

2. Alternatives Analysis

2.1 Introduction

The California Environmental Quality Act (CEQA) Guidelines Section 15126.6 requires that an EIR describe and evaluate a reasonable range of alternatives that would feasibly meet most of the basic project objectives but would avoid or substantially lessen significant Project impacts. CEQA also requires that an EIR evaluate the “No Project” alternative along with its impacts. An EIR need only examine in detail alternatives that the lead agency determines could feasibly attain most of the objectives of the project and would avoid or substantially lessen at least one of the significant environmental effects of the project. The range of potential alternatives to the proposed Project does not need to include alternatives that fail to meet most of the Project objectives, are infeasible, or cannot be used to avoid significant environmental impacts.

The National Environmental Policy Act (NEPA) implementing regulations are administered by the Council on Environmental Quality (CEQ) (40 CFR 1500 et seq.). Section 1502.14 of the CEQ regulations for implementing NEPA requires that an EIS rigorously explore and objectively evaluate all reasonable alternatives to the project, including a No Action Alternative. The range of alternatives under NEPA can include reasonable alternatives that are not within the jurisdiction or authorization of the lead agency. Additionally, NEPA requires that an EIS devote substantial treatment to each alternative considered in detail, including the proposed Project, so that reviewers may evaluate their comparative merits.

The Department of the Interior (DOI) has adopted additional regulations [43 CFR 46.415(b)] that would affect EISs prepared by the Bureau of Reclamation (Reclamation). These regulations state that alternatives to be included in an EIS, in addition to the No Action Alternative, must be: (1) reasonable, (2) meet the purpose and need of the proposed project, and (3) address one or more significant issues related to the proposed project. These regulations also state that in addition to criteria in 40 CFR 1502.14, reasonable alternatives must be technically and economically practical or feasible to meet the purpose and need of the proposed project.

The DOI NEPA regulations also state that the lead agencies should consider any consensus-based alternatives developed through direct community involvement by participating persons, organizations, or communities (43 CFR 46.110). However, to be considered as a reasonable alternative, the alternatives must be consistent with NEPA and other federal requirements, as described above, as well as DOI written policies and guidance.

This chapter summarizes the alternatives development process and alternatives analysis for the Sites/Reservoir/NODOS Project. A detailed description of this comprehensive and iterative process is included in Appendix 2A Screening of Range of Surface Water Storage Alternatives.

2.1.1 Project Objectives and Purpose and Need Statement

As described in Chapter 1 Introduction, the reason for the proposed Project is to build an offstream surface water storage reservoir located north of the Delta. The proposed Project’s primary objectives and purpose and needs are to:

- Improve water supply reliability for local Sacramento Valley uses as well as statewide agricultural, urban, and environmental uses.

- 1 • Increase survival of anadromous and endemic fish populations.
- 2 • Improve environmental and drinking water quality in the Delta.
- 3 • Provide flexible hydropower generation to support integration of renewable energy sources.
- 4 Secondary objectives for the proposed Project were identified as:
 - 5 • Develop additional recreation opportunities.
 - 6 • Provide incremental flood damage reduction opportunities.
 - 7 • Develop operational flexibility.

8 **2.2 Approach to Alternatives Analysis**

9 **2.2.1 Previous Reservoir Alternatives Analyses**

10 As described in Chapter 1 Introduction, and Appendix 2A Screening of Range of Surface Water Storage
 11 Alternatives, multiple alternatives to develop north-of-the-Delta offstream reservoirs have been developed
 12 and evaluated since 1930. These alternatives have included reservoirs that have been constructed (e.g.,
 13 Black Butte Reservoir on Stony Creek) and the following proposed facilities that were not constructed:

- 14 • Sites Reservoir (Stone Corral and Funks Creek)
- 15 • Neville Reservoir (North Fork Stony Creek)
- 16 • Colusa Reservoir (Willow, Logan, Hunters, Funks, and Stone Corral creeks)
- 17 • Glenn Reservoir (Stony Creek)
- 18 • Millsite Reservoir (Stony Creek downstream of Black Butte Reservoir)
- 19 • Schoenfield Reservoir (on Red Bank Creek)
- 20 • Paskenta Reservoir (Thomes Creek)
- 21 • Dutch Gulch Reservoir (Cottonwood Creek)
- 22 • Tehama Reservoir (Cottonwood Creek)

23 Federal, State, and local agencies signed the Bay-Delta Framework Agreement in December 1994, which
 24 led to the adoption of the Bay-Delta Accord and initiation of the CALFED Bay-Delta Program
 25 (CALFED) Program in 1995 (CALFED, 2000c). The CALFED Program initiated the evaluation of
 26 expanded surface water storage in the Sacramento Valley as part of a long-term comprehensive plan to
 27 restore the ecological health and improve water management to protect beneficial uses in the Delta and
 28 the Delta watershed. The CALFED Program identified the need for an additional 3.0 million acre-feet
 29 (MAF) of storage to be located north of the Delta to meet environmental and water supply needs. The
 30 CALFED Program also expressed a preference for offstream over onstream storage to avoid redirected
 31 impacts on aquatic species. The CALFED Program initially identified 52 potential surface storage
 32 locations¹ but retained only 12 reservoir locations statewide for further study (CALFED, 2000c). For a
 33 summary of the CALFED Program Inventory of Potential Surface Water Storage Sites, refer to
 34 Appendix 2A Screening of Range of Surface Water Storage Alternatives. Recommendations in the Final
 35 EIR/EIS for CALFED included actions to increase reservoir storage in the Sacramento Valley upstream

¹The 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* added the San Luis Enlargement to the list of potential sites.

