process, the Newville Reservoir alternative was eliminated from further consideration because of the extent of potential impacts on cultural resources, aquatic and terrestrial biological resources, and jurisdictional wetlands or other waters of the U.S., and because potential energy use and greenhouse gas emissions were greater than for the Sites Reservoir alternative.

2.2.3.4 Consideration of the Expansion of Shasta Lake

The option of including the expansion of Shasta Lake also was considered as part of the 2001 to 2006 Surface Water Storage Investigation. However, during this period, there was a concurrent investigation being conducted by Reclamation for the expansion of Shasta Lake. As was described in the CALFED ROD, both expansion of Shasta Lake and a new reservoir on the west side of the Sacramento Valley were considered as separate projects to meet similar but different Project Objectives and Purpose and Need Statements. Therefore, expansion of Shasta Lake was considered a concurrent project and not as an option to a new reservoir on the west side of the Sacramento Valley. The EIS completed for the Shasta Lake Water Resources Investigation included the same conclusion about the need to consider Sites Reservoir as an option in addition to expansion of Shasta Lake (U.S. Department of the Interior, 2014).

2.2.4 Range of Alternatives for Sites Reservoir in this EIR/EIS

As summarized above, it was determined that the location for the reservoir on the west side of the Sacramento Valley should be Sites Reservoir. However, additional analyses were required to determine the size of the reservoir, methods to provide water conveyance to and from the reservoir, and water resources operations to meet the Project Objectives and Purpose and Need Statement. Potential options were identified in the 2001–2002 scoping process and subsequent meetings with the public, public agencies, and interest groups. A subsequent supplemental public scoping process was initiated to obtain input in 2017 that provided additional information, as described below.

2.2.4.1 Alternatives Identified in the 2017 Supplemental Scoping Process

During the 2017 scoping process, 155 scoping comments were received; 7 comments were specifically related to the range of alternatives to be considered. Most of the comments expressing concern about the range of alternatives focused on the operational alternatives of the project. Three comments recommended the evaluation of groundwater storage rather than surface storage alternatives. Two scoping comments were received related to including the potential to expand Shasta Lake.

Similar to the scoping process conducted in 2001-2002, scoping comments received during the 2017 meetings and process were generally consistent with the results and input obtained in the development of the CALFED ROD and/or the first phase of the Surface Water Storage Investigations reports.

2.2.4.2 Final Range of Alternatives Considered for Detailed Evaluation

The range of action alternatives for Sites Reservoir are defined as Alternative A, Alternative B, Alternative C (and C_1), and Alternative D. The basis for the development of these alternatives and the description of these alternatives are presented in Section 2.4 Sites Reservoir Alternatives and Appendix 2A Alternatives Screening Process.

For the purposes of CEQA, these action alternatives are considered and compared to Existing Conditions. For the purposes of NEPA, these action alternatives and the No Project/No Action Alternative are considered as a range of reasonable alternatives.

2.3 Existing Conditions, No Project Alternative, and No Action Alternative (Existing Conditions/No Project/No Action Condition)

The following identifies baseline conditions that must be considered as part of the CEQA/NEPA review process. This section also identifies assumptions made related to existing conditions, No Project Alternative, and No Action Alternative, and their associated similarities for this Project such that existing conditions and the No Project and No Action alternatives are assumed to be substantially the same (expressed as the Existing Conditions/No Project/No Action Condition). The potential for future climate change (including associated uncertainty related to the range of potential effects) to influence future conditions is discussed in detail in Chapter 25 Climate Change and Greenhouse Gas Emissions.

2.3.1 Existing Conditions

The CEQA Baseline for assessing the significance of Project impacts is the environmental setting, or Existing Conditions. The CEQA Baseline is developed to assess the significance of Project impacts in relation to the actual environment upon which the Project will operate. The Existing Conditions assumptions account for all current conditions at the time of the release of the NOP (March 2017); applicable regulatory requirements and operational criteria of both the State Water Project (SWP) and CVP, including implementation of the 2008 U.S. Fish and Wildlife Service (USFWS) and 2009 National Marine Fisheries Service (NMFS) biological opinions; and the State Water Resources Control Board (SWRCB) water rights orders and decisions and water quality criteria; municipal, environmental, and agricultural water uses; land uses; and relevant current plans and policies.

2.3.2 No Project Alternative

CEQA also requires an analysis of an alternative in which the Project is not implemented. CEQA calls this scenario the No Project Alternative. The No Project Alternative allows decision-makers to use the EIR to compare the impacts of approving the Project with the future conditions of not approving the Project. *CEQA Guidelines* Section 15126.6, subdivision (e)(2), indicates that the No Project Alternative should include reasonably foreseeable changes in Existing Conditions and changes that would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services. The No Project Alternative assumes the same regulatory criteria as Existing Conditions, including implementation of biological opinions and SWRCB water rights and water quality criteria related to the CVP and SWP operations. While these regulatory criteria may change during the Sites Project planning, permitting, and construction phases, specific criteria are not available at this time. Also, relying on proposed criteria or other speculation regarding the timing of implementation or the specific criteria is not recommended in either CEQA or NEPA (see additional discussion in Section 2.3.5 Ongoing Federal and State Future Water Management Actions). In addition, the potential for future climate change to affect future conditions is addressed in Chapter 25 Climate Change and Greenhouse Gas Emissions. The analysis included in Chapter 25 discusses the uncertainty of anticipated effects, including the extent and timing of potential impacts. As such, specific climate change conditions are not included in the No Project Alternative (nor are they included in the No Action

Alternative discussed in Section 2.3.3). As described in Section 2.3.3, the CEQA No Project Alternative assumes the same conditions as the NEPA No Action Alternative.

2.3.3 No Action Alternative

NEPA requires an analysis of an alternative in which the Project is not implemented assuming continuation of existing policies and management direction into the future. The No Action Alternative is used as the basis of comparison to determine the anticipated environmental effects of the action alternatives in the absence of the Project. The No Action Alternative focuses on programs, projects, or policies that are assumed to be in place in the future that would affect or be affected by the action alternatives. The No Action Alternative includes Existing Conditions and future actions that are authorized and approved through completion of NEPA, CEQA, Endangered Species Act, and other applicable regulatory compliance processes.