1 of the Delta through expansion of Shasta Lake and potential implementation of Sites Reservoir following
2 additional studies.

3 The CALFED Bay-Delta Authority and California Department of Water Resources (DWR), with
4 technical assistance from Reclamation, initiated the Integrated Storage Investigation in 1997 to develop
5 information to be considered in the evaluation of surface water storage projects in the CALFED EIR/EIS.
6 The Integrated Storage Investigation considered five potential surface water projects, including the North-
7 of-the-Delta Offstream Storage (NODOS) Investigation. The NODOS Investigation under the Integrated
8 Storage Investigation was conducted in coordination with several local entities, including the Glenn-
9 Colusa Irrigation District (GCID) and Tehama-Colusa Canal Authority (TCCA), which are members of
10 the Sites Project Authority (SPA).

11 Preliminary results from the Integrated Storage Investigation were used to inform the analysis of
12 12 potential surface water reservoir sites and several groundwater storage locations, including Sites,
13 Schoenfield, Newville, and Colusa reservoirs, in the CALFED EIR/EIS. The range of alternatives
14 considered and the results of the screening analysis conducted in the CALFED EIR/EIS are summarized
15 below and described in more detail in Appendix 2A Screening of Range of Surface Water Storage
16 Alternatives.

17 The Final CALFED EIR/EIS and the CALFED Record of Decision (ROD) (CALFED, 2000d) relied
18 upon information presented in the 2000 NODOS Progress Report (CALFED, 2000a). In that analysis,
19 DWR and Reclamation determined that the Schoenfield and Colusa reservoirs should not be evaluated in
20 detail in subsequent analyses based on potential adverse environmental effects and feasibility
21 considerations. The Final CALFED EIR/EIS and the CALFED ROD recommended additional studies for
22 the NODOS Project to provide additional engineering and environmental analyses as well as development
23 of fund-sharing agreements. The CALFED ROD indicated that the NODOS Project could enhance water
24 management flexibility and water supply reliability in the Sacramento Valley, improve fish survival, and
25 improve water quality.

26 Following the CALFED ROD, DWR and Reclamation continued to analyze potential locations for the
27 NODOS reservoir. The 2006 NODOS Initial Alternatives Information Report (DWR, 2006) analyzed the
28 No Project/No Action Alternative, as well as the Red Bank, Colusa Reservoir, Newville Reservoir, and
29 Sites Reservoir alternatives in greater detail, consistent with NEPA and CEQA requirements, as
30 summarized below. Based on the detailed evaluation of these alternatives, the Sites Reservoir Alternative
31 was selected as the preferred proposed Project alternative (see Appendix 2A Screening of Range of
32 Surface Water Storage Alternatives).

33 **2.2.2 Development of Reservoir Alternatives for this EIR/EIS**

34 The process for developing the alternatives to be evaluated in detail in this EIR/EIS was initiated in the
35 1997 Integrated Storage Investigation by DWR and Reclamation, as described above. During the
36 development of this EIR/EIS, alternative locations for offstream storage located north of the Delta were
37 reconsidered. In addition, comments received during the scoping process (see Appendix 36A Consultation
38 and Coordination) were considered in the development of the alternatives. As summarized below and
39 described in Appendix 2A Screening of Range of Surface Water Storage Alternatives, the alternative
40 reservoir locations were compared to screening criteria in a three-step screening process.

1 **2.2.2.1 NODOS Reservoir Location Alternatives**

2 The four NODOS reservoir alternatives evaluated in detail in the 2000 and 2006 NODOS investigations
3 (CALFED, 2000b; DWR, 2006) are briefly described below and are shown on Figure 2-1.