While future regulatory requirements may change during the Sites Project planning, permitting, and construction phases, specific future regulatory criteria are not available at this time (see additional discussion in Section 2.3.5 Ongoing Federal and State Future Water Management Actions). Therefore, the No Action Alternative assumptions for this EIR/EIS are the same as the assumptions included in the No Project Alternative, and the two are treated as one alternative (the No Project/No Action Alternative) in this document. Potential effects related to anticipated climate change are addressed in Chapter 25 Climate Change and Greenhouse Gas Emissions.

2.3.4 Water Demand and Land Use Assumptions for Existing Conditions, No Project, and No Action Alternatives (Existing Conditions/No Project/No Action Condition)

Existing Conditions and the future No Project/No Action Alternative were assumed to be similar in the Primary Study Area given the generally rural nature of the area and limited potential for growth and development in Glenn and Colusa counties within the 2030 study period used for this EIR/EIS. As a result, within the Primary Study Area, it is anticipated that the No Project/No Action Alternative would not entail material changes in conditions as compared to the Existing Conditions baseline.

With respect to the Extended and Secondary study areas, the effects of the proposed action alternatives would be primarily related to changes to available water supplies in the Extended and Secondary study areas and the Project's cooperative operations with other existing large reservoirs in the Sacramento watershed. Other effects would be continued water use and diversions throughout the Secondary and Extended Study areas, and the resultant potential impacts and benefits to biological resources, land use, recreation, socioeconomic conditions, and other resource areas. Land use and water demand assumptions for the Existing Conditions and the 2030 No Project/No Action Alternative scenarios were used as the basis of the analysis and subsequent modeling efforts.

For this EIR/EIS, the Existing Conditions land use and water demand assumptions were based on an aggregation of historical land use surveys and projected water demands for senior water rights and CVP water service contract supplies. The No Project/No Action Alternative water demand assumptions for 2030 assumed that water users would use their full CVP and SWP water contract amounts and/or water rights in most cases. The difference between the Existing Conditions and the No Project/No Action Alternative assumed water demands was found to be minimal in most areas because the existing conditions assumptions included full use of most CVP and SWP contract amounts for most agricultural uses and CVP and SWP municipal and industrial users that divert water from the Delta. The greatest

anticipated increases in municipal and industrial water demand between prior Existing Conditions assumptions and Year 2030 water demands included an increase in water demand of 253,000 acre-feet per year (af/yr) in the Sacramento Valley, primarily in the Sacramento, El Dorado, and Placer counties, which are located in the American River watershed. One of the reasons for this differential was the lack of conveyance facilities included in the original existing conditions assumptions. Conveyance facilities for the Freeport Regional Water Authority, East Bay Municipal Utility District, and Placer County Water Agency are now currently operational and as such need to be accounted for as part of an existing conditions scenario.

Accordingly, increased water supplies are assumed as part of the Existing Conditions and No Project/No Action Alternative baselines with respect to increased deliveries of CVP water service contract water and water rights water in the American River watershed. These assumptions include the Freeport Regional Water Authority intake that was constructed on the Sacramento River and increased surface water supplies of more than 66,000 acre-feet available to Sacramento County. This facility and surface water supply reduced reliance on groundwater, especially in areas with groundwater overdraft conditions. Completion of this intake also allows East Bay Municipal Utility District to divert up to 133,000 acre-feet in drier years under their CVP water service contract. In addition, the Placer County Water Agency American River Pump Station was constructed, which allows for additional CVP water service contract water to be delivered.

In general, water demands for senior water rights in the American River watershed have proven to occur sooner than anticipated. Water rights demands in Folsom Lake were initially assumed to not be fully used by El Dorado Irrigation District and San Juan Water District until 2030. However, the 2015 urban water management plans prepared by these agencies indicate that these water rights are currently being used by these agencies (Eldorado Irrigation District, 2016; San Juan Water District, 2016). Similarly, the City of Sacramento holds a pre-1914 water right and diverted 227,500 af/yr in 2010 and 252,000 af/yr in 2015, which occurred sooner than originally anticipated in the DWR water use projections. The 2015 urban water management plan (City of Sacramento, 2016) indicates that these water rights would be fully used on a long-term average basis in the near term and should be included as part of the Existing Conditions baseline assumptions.

Other key water supply facilities that have been completed relatively recently and are fully operational include:

- Replacement of the Red Bluff Diversion Dam with the Red Bluff Pumping Plant
- Folsom Dam Safety and Flood Damage Reduction Project
- City of Stockton Delta Water Supply Project
- Contra Costa Water Districts Middle River Intake and Pump Station
- Contra Costa Water District Los Vaqueros Reservoir Expansion to a capacity of 160,000 acre-feet
- Reclamation Contra Costa Canal Fish Screen Project
- South Bay Aqueduct Improvement and Enlargement Project
- Delta-Mendota Canal and California Aqueduct Intertie

Future water demands to serve future growth are based on approved land use plans, master plans, or urban water management plans completed by municipal and industrial water users. Currently, the approved plans for the municipal and industrial water users that use CVP water only project water demands through 2030; and as indicated above, those water demands account for growth that has occurred sooner than originally anticipated. It is understood that future water demands would increase under future land use

and water master plans; however, it would be speculative to project those potential future demands prior to completion and adoption of the land use and water master plans by the local agencies.

Because water demands would be similar under the Existing Conditions and the No Project/No Action Alternative in 2017, the analysis in this EIR/EIS assumes that the Existing Conditions baseline and No Project/No Action Alternative baseline are substantially the same baseline condition. As such, the identification of impacts for this EIR/EIS is based on the comparison of the action alternatives to what is termed the "Existing Conditions/No Project/No Action Condition."

2.3.5 Ongoing Federal and State Future Water Management Actions

The following summarizes the status of key ongoing future water management actions that are anticipated to influence future CVP and SWP operations, as well as flow and habitat requirements in various rivers throughout the state and the Bay-Delta.