- 4 • **Red Bank Alternative (Schoenfield Reservoir):** The Red Bank Alternative was proposed to include
5 facilities located approximately 17 miles west of the City of Red Bluff in Tehama County. This
6 project would include a 104 thousand acre-foot (TAF) Dippingvat Reservoir on South Fork
7 Cottonwood Creek, and a 250-TAF Schoenfield Reservoir on Red Bank Creek. The primary source of
8 water would be from South Fork Cottonwood Creek, with water diverted from Dippingvat Reservoir
9 to Schoenfield Reservoir. Two small dams and reservoirs, Lanyan and Bluedoor, would be located on
10 small tributaries of Red Bank Creek and would be part of the conveyance from Dippingvat to
11 Schoenfield. Dippingvat Reservoir would be an onstream storage facility used for short-term storage
12 and diversion; Schoenfield is considered to be an offstream storage facility. This alternative location
13 was designed to allow water stored in Schoenfield Reservoir to be released down Red Bank Creek
14 directly into the Tehama-Colusa Canal intake. The Red Bank Alternative was conceived to provide an
15 alternative water supply to the Tehama-Colusa Canal which would not require operation of the then-
16 Red Bluff Diversion Dam (RBDD) during critical fish passage periods.
- 17 • **Newville Reservoir Alternative:** The Newville Reservoir was proposed to be located upstream from
18 Black Butte Reservoir, approximately 18 miles west of the City of Orland and 23 miles west-
19 southwest of the City of Corning in Glenn and Tehama counties. Alternative reservoir sizes of 1.9
20 MAF and 3.0 MAF were considered. The 1.9-MAF reservoir would be formed by a dam on North
21 Fork Stony Creek and a saddle dam at Burrows Gap. The 3.0-MAF reservoir would require up to five
22 additional saddle dams and a dike. A small diversion dam and diversion from Thomes Creek would
23 transfer water to the reservoir. Other water source options include Stony Creek and the Sacramento
24 River.
- 25 • **Colusa Reservoir Alternative:** The Colusa Reservoir was proposed to be located in north-central
26 Colusa County and south-central Glenn County, approximately 12 miles southwest of the community
27 of Willows and 10 miles west of Maxwell. The 3.0-MAF Colusa Reservoir would include the area
28 inundated by the 1.8-MAF Sites Reservoir (described below) plus the adjacent Logan Creek and
29 Hunters Creek watersheds to the north (known as the Colusa Cell). The Colusa Cell would require
30 four major dams along Logan Ridge in addition to those described for Sites Reservoir: one for Logan
31 Creek and three for Hunters Creek and its tributaries. Water source and conveyance options for
32 diversion and delivery to offstream storage would be similar to those for Sites Reservoir.
- 33 • **Sites Reservoir Alternative (Proposed Project):** The 1.8-MAF Sites Reservoir would be located in
34 Antelope Valley, approximately 10 miles west of the town of Maxwell in Glenn and Colusa counties,
35 and would be formed by constructing two major dams on Stone Corral Creek and Funks Creek and
36 nine saddle dams along the southern edge of the Hunters Creek watershed. Diversions from the
37 Colusa Basin Drain (CBD), the Sacramento River, and local tributaries were considered in these
38 previous studies as potential sources of water supply for Sites Reservoir.

39 **2.2.2.2 Alternatives Identified in the Scoping Process**

40 During the scoping process for this EIR/EIS in 2001 and 2002, numerous individual verbal and written
41 comments were received. Thirty-three people gave verbal comments during the four public scoping
42 meetings. Thirty-four letters were received during scoping that contained numerous comments.

1 The scoping comments included 96 scoping comments that addressed development of alternatives in the
 2 EIR/EIS. Thirteen comments related to level of detail to be included in the impact analyses, and
 3 10 comments related to assumptions to be considered under the No Action Alternative. These comments
 4 were considered in the development of the EIR/EIS, including development of the No Action Alternative
 5 (see Appendixes 2B through 2D).

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

12 Four scoping comments were received related to expanding Shasta Lake. However, these types of
 13 alternatives were considered under a separate storage investigation, the effects of which are evaluated in
 14 this EIR/EIS under cumulative impacts.

15 Sixty scoping comments were received related to NODOS alternatives, including the need to consider
 16 several reservoir locations (e.g., Sites and Newville), conveyance facilities, and water sources. Several
 17 comments addressed potential road locations if Sites Reservoir is constructed and the effects of such
 18 relocations on access to remaining landowners and the local economy. Most of the comments specific to
 19 Newville Reservoir opposed the Newville Reservoir formulation due to potential impacts on the wildlife
 20 and fish habitat, cultural resources, and historical resources at the Newville Reservoir site and impacts on
 21 wildlife habitat and cattle along proposed access roads.

22 Therefore, the range of reservoir alternatives was not modified based upon scoping comments.

23 **2.2.2.3 Reservoir Alternatives Screening Analysis**

24 The four reservoir location alternatives (Red Bank and Newville, Colusa, and Sites reservoirs), all of
 25 which are located north of the Delta consistent with the purpose and need statement for the project, were
 26 compared to screening criteria in a three-step screening process based upon legal considerations under
 27 CEQA and NEPA.

28 The first screening criterion was based upon the ability of the alternatives to meet the project objectives
 29 and purpose and need statement to improve water supply reliability and water quality, increase survival of
 30 native fish populations, provide recreation and flood management opportunities, and provide operational
 31 flexibility. The four reservoir alternatives would be consistent with this first step of the screening process.

32 The second screening criterion was related to avoiding or reducing adverse effects. The second screening
 33 step focused on reductions in jurisdictional wetlands and other waters of the U.S. and potential impacts on
 34 sensitive aquatic and terrestrial habitats. Under the second step of the screening process, the Red Bank
 35 and Colusa Reservoir alternatives were eliminated from detailed analyses, as described in Appendix 2A
 36 Screening of Range of Surface Water Storage Alternatives. The Sites and Newville reservoirs appeared to
 37 be relatively similar at the level of detail considered in the second step of the screening process.