2.3.5.1 2006 Bay-Delta Plan Update

The SWRCB is currently leading a four-phased process of developing and implementing updates to the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (2006 Bay-Delta Plan) to protect beneficial uses in the Bay-Delta watershed and achieve water quality objectives. Phase I includes review and update of the San Joaquin River flow and southern Delta salinity objectives, and adoption of an implementation program. Phase II includes review and update to other portions of the 2006 Bay-Delta Plan, including Delta outflows, SWP and CVP Delta operations, and other requirements to protect fish and wildlife beneficial uses, including recommendations related to Delta inflows from the Sacramento River and eastside Delta tributaries. Phase III will include assigning responsibility for actions to implement the water quality objectives established in Phases I and II, including changes to water rights decisions or other implementation plans, in accordance with water quality certifications under Federal Clean Water Act provisions. Phase IV would include development and implementation of minimum instream flow criteria to protect public trust resources and other beneficial uses of water on priority Delta tributaries, including agricultural and municipal water supplies. These flow criteria and associated objectives are anticipated to include an implementation plan for each tributary with an adaptive management component accounting for future conditions, ongoing monitoring, watershed changes, stakeholder agreements, and climate change.

During Phase I, the SWRCB prepared the State Water Resources Control Board (SWRCB). 2016a. *Recirculated Draft Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the San Francisco Bay–Sacramento San Joaquin Delta Estuary: San Joaquin River Flows and Southern Delta Water Quality***.** (Phase I SED) (SWRCB, 2016a). The SWRCB held public workshops and hearings and are currently reviewing the comments received on the Phase I SED. The SWRCB anticipates publishing a Final Phase I SED and adopting changes to the Bay-Delta Plan in late 2017. The proposed changes in the Bay-Delta Plan evaluated in the Phase I SED include the following: (1) narrative flow objectives for the Lower San Joaquin, Stanislaus, Tuolumne, and Merced rivers from February through June to support salmonids and other fish that migrate through the Delta; and (2) revised numerical southern Delta salinity objectives to protect beneficial uses in the south Delta.

Phases II and I are being conducted concurrently. The first Phase II report, *Working Draft Scientific Basis Report for New and Revised Flow Requirements on the Sacramento River and Tributaries, Eastside Tributaries to the Delta, Delta Outflow, and Interior Delta Operations* (SWRCB, 2016b) was published in 2016. This staff report provides updated information on the status of several Delta fish and other

aquatic species, and compares recent historical flow conditions to unimpaired flow conditions for the Sacramento River watershed and the Eastside tributaries to the Delta (Cosumnes, Mokelumne, and Calaveras rivers and several major drainages). The report was informed by the 2010 *Report on the Development of Flow Criteria for the Bay-Delta Ecosystem* (SWRCB, 2010), which was completed in accordance with the Delta Reform Act provisions. The report recommends modifying habitat and flows to support native species, including consideration of flow objectives to restore tributary inflows of 35 to 75 percent of unimpaired flow, which will also increase Delta outflow, improve cold-water habitat, reduce reverse flows in Old and Middle rivers, and reduce SWP and CVP exports. Phase II also will address Delta Cross Channel Gate closure objectives, Suisun Marsh operations, floodplain habitat flow objectives, and use of monitoring and adaptive management in implementation of the revised Bay-Delta Plan. During the next stages of Phase II in 2017, a Draft Substitute Environmental Document (Phase II SED) will be prepared and circulated for public comments, and a Sacramento Water Allocation Model will be revised to evaluate effects of the Phase II alternatives considered in the Phase II SED. It is anticipated that Phase II documentation would be completed in 2018 to support the development of the update.

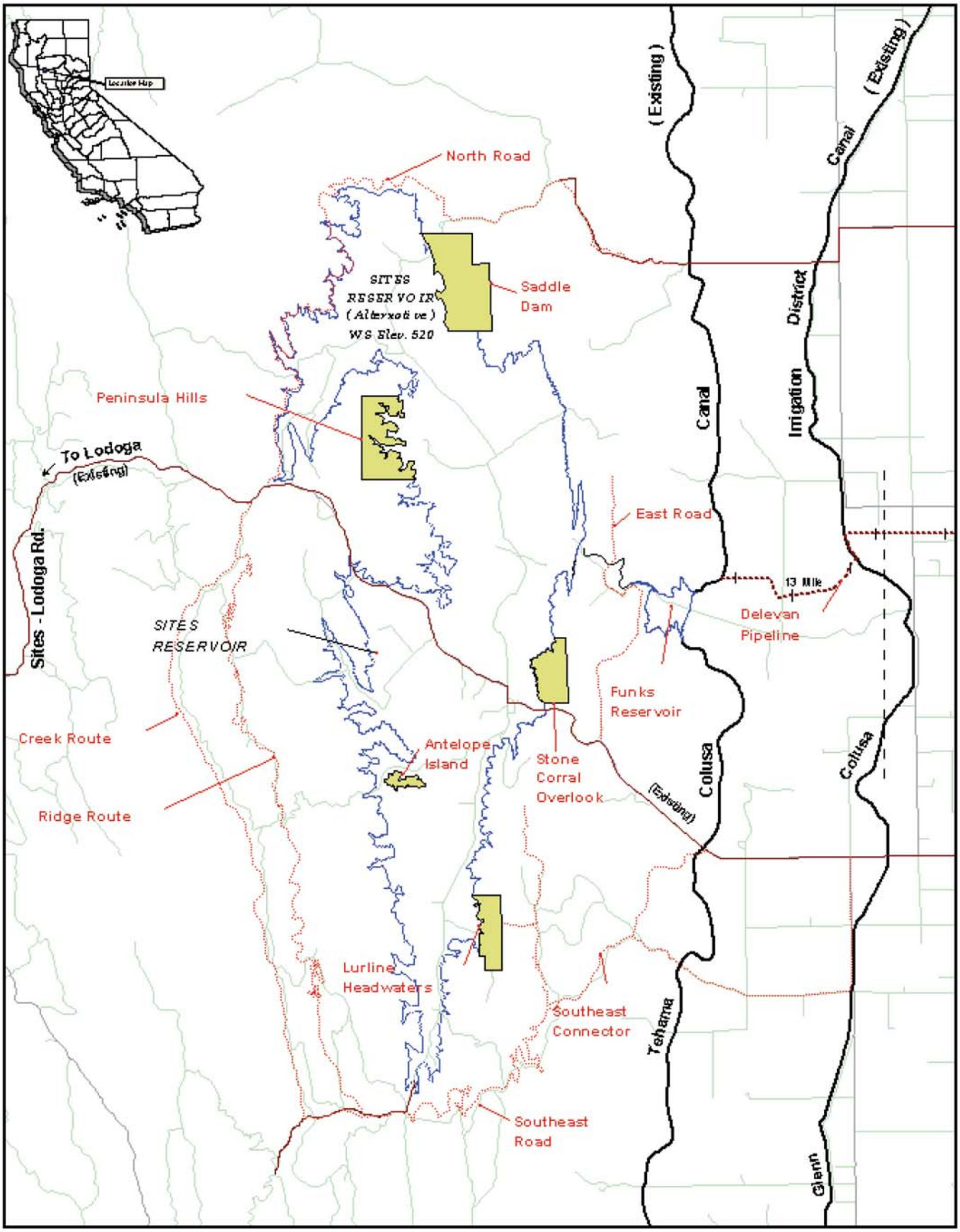
SWRCB currently intends to complete the Bay-Delta Plan update by 2025. Given that the objectives and criteria are still under development and are not expected to be finalized for several years, and the outcome of this multi-phased process is presently uncertain, the inclusion of future projections of the Bay-Delta Plan update within the Existing Conditions/No Project/No Action Condition would be speculative at this juncture.

2.3.5.2 Re-Initiation of Consultation on the Coordinated Long-term Operation of the CVP and SWP

On August 2, 2016, Reclamation and DWR requested re-initiation of consultation with USFWS and NMFS on the coordinated long-term operation of the CVP and SWP related to federally listed aquatic species, including various runs of salmon, steelhead, sturgeon, killer whale, and Delta smelt. The re-initiation of consultation is based on recent drought conditions, recent data demonstrating low delta smelt populations, and new information from collaborative science processes. If the SWP seeks to avail itself of the incidental take exemption provided by the biological opinions, the cooperative long-term operation of the SWP would be subject to the biological opinions, including reasonable and prudent measures, terms, and conditions, or reasonable and prudent alternatives required by the biological opinions. This process is anticipated to take several years and the outcome is uncertain; therefore, the inclusion of potential regulatory constraints and/or CVP/SWP operational criteria is speculative at this time.

2.4 Sites Reservoir Alternatives

Following selection of the Sites Reservoir Alternative as the proposed reservoir alternative, necessary Project features were conceptually developed and refined, including analyses of reservoir storage size, conveyance, and operational alternatives to maximize achievement of the Project objectives, including those shown on Figures 2-2 and 2-3. Configurations of the facilities were compiled into the following alternatives to be evaluated in detail in this EIR/EIS: Alternatives A, B, C (and C_1), and D.