38 The third screening criterion was related to avoiding or reducing adverse effects and/or providing
 39 benefits. The third screening step focused on a more detailed review of potential effects on cultural
 40 resources, aquatic and terrestrial biological resources, jurisdictional wetlands and other waters of the U.S.,
 41 energy use and greenhouse gas emissions related to pumping of water into the reservoir, and flood

1 management opportunities. Under the third step of the screening process, Newville Reservoir was
2 eliminated from further consideration.

3 **Summary of Reservoir Alternatives Screening Process**

4 Under this screening process, the Sites Reservoir location was identified as the proposed Project reservoir
5 alternative.

6 **2.2.3 Reservoir Alternatives Considered but Eliminated from Further Consideration**

7 As described above, reservoir alternatives were considered prior to initiating this EIR/EIS, which are
8 further discussed in Appendix 2A Screening of Range of Surface Water Storage Alternatives. The Red
9 Bank, Colusa Reservoir, and Newville Reservoir alternatives were considered for detailed analysis in this
10 EIR/EIS and evaluated through a three-step screening process discussed above and in Appendix 2A
11 consistent with the Notice of Preparation (NOP) and Notice of Intent (NOI) issued by DWR and
12 Reclamation, respectively.

13 DWR's November 5, 2001, NOP and Reclamation's November 9, 2001, NOI indicated that the No
14 Project/No Action, Sites Reservoir, and Newville Reservoir alternatives would be analyzed in the
15 NODOS Project EIR/EIS. However, as described above and in Appendix 2A Screening of Range of
16 Surface Water Storage Alternatives, the Newville Reservoir was eliminated from detailed analyses
17 following the third step of the alternatives screening process.

18 Reclamation's NOI also allowed for the evaluation of other alternatives to meet NODOS Project
19 objectives, including conjunctive use or Shasta Lake enlargement, either as stand-alone projects or in
20 conjunction with other NODOS Project alternatives. Subsequent evaluations by programs completed by
21 other entities determined that the potential for conjunctive use is limited because Sacramento Valley
22 groundwater basins recharge annually, leaving insufficient space for appreciable operable storage (NHI
23 and GCID 2011; URS 2007) and use to meet the project objectives. Conjunctive use was, therefore, not
24 retained as a feasible alternative.

25 Reclamation is continuing to investigate the potential enlargement of Shasta Lake as part of its Shasta Lake
26 Water Resources Investigation. As a result, Shasta Lake enlargement was not retained as a feasible alternative
27 to meet NODOS Project objectives. However, potential enlargement of Shasta Lake is included in the
28 cumulative impact analysis.

29 **2.2.4 Range of Alternatives for Sites Reservoir**

30 Following the alternatives screening process, the NODOS Investigation process continued to develop
31 alternative concepts for implementing Sites Reservoir. This included developing four configurations
32 related to water sources, conveyance facilities, and operational considerations. Several of these
33 configurations were developed based upon comments received during the scoping process and
34 subsequently in meetings with the public, public agencies, and interest groups.

35 The alternatives for Sites Reservoir are hereafter called Alternative A, Alternative B, Alternative C (and
36 C₁), and Alternative D. For purposes of CEQA, these alternatives should be considered as four variations
37 of the Sites Reservoir Alternative (the proposed Project alternative). For NEPA purposes, Alternatives A,
38 B, C (and C₁), and D and the No Project/No Action Alternative were considered as a range of reasonable
39 alternatives.

2.3 Existing Conditions

The CEQA Baseline for assessing significance of impacts of the proposed Project is the environmental setting, or Existing Conditions, at the time a NOP is issued, as provided for in CEQA Guidelines section 15125. However, the CEQA lead agency has the discretion, where appropriate, to fully or partially update baseline conditions beyond the time of the issuance of the NOP. The CEQA Baseline is developed to assess the significance of impacts of the proposed Project in relation to the actual environment upon which the proposed Project will operate. Generally, this environment is represented by conditions that exist at the time the NOP is issued. However, if the preparation of the EIR occurs over many years, it may be more relevant to expand the definition to include programs, projects, or policies that have been implemented during the preparation of the EIR.

The NOP for the proposed Project was published on November 5, 2001. However, because the preparation of this environmental document has occurred over many years, it was deemed necessary to update the baseline condition to June 2009 to include programs, projects, or policies that have been implemented during the document's preparation. Changes in the regulatory environment since November 2001 have fundamentally changed water management in California and necessitate updating the baseline conditions for environmental analyses in this DEIR/EIS. These changes include the issuance of new biological opinions by the U.S. Fish and Wildlife Service (USFWS) in December 2008 and the National Marine Fisheries Service (NMFS) in June 2009 on the operations of the State Water Project (SWP) and Central Valley Project (CVP). Consequently, June 2009 (following the release of NMFS' biological opinion) was selected as the proposed Project's Existing Conditions date.

2.4 Alternatives Selected for Detailed Analysis

The alternatives retained for further consideration in this EIR/EIS include the No Project Alternative/No Action Alternative and Alternatives A, B, C (and C₁), and D.

2.4.1 No Project Alternative

CEQA requires an analysis of an alternative in which the proposed 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 proposed Project with the future conditions of not approving the proposed Project. Under CEQA, the No Project Alternative is the baseline for assessing the significance of impacts of the proposed Project (CEQA Guidelines section 15126.6 subsection (c) (1)). Analysis of the No Project Alternative proceeds along different lines depending upon the nature of the project. Where, as here, the project is a development project on identifiable property, the "no project" alternative is the circumstance under which the project does not proceed (CEQA Guidelines section 15126.6 subsection (e) (3)(B)). The No Project Alternative compares the environmental effects of the property remaining in its existing state against environmental effects which would occur if the project is approved.

CEQA Guidelines section 15126.6, subdivision (e)(2), indicates that No Project conditions 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.

Many of the reasonably foreseeable programs and projects included within the No Project Alternative will affect water supply, water quality, or anadromous fisheries conditions as compared to the Existing Conditions.

1 2.4.2 No Action Alternative

2 Similar to CEQA, NEPA also requires an analysis of an alternative in which the proposed Project is not
 3 implemented. The No Action Alternative is used as a basis of comparison to determine the environmental
 4 effects, including cumulative effects, of the proposed Project and alternatives is defined as the No Action
 5 Alternative. The No Action Alternative also demonstrates the future conditions without implementation
 6 of the proposed Project or the other action alternatives. The No Action Alternative generally focuses on
 7 programs, projects, or policies that would affect or be affected by the proposed Project or the alternatives.
 8 The No Action Alternative represents a projection of current conditions to reasonably foreseeable future
 9 conditions that could occur if the proposed Project or alternatives are not implemented assuming
 10 continuation of existing policies and management direction. The No Action Alternative includes Existing
 11 Conditions and future actions that are authorized and approved through completion of NEPA, CEQA, and
 12 Endangered Species Act (ESA) compliance processes.

13 The No Action Alternative assumptions for this EIR/EIS are consistent with the assumptions included in
 14 the No Project Alternative; therefore, analysis of the No Action Alternative is the same as for the No
 15 Project Alternative, and the two are treated as one alternative in this document. The No Project/No Action
 16 Alternative assumptions include the assumptions related to the SWP and CVP, ongoing programs and
 17 policies by governmental and nonprofit entities, and assumptions related to annual actions that vary every
 18 year. The No Project/No Action Alternative includes projects and programs with clearly defined
 19 management and/or operational plans, including facilities being constructed as of June 2009². The No
 20 Project/No Action Alternative also includes projects and programs that were consistent with existing
 21 management direction in 2009 and, if appropriate, had completed environmental documentation. Those
 22 actions are consistent with the continuation of existing management direction or level of management for
 23 plans, policies, and operations by the lead agencies and other agencies. Table 2-1 provides a summary of
 24 SWP and CVP operations included in the No Project/No Action Alternative.

Table 2-1
Summary of SWP and CVP Operations Included in the No Project/No Action Alternative

Non-SWP and CVP Project: Water Rights: Pursuant to water rights and SWRCB Decision for Existing Facilities
Federal and State Refuges with Level 2 Water Supplies: Firm Level 2 water needs provided by CVP
Level 4 Refuge Supplies: Incremental difference between Level 4 and Level 2 water supplies assumed to be provided through water transfers
American River Demands: Water Rights: Full water rights CVP Contracts: Full contracts, including Freeport Regional Water Project
Operations of SWP Facilities: Existing Facilities Operations in accordance with Coordinated Operations Agreement, SWRCB D-1641, and 2008 USFWS and 2009 NMFS biological opinions Proposed FERC License Renewal for Oroville Project South Bay Aqueduct Improvement and Enlargement Project

² The lead agencies have established June 2009 as the Existing Conditions date; it is characterized in Chapters 6 through 31 as the Environmental Setting/Affected Environment discussion.

**Table 2-1
Summary of SWP and CVP Operations Included in the No Project/No Action Alternative**

<p>Operations of CVP Facilities: Existing Facilities Operations in accordance with Coordinated Operations Agreement, SWRCB D-1641, and 2008 USFWS and 2009 NMFS biological opinions Red Bluff Diversion Dam Fish Passage Improvement Facilities Interim implementation for San Joaquin River Restoration Plan Freeport Regional Water Project Delta Mendota Canal-California Aqueduct Intertie</p>
<p>Operations of non-CVP Facilities: City of Stockton Delta Water Supply Project Contra Costa Water District's Middle River Intake and Pump Station (previously known as the Alternative Intake Project) Contra Costa Fish Screen Project (Rock Slough) Los Vaqueros Reservoir Expansion to 160 TAF of total storage capacity Full implementation of Grasslands Bypass Project</p>