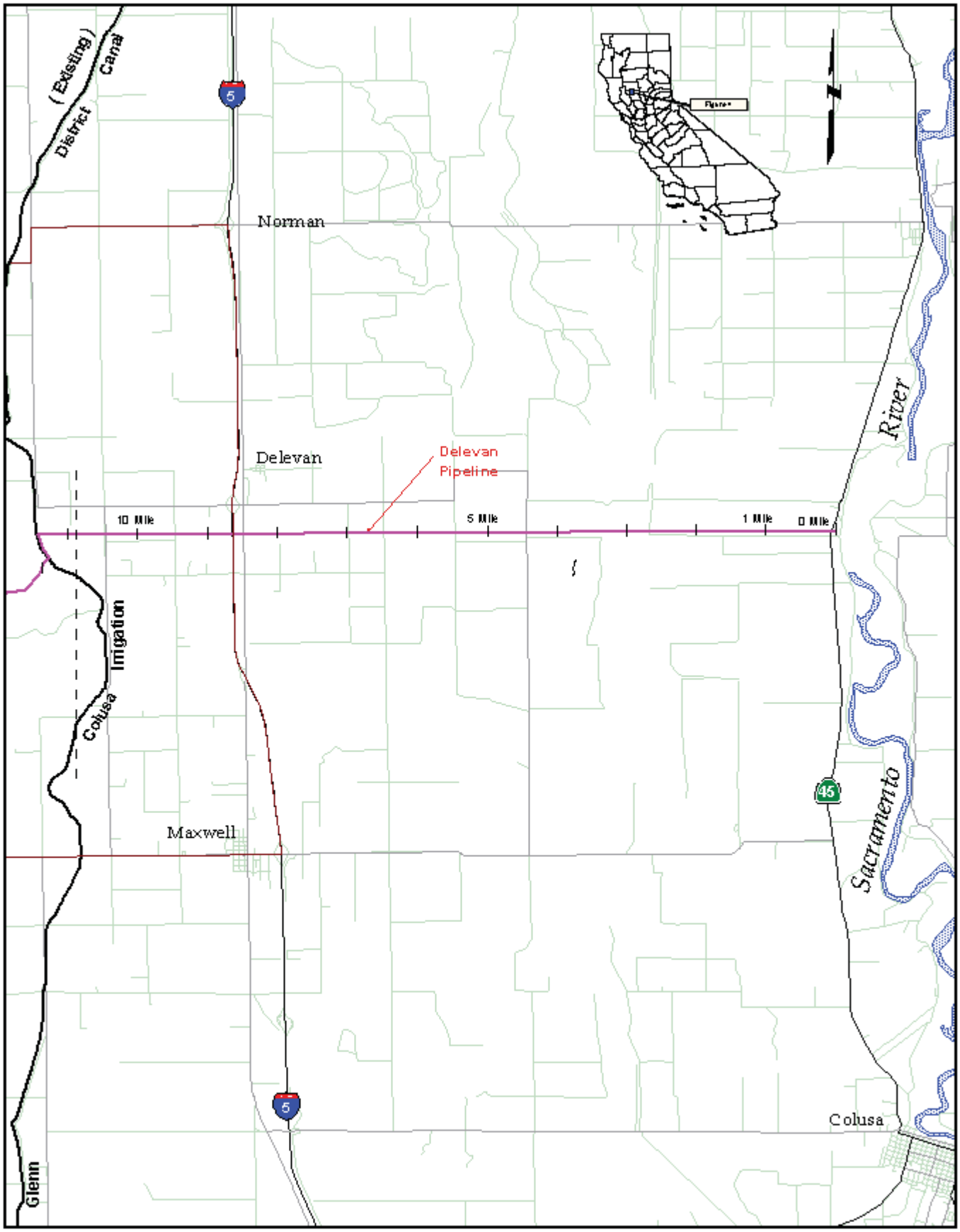


Proposed Road Relocations
Existing Roads
Proposed Reservoir Boundary
Proposed Recreation Areas

N

0 0.5 1 1.5 2 Miles

FIGURE 2-2
Sites Reservoir Alternative Project Features
Sites Reservoir Project EIR/EIS



Proposed Conveyance Routes

N

0 0.5 1 1.5 2 Miles

FIGURE 2-3
Sites Reservoir Alternative Conveyance Project Features
Sites Reservoir Project EIR/EIS

2.4.1 Sites Reservoir Storage Size Alternatives

Various storage capacities for Sites Reservoir were initially considered, including 0.8 MAF, 1.3 MAF, 1.8 MAF, and 2.1 MAF. This range of storage values allowed for a useful comparison of the costs and benefits estimates that was completed in a separate analysis by Reclamation and DWR. The values for storage capacities were selected because they also represent points on the cost curve where the Project's costs would change significantly due to the need for new Project features, such as dams or embankments, as storage capacity and surface water elevations increase.

Table 2-1 presents a summary of each Sites Reservoir storage capacity concepts that were initially considered, including the total number of dams that would be required to impound Sites Reservoir and the total embankment volume that would be required for each of the four storage capacities.

Table 2-1
Summary of Dams and Embankment Volume of Potential Sites Reservoir Storage Sizes

Reservoir Storage (MAF)	Maximum Water Surface Elevation (feet)	Reservoir Surface Area (acres)	Total Number of Dams[a] (main + saddle)	Total Embankment Volume (cubic yards)
0.80	440	10,200	2 + 3	6,900,000
1.3	480	12,400	2 + 7	11,018,400
1.8	520	14,200	2 + 9	22,009,000
2.10	540	15,100	2 + 7[b]	33,800,000

[a] Total number of dams includes the Sites and Golden Gate dams and the saddle dams.

[b] Saddle dams 7, 8, and 9 become one continuous embankment for the 2.1-MAF reservoir.

Source: DWR, 2004

Based on a review of the reservoir rim topography, site geology, and a cursory evaluation of the relationship between embankment volume and reservoir storage, it was determined that a 2.1-MAF reservoir may present significant design challenges. Reservoir elevations at or above 540 feet elevation would likely require grouting of the lower saddle areas along the relatively steep ridges of the eastern rim to ensure the Project would perform satisfactorily. This treatment, combined with the increasing relationship between embankment material volume and reservoir surface elevations, would result in larger unit costs (reservoir cost per acre-foot of storage) for surface water elevations above the 540-foot elevation. Therefore, the maximum Sites Reservoir storage capacity was limited to maintain surface water elevations at or below the 520-foot elevation to avoid unknown conditions (such as leakage) on the relatively steeper slopes of the eastern reservoir rim. As a result, reservoir size of 2.1 MAF was eliminated from further consideration. Reservoir storage capacities of 0.8 MAF, 1.3 MAF, and 1.8 MAF were carried forward for further consideration. Operational scenarios for each of the alternatives are discussed below.

2.4.2 Sites Reservoir Conveyance Alternatives

Preliminary model runs that simulated operations of Sites Reservoir indicated that 3,000 to 6,000 cubic feet per second (cfs) of total inflow capacity would be needed to reliably fill Sites Reservoir. Because Sites Reservoir would be located offstream, water would need to be diverted to and released from the reservoir via conveyance facilities. As a result, diversion and conveyance facilities would be needed to transport water to Sites Reservoir, and to deliver water from Sites Reservoir to service areas, the Sacramento River, and other locations to meet various water resources needs and uses.

It was determined that, to maximize operational flexibility, the diversion and conveyance facilities would need to be able to:

- Release water directly from Sites Reservoir to meet local needs in the vicinity of the existing Tehama-Colusa and Glenn-Colusa Irrigation District (GCID) Main canals.
- Release water in an integrated manner, consistent with existing CVP and SWP operations to facilitate meeting additional needs throughout the Bay-Delta system.
- Release water directly to the Sacramento River to meet additional needs throughout the Bay-Delta system and provide downstream benefits for Delta water quality and water supply reliability (through additional supplies or alternative source) within the CVP and SWP service areas, as well as Level 4[2] wildlife refuge water supply. Additionally, the ability to release water directly to the Sacramento River would allow Sites Reservoir to respond to Delta conditions, including releasing flows to repel saltwater intrusion following a Delta levee failure. This factor became one of the most important criteria in evaluating conveyance concepts due to the ongoing system need for flexibility, water supply reliability, and ability to improve habitat along the Sacramento River and at the wildlife refuges.

Conveyance facilities alternatives that would divert water from the Sacramento River included the existing Tehama-Colusa and GCID Main canals and a new proposed Delevan Pipeline. Tributary source conveyance facilities alternatives included new pipelines from the CBD and Stony Creek. Conveyance facilities alternatives that were evaluated initially had a range of capacity sizes, known as options (Table 2-2), and are illustrated schematically on Figure 2-4.