Notes:

CVP = Central Valley Project
FERC = Federal Energy Regulatory Commission
NMFS = National Marine Fisheries Service
SWP = State Water Project
SWRCB = State Water Resources Control Board
TAF = thousand acre-feet
USFWS = U.S. Fish and Wildlife Service

- 1 The projects and programs that are included in the No Project/No Action Alternative are summarized in
- 2 Table 2-2. For a more detailed description of each project or program included in the No Project/No
- 3 Action Alternative, refer to Appendix 2B.
- 4 The No Project/No Action Alternative includes continued implementation of operations, maintenance,
- 5 enforcement, and protection programs by federal, State, and local agencies and non-profit groups, as
- 6 summarized in Table 2-3 and described in detail in Appendix 2C.

**Table 2-2
Projects and Programs Included in the No Project/No Action Alternative**

Agency	Project/Program	Comments
California Department of Water Resources	Mayberry Farms Subsidence Reversal and Carbon Sequestration Project	Completed in 2010.
Contra Costa Water District	Contra Costa Canal Fish Screen Project	Completed in late 2011.
Contra Costa Water District, Bureau of Reclamation, and California Department of Water Resources	Middle River Intake and Pump Station (previously known as the Alternative Intake Project)	Completed in July 2010.
California Department of Water Resources	FERC License Renewal for Oroville Project	Final EIR in 2008.
Freeport Regional Water Authority and Bureau of Reclamation	Freeport Regional Water Project	Completed in 2011.
City of Stockton	Delta Water Supply Project - Phase I	Completed in 2012.

**Table 2-2
Projects and Programs Included in the No Project/No Action Alternative**

Agency	Project/Program	Comments
Bureau of Reclamation and State Water Resources Control Board	Battle Creek Salmon and Steelhead Restoration Project	Construction started in 2009. Estimated completion in 2017.
Tehama-Colusa Canal Authority and Bureau of Reclamation	Red Bluff Diversion Dam Fish Passage Improvement Project	Completed in September 2012.
Bureau of Reclamation, California Department of Fish and Wildlife, and Natomas Central Mutual Water Company	American Basin Fish Screen and Habitat Improvement Project	Completed in 2014.
Bureau of Reclamation	Delta-Mendota Canal/California Aqueduct Intertie	Completed in April 2012.
Bureau of Reclamation, U.S. Army Corps of Engineers, Sacramento Area Flood Control Agency, and Central Valley Flood Protection Board	Folsom Dam Safety and Flood Damage Reduction Project	Being constructed. Estimated completion in 2016. Operations Manual under development.
Zone 7 Water Agency and California Department of Water Resources	South Bay Aqueduct Improvement and Enlargement Project	Completed in 2012.

Notes:

EIR = Environmental Impact Report

FERC = Federal Energy Regulatory Commission

- 1 Many ongoing programs include development of future projects that would require separate
 2 environmental documentation as well as continued operations, maintenance, and/or enforcement
 3 activities. The No Project/No Action Alternative does not include future projects that have not been
 4 specifically defined or do not have completed environmental documentation. It is recognized that it is the
 5 intent of the SWP and CVP to comply with the NMFS Operations and USFWS Operations biological
 6 opinions, although the specific actions for new facilities have not been identified or evaluated at this time.

**Table 2-3
Ongoing Programs Included in the No Project/No Action Alternative**

Agency	Program
California Department of Boating and Waterways	<i>Egeria densa</i> Control Programs
California Department of Boating and Waterways	Water Hyacinth Control Programs
California Department of Fish and Wildlife	Invasive Species Program
California Department of Fish and Wildlife	California Aquatic Invasive Species Management Plan
California Department of Fish and Wildlife	Zebra Mussel Rapid Watch Program and Response Plan for California
California Department of Fish and Wildlife	Fish Screen Passage Program
California Department of Fish and Wildlife	Yolo Bypass Wildlife Area Land Management Plan
California Department of Fish and Wildlife and U.S. Fish and Wildlife Service	Hatchery and Stocking Program

PRELIMINARY – SUBJECT TO CHANGE

PRELIMINARY WATER STORAGE INVESTMENT PROGRAM DRAFT 2016 SITES RESERVOIR NORTH-OF-THE-DELTA OFFSTREAM STORAGE PROJECT EIR/EIS