Table 2-2
Conveyance Facilities Alternatives Considered for Sites Reservoir

Conveyance Facility Alternative	Source	Option Capacity Description
GCID Main Canal[a]	Sacramento River at Hamilton City	Existing 1,800-cfs capacity Expand to 3,000-cfs capacity Expand to 4,000-cfs capacity Expand to 5,000-cfs capacity
Tehama-Colusa Canal[a]	Sacramento River at Red Bluff	Existing 2,100-cfs capacity Modify to 2,700-cfs capacity Expand to 4,000-cfs capacity Expand to 5,000-cfs capacity
Delevan Pipeline[b]	Sacramento River opposite Moulton Weir	1,500-cfs capacity 2,000-cfs capacity 3,000-cfs capacity 4,000-cfs capacity 5,000-cfs capacity
Colusa Basin Pipeline[b]	Colusa Basin Drain	1,000-cfs capacity 3,000-cfs capacity
Stony Creek Pipeline[b]	Stony Creek at Black Butte Afterbay	1,000-cfs capacity 2,100-cfs capacity

[a]Existing conveyance facility.

[b]Proposed new conveyance facility.

Source: DWR and Reclamation, 2008.

2 Incremental Level 4 Water is the additional amount of water identified for each refuge in CVPIA as required for optimum wetland and wildlife habitat development and management (California Department of Fish and Wildlife, 2017)

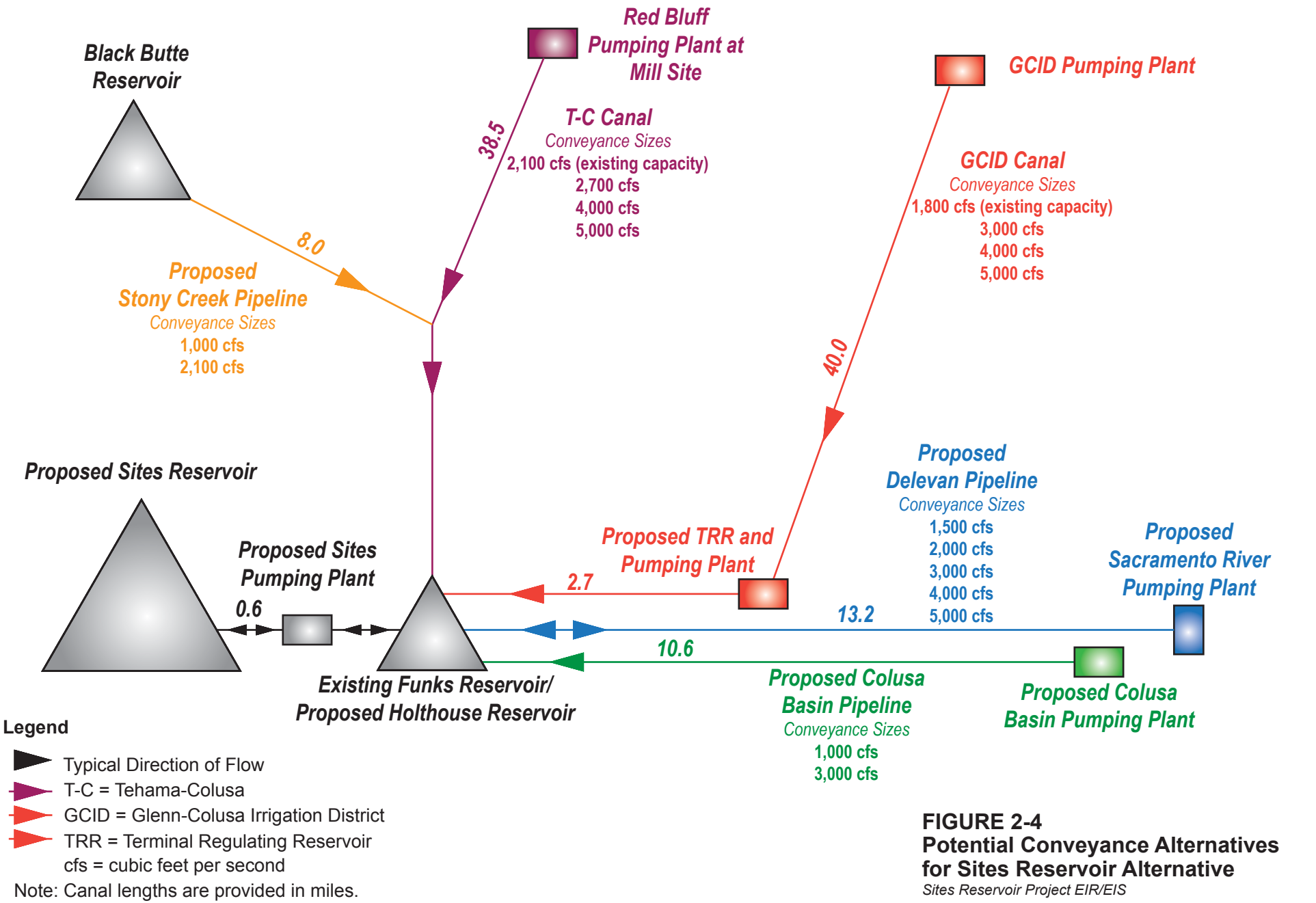


FIGURE 2-4
Potential Conveyance Alternatives for Sites Reservoir Alternative
Sites Reservoir Project EIR/EIS

The options for the conveyance alternatives were evaluated based on the importance of providing direct release to the Sacramento River and preliminary assessments of potential habitat and cultural resources impacts. Table 2-3 summarizes the ability of the option to provide direct releases to the Sacramento River.

Table 2-3
Sacramento River Direct Release Potential for the Sites Reservoir Conveyance Options

Conveyance Facility Alternative	Option Capacity Description	Ability to Provide Direct Release to Sacramento River?
GCID Main Canal[a]	Existing 1,800-cfs capacity Expand to 3,000-cfs capacity Expand to 4,000-cfs capacity Expand to 5,000-cfs capacity	No No No No
Tehama-Colusa Canal[a]	Existing 2,100-cfs capacity Modify to 2,700-cfs capacity Expand to 4,000-cfs capacity Expand to 5,000-cfs capacity	No No No No
Delevan Pipeline[b]	1,500-cfs capacity 2,000-cfs capacity 3,000-cfs capacity 4,000-cfs capacity 5,000-cfs capacity	Yes Yes Yes Yes Yes
Colusa Basin Pipeline[b]	1,000-cfs pipeline capacity 3,000-cfs pipeline capacity	No No
Stony Creek Pipeline[b]	1,000-cfs capacity 2,100-cfs capacity	No No

[a]Existing conveyance facility.