**Table 2-3
Ongoing Programs Included in the No Project/No Action Alternative**

Agency	Program
California Department of Fish and Wildlife, California Department of Food and Agriculture, and California State Parks	Watercraft Inspection Programs
California Department of Water Resources	Delta Levees Flood Protection Program
California Department of Water Resources	Levee Repair-Levee Evaluation Program
California Department of Water Resources	Interagency Ecological Program
California Department of Water Resources	South Delta Temporary Barriers Program
California Department of Water Resources	Stockton Deep Water Ship Channel Demonstration Dissolved Oxygen Project
California Department of Water Resources	Zebra Mussel Watch Program
California Department of Water Resources and California Department of Fish and Wildlife	Delta Fish Agreement (Four Pumps Project)
California Department of Water Resources and Yuba County Water Agency	Lower Yuba River Accord
California State Lands Commission	Marine Invasive Species Program
Central Valley Regional Water Quality Control Board	Cache Creek, Bear Creek, Sulfur Creek, Harley Gulch Mercury TMDL
Central Valley Regional Water Quality Control Board	Irrigated Lands Regulatory Program
California Partners in Flight	Riparian Habitat Joint Venture
Central Valley Joint Venture Program	Central Valley Joint Venture
Contra Costa County and East Contra Costa County Habitat Conservancy	East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan
Delta Protection Commission	Delta Protection Commission Land Use and Resource Management Plan Update
East Bay Municipal Utility District	Lower Mokelumne River Spawning Habitat Improvement Project
National Marine Fisheries Service, Bureau of Reclamation, and California Department of Water Resources	Biological Opinion on the Long-Term Operations of the CVP and SWP (Sacramento River Winter-run Chinook Salmon, Central Valley Spring-run Chinook Salmon, Central Valley Steelhead, Southern Distinct Population Segment of North American Green Sturgeon, and Southern Resident Killer Whales)
Sacramento County	Sacramento International Airport Master Plan
Sacramento Area Flood Control Agency, Central Valley Flood Protection Board, and U.S. Army Corps of Engineers	Flood Management Program
Sacramento County, Sacramento, Citrus Heights, Elk Grove, Folsom, Galt, and Rancho Cordova	Sacramento Stormwater Quality Partnership
San Francisco Bay Regional Water Quality Control Board	San Francisco Bay Mercury TMDL
San Joaquin Council of Governments	San Joaquin County Multi-Species Habitat Conservation and Open Space Plan
San Joaquin County, Stockton, Tracy, and State Water Resources Control Board	San Joaquin County, Stockton, and Tracy Stormwater Management Programs
Bay Area Stormwater Management Association Agencies	Bay Area Stormwater Management Programs

PRELIMINARY – SUBJECT TO CHANGE

PRELIMINARY WATER STORAGE INVESTMENT PROGRAM DRAFT 2016 SITES RESERVOIR NORTH-OF-THE-DELTA OFFSTREAM STORAGE PROJECT EIR/EIS

**Table 2-3
Ongoing Programs Included in the No Project/No Action Alternative**

Agency	Program
U.S. Army Corps of Engineers	Delta Dredged Sediment Long-Term Management Strategy
U.S. Army Corps of Engineers	Suisun Bay Channel Operations and Maintenance
U.S. Army Corps of Engineers	Suisun Channel (Slough) Operation and Maintenance
Bureau of Reclamation and California Department of Water Resources	Water Year 2010 Interim Flows Project (San Joaquin River)
Bureau of Reclamation and U.S. Fish and Wildlife Service	Anadromous Fish Screen Program
Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, California Department of Water Resources, and Department of Fish and Wildlife	San Joaquin River Restoration Program
U.S. Coast Guard	Ballast Water Management Program
U.S. Environmental Protection Agency and State Water Resources Control Board	Implementation of TMDL objectives in accordance with schedule published as of 2016
U.S. Fish and Wildlife Service	Stone Lakes National Wildlife Refuge Comprehensive Conservation Plan
U.S. Fish and Wildlife Service	North American Waterfowl Management Plan
U.S. Fish and Wildlife Service, Bureau of Reclamation, and California Department of Water Resources	Biological Opinion on the Long-Term Operations of the CVP and SWP (Delta Smelt)
U.S. Fish and Wildlife Service, Bureau of Reclamation, and California Department of Fish and Wildlife	San Joaquin Basin Action Plan
University of California, Davis and California Department of Water Resources	Smelt Hatchery Program
Yolo County	Yolo County Stormwater Management Program

Notes:

CVP = Central Valley Project

SWP = State Water Project

TMDL = total maximum daily load

1 The following are other key assumptions for the No Project/No Action Alternative:

- 2 • The California Endangered Species Act (CESA) and the federal ESA would continue to be
3 implemented on a case-by-case basis for future programs and projects that have a potential to take
4 listed species pursuant to each act.
- 5 • The No Project/No Action Alternative assumes settlement and exchange water rights holders in the
6 Sacramento and San Joaquin river watersheds will use their full contract amounts by 2025 based on
7 their contracts with Reclamation.
- 8 • The No Project/No Action Alternative assumes continued operations of flood management facilities
9 by the federal, State, and local agencies. In addition, the No Project/No Action Alternative assumes
10 that, without future engineering and environmental analyses, levee failures due to flooding, erosion,
11 subsidence, wave action, seismic events, burrowing animals, physical encroachment (such as barge
12 collisions), or other causes would be repaired as part of ongoing programs. The No Project/No Action
13 Alternative assumes that these repairs also would occur on privately owned levees that are integral to