[b]Proposed new conveyance facility.

Source: DWR and Reclamation, 2008.

Based on this initial conveyance evaluation, the following options were eliminated from further consideration:

- **GCID Main Canal Expansions:** Expansion of the GCID Main Canal would require the acquisition of temporary and permanent rights-of-way. For example, the larger GCID Main Canal expansion options would require approximately 1,890 acres of land during construction. Permanent land area acquired for the canal expansion would be 940 acres, of which 727 acres are classified as prime agricultural land (preliminary estimates based on field survey). California's desire to preserve agricultural land is reflected in the California Land Conservation Act, also known as the Williamson Act. Other environmental considerations in the canal expansion footprint would include the loss of 286 elderberry stems greater than 1 inch in diameter, adverse effects on salmon and steelhead related to siphon enlargements, loss of giant garter snake habitat, disturbance of nesting habitat for the Swainson's hawk, and extensive loss of jurisdictional wetlands, including vernal pools. The potential impacts on prime agricultural land and environmental resources associated with these facilities support the recommendation not to further evaluate GCID Main Canal expansions.
- **Tehama-Colusa Canal Modification and Expansions:** There were 2,468 acres of agricultural land determined to be within 100 feet of the Tehama-Colusa Canal modification and expansion area footprint; of these, 1,244 acres are classified as prime agricultural land (preliminary estimates based on field survey). Environmental considerations in the expansion area footprint would include the loss of vernal pool plants and invertebrates, loss of California tiger salamander habitat, loss of

170 elderberry stems greater than 1 inch in diameter, adverse effects on salmon and steelhead related to siphon enlargements, potential giant garter snake habitat loss, disturbance of nesting habitat for the Swainson's hawk, and loss of jurisdictional wetlands, including vernal pools. These potential impacts on prime agricultural land and environmental resources support the recommendation not to further evaluate Tehama-Colusa Canal modifications or expansion.

- **4,000- and 5,000-cfs Delevan Pipeline:** These options were determined to be inefficient due to the additional construction disturbance that would occur along the alignment and need for additional construction materials and duration of construction period as compared to the water supply benefits, especially when compared to smaller conveyance facilities. The smaller pipeline sizes were determined to be able to reliably fill and drain Sites Reservoir when combined with other conveyance options, such as use of existing Tehama-Colusa and GCID Main canals.
- **Colusa Basin Pipeline:** The Colusa Basin Pipeline was considered to convey water from the CBD to the Sites Reservoir. The initial review of the CBD indicated that the supply available would likely coincide with water being available from the Sacramento River for diversion, resulting in a preliminary conclusion that a CBD diversion would likely not justify anticipated costs. Therefore, the Colusa Basin Pipeline conveyance options were not recommended for further consideration but remain under study as a potential future option if economics warrant.
- **Stony Creek Pipeline:** The Stony Creek Pipeline conveyance options would rely on increased capacity of the Tehama-Colusa Canal downstream of Orland. The Tehama-Colusa Canal modification and expansion conveyances were eliminated from further consideration (as indicated above); therefore, the Stony Creek Pipeline as a primary conveyance option was also eliminated from further consideration.

The conveyance options to be evaluated in detail in the EIR/EIS include the following:

- Tehama-Colusa Canal at its existing capacity of 2,100 cfs
- GCID Main Canal at its existing capacity of 1,800 cfs
- A new Delevan Pipeline at capacities of 1,500 cfs, 2,000 cfs, and 3,000 cfs

The Tehama-Colusa and GCID Main canals at their existing capacities were selected for further evaluation because they could be combined to provide conveyance packages with up to 6,900 cfs total capacity for use in alternative development. In addition, these conveyance options allowed for an evaluation of benefits associated with the Delevan Pipeline's ability to return water directly to the Sacramento River.

2.4.3 Sites Reservoir Storage, Conveyance, and Operations Formulation

Based on the initial evaluation of storage, conveyance and operational alternatives, the following Project features were identified to be considered in detail in this EIR/EIS:

- Sites Reservoir Storage Range of Capacities:
  - 0.8 MAF
  - 1.3 MAF
  - 1.8 MAF
- Sites Reservoir Conveyance Concepts:
  - Existing Tehama-Colusa Canal (2,100-cfs capacity)

  - Existing GCID Main Canal (1,800-cfs capacity)
  - New Delevan Pipeline (1,500-cfs, 2,000-cfs, and 3,000-cfs capacity)

- Operational scenario that emphasizes a balance of multiple benefits related to water supply reliability, water quality, and ecosystem enhancement

To further evaluate and optimize reservoir storage and conveyance options, preliminary costs were estimated and operations modeling was performed. Table 2-4 identifies the reservoir storage and conveyance facility options that were evaluated.

Table 2-4
Sites Reservoir Storage and Conveyance Options Combinations

Reservoir Storage	Conveyance			
	Tehama-Colusa and GCID Main Canal Diversion Capacity (cfs)	Delevan Pipeline Diversion Capacity (cfs)	Delevan Pipeline Release Capacity (cfs)	Total Diversion Capacity (cfs)
800 TAF	3,900	0	0	3,900
800 TAF	3,900	1,500	1,125	5,400
800 TAF	3,900	2,000	1,500	5,900
800 TAF	3,900	3,000	2,250	6,900
1.3 MAF	3,900	0	0	3,900
1.3 MAF	3,900	1,500	1,125	5,400
1.3 MAF	3,900	0	1,500	3,900
1.3 MAF	3,900	2,000	1,500	5,900
1.3 MAF	3,900	3,000	2,250	6,900
1.8 MAF	3,900	0	0	3,900
1.8 MAF	3,900	1,500	1,125	5,400
1.8 MAF	3,900	0	1,500	3,900
1.8 MAF	3,900	2,000	1,500	5,900
1.8 MAF	3,900	0	2,250	3,900
1.8 MAF	3,900	3,000	2,250	6,900

Note:
TAF = thousand acre-feet
Source: DWR, 2011.

The purpose of the operations modeling was to reduce the number of possible Project combinations and to help formulate Sites Reservoir alternatives with the most efficient conveyance options and reservoir storage capacities. The operations simulations modeling was performed using an assumed operational scenario that provided a balanced mix of water supply reliability, water quality, and ecosystem enhancement. The water supply yield of the conveyance options and Sites Reservoir storage combinations was analyzed for long-term average and driest-period average hydrologic conditions, as shown in Table 2-5.

Table 2-5
Preliminary Sites Reservoir Storage and Conveyance Options Combinations

Reservoir Storage	Conveyance			
	Tehama-Colusa and GCID Capacity (cfs)	Delevan Pipeline Diversion Capacity (cfs)	Delevan Pipeline Release Capacity (cfs)	Total Diversion Capacity (cfs)
1.8 MAF	3,900	0	1,500	3,900
1.3 MAF	3,900	2,000	1,500	5,900
1.8 MAF	3,900	2,000	1,500	5,900
1.3 MAF	3,900	1,500	1,125	5,400
1.8 MAF	3,900	1,500	1,125	5,400
1.8 MAF	3,900	0	2,250	3,900
1.3 MAF	3,900	0	1,500	3,900
800 TAF	3,900	1,500	1,125	5,400
800 TAF	3,900	2,000	1,500	5,900
1.3 MAF	3,900	0	0	3,900
800 TAF	3,900	0	0	3,900
1.8 MAF	3,900	0	0	3,900

Notes:

Source: DWR, 2011.

Based on the preliminary operations simulations, a 3,000-cfs Delevan Pipeline was eliminated from consideration. Preliminary modeling results of the above-listed conveyance options indicated that a 2,000-cfs conveyance was adequate to meet the Project objectives. In addition, constructing a larger Delevan Pipeline would require a larger intake/discharge structure that would result in greater environmental impacts.

As shown in Table 2-5, the first three reservoir storage and conveyance options combinations are estimated to perform much better than the remainder of the reservoir storage and conveyance options combinations that were considered. These three reservoir size and conveyance options combinations were combined with new hydropower facilities to develop four configurations of Sites Reservoir denoted as Alternatives A, B, C, and D in this EIR/EIS. In addition, Alternative C_1 has been added, which includes the facilities and operational assumptions of Alternative C but assumes no hydropower generation or delayed construction of hydropower facilities to account for potential future power market conditions and anticipated permitting processes.

These action alternatives and the No Project/No Action Alternative provided a range of alternatives for further refinement and detailed analysis in the Feasibility Report and EIR/EIS. Following is a brief description of the No Project/No Action Alternative and Alternatives A, B, C (and C_1), and D that are evaluated in this EIR/EIS:

- **No Project/No Action Alternative:** The No Project/No Action Alternative assumes that no actions would be taken to provide storage north of the Delta to improve water supply reliability, to enhance the survivability of anadromous fish or drinking water quality in the Delta, or to improve flexible hydropower generation.

- **Alternative A – 1.3-MAF Sites Reservoir with Delevan Pipeline:** Alternative A includes a 1.3-MAF Sites Reservoir with conveyance to the reservoir from the Sacramento River provided by the existing Tehama-Colusa and GCID Main canals, and conveyance from the reservoir to the Sacramento River through the new Delevan Pipeline (2,000-cfs diversion/1,500-cfs release). This alternative is assumed to include new hydropower facilities with related overhead power line facilities.
- **Alternative B – 1.8-MAF Sites Reservoir with Release-only Delevan Pipeline:** Alternative B includes a 1.8-MAF Sites Reservoir with conveyance from the Sacramento River to the reservoir provided by the existing Tehama-Colusa Canal and GCID Main Canal, and conveyance from the reservoir to the Sacramento River through the new Delevan Pipeline (1,500-cfs release). This alternative also includes new hydropower facilities with related overhead power line facilities. The reservoir would be larger than under Alternative A; however, the ability to convey water into the reservoir would be less than under Alternative A.
- **Alternative C – 1.8-MAF Sites Reservoir with Delevan Pipeline:** Alternative C includes a 1.8-MAF Sites Reservoir with conveyance from the Sacramento River to the reservoir provided by the existing Tehama-Colusa and GCID Main canals, and conveyance from the reservoir to the Sacramento River through the new Delevan Pipeline (2,000-cfs diversion/1,500-cfs release). This alternative also includes new hydropower facilities with related overhead power line facilities. The reservoir would be larger than under Alternative A and the same size as under Alternative B; however, the ability to convey water into the reservoir would be similar as under Alternative A and greater than Alternative B.
- **Alternative C_1 – 1.8-MAF Sites Reservoir with Delevan Pipeline without Hydropower Facilities**: Alternative C_1 is identical to Alternative C with no difference in project components or facilities but assumes hydropower generation facilities with related overhead power line facilities would not be operated.
- **Alternative D – 1.8-MAF Sites Reservoir with Delevan Pipeline:** Alternative D includes a 1.8-MAF Sites Reservoir with conveyance from the Sacramento River to the reservoir provided by the existing Tehama-Colusa and GCID Main canals, and conveyance from the Reservoir to the Sacramento River through the new Delevan Pipeline (2,000-cfs diversion/1,500-cfs release), as described under Alternative C. This alternative also could include new hydropower facilities with related overhead power line facilities; however, these facilities may not be included in the final implementation of this alternative. The facilities under Alternative D would be similar to those under Alternative C; however, the operations of the reservoir would be different to allow for specified volume of the storage to be used by the local users in this portion of the Sacramento Valley.

It should be noted that the operational scenarios specifically included in Alternatives A, B, C, or D could be integrated into each alternative. For example, operational assumptions for Alternative D could subsequently be considered with the facilities for Alternative A.

Maps and detailed descriptions of Alternatives A, B, C, C_1, and D are presented in Chapter 3 Description of the Sites Reservoir Project Alternatives, including descriptions of construction, operation, and maintenance activities associated with each Project feature.