- 1 the main waterways in the Delta, such as repairs that occurred to privately owned levees following the
2 1996 and 1997 floods.
- 3 • The No Project/No Action Alternative also includes existing facilities for SWP, CVP, and Contra
4 Costa Water District, and the Tehama-Colusa Canal and Glenn-Colusa Irrigation District Canal.
5 Summary descriptions of these facilities are provided in Appendix 2D.
 - 6 • Operations of the SWP and CVP by DWR and Reclamation, respectively, are described in the
7 August 2008 Biological Assessment for the Long-term OCAP for the CVP and SWP prepared by
8 Reclamation and modified by the 2008 USFWS and 2009 NMFS biological opinions.
 - 9 • SWP and CVP operational assumptions also include continued operations under the Coordinated
10 Operations Agreement; SWRCB Decision 1641 (D-1641); use of Joint Points of Diversion (which
11 allows DWR and Reclamation to use both the SWP and CVP diversion capacity capabilities in
12 accordance with D-1641); SWRCB Water Quality Control Plan adopted in 2006; and implementation
13 of the *Central Valley Project Improvement Act including environmental water actions in accordance*
14 *with Section 3406(b)(2)*.
 - 15 • The No Project/No Action Alternative includes completion of the RBDD Fish Passage Improvement
16 Project, and year-round gates out operations.
 - 17 • The No Project/No Action Alternative does not assume new Delta conveyance facilities to be in place,
18 rather Delta exports would continue to be diverted from the southern Delta and conveyed to the Banks
19 and Jones pumping plants.
 - 20 • The No Project/No Action Alternative does not include assumptions of future changes in facilities
21 operations, land use, or policies to accommodate or mitigate the adverse impacts associated with
22 climate change and/or sea-level rise.
 - 23 • The No Project/No Action Alternative does not include assumptions for climate change related to sea-
24 level rise and changes in precipitation patterns, including changes in ratios between snow and rainfall.
25 A sensitivity analysis to account for climate change effects on the proposed Project was performed
26 and is presented in Chapter 25 Climate Change and Greenhouse Gas Emissions.
 - 27 • Population growth is expected to continue to occur in California throughout the period of project
28 analysis (i.e., 100 years).

29 **2.4.3 Sites Reservoir Alternatives**

30 Following selection of the Sites Reservoir Alternative as the proposed reservoir alternative (proposed
31 Project), as described above and in Appendix 2A Screening of Range of Surface Water Storage
32 Alternatives, necessary proposed Project features were conceptually developed and refined, including
33 analyses of reservoir storage size, conveyance, and operational alternatives to maximize achievement of
34 the Project objectives, including those shown on Figures 2-2 and 2-3. Configurations of the facilities were
35 compiled into the following alternatives to be evaluated in detail in this EIR/EIS: Alternatives A, B, C
36 (and C₁), and D.

37 **2.4.3.1 Sites Reservoir Storage Size Alternatives**

38 Various storage capacities for Sites Reservoir were considered, including 800 TAF, 1.27 MAF,
39 1.81 MAF, and 2.1 MAF. This range of storage values allowed for a useful comparison of the costs and

1 benefits estimates that was completed in a separate analysis by the lead agencies. The values for storage
 2 capacities were selected because they also represent points on the cost curve where the proposed Project's
 3 costs would change significantly due to the need for new Project features, such as dams or embankments,
 4 as storage capacity and surface water elevations increase.

5 Table 2-4 presents a summary of each Sites Reservoir storage capacity concept that was initially
 6 considered, including the total number of dams that would be required to impound Sites Reservoir and the
 7 total embankment volume that would be required for each of the four storage capacities.

**Table 2-4
 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
1.27	480	12,400	2 + 7	11,018,400
1.81	520	14,200	2 + 9	22,009,000
2.10	540	15,100	2 + 7 ^b	33,800,000

^aTotal number of dams includes the Sites and Golden Gate dams and the saddle dams.

^bSaddle dams 7, 8, and 9 become one continuous embankment for the 2.1-MAF reservoir.

Notes:

MAF = million acre-feet

Source: DWR, 2004

8 Based on a review of the reservoir rim topography, site geology, and a cursory evaluation of the
 9 relationship between embankment volume and reservoir storage, it was determined that a 2.1-MAF
 10 reservoir may present significant design challenges. Reservoir elevations at or above 540 feet elevation
 11 would likely require grouting of the lower saddle areas along the relatively steep ridges of the eastern rim
 12 to ensure the proposed Project would perform satisfactorily. This treatment, combined with the increasing
 13 relationship between embankment material volume and reservoir surface elevations, would result in larger
 14 unit costs (reservoir cost per acre-foot of storage) for surface water elevations above the 540-foot
 15 elevation. Therefore, the maximum Sites Reservoir storage capacity was limited to maintain surface water
 16 elevations at or below the 520-foot elevation to avoid unknown conditions (such as leakage) on the
 17 relatively steeper slopes of the eastern reservoir rim. Therefore, a reservoir size of 2.1 MAF was
 18 eliminated from further consideration. Reservoir storage capacities of 800 TAF, 1.27 MAF, and
 19 1.81 MAF were carried forward for further consideration.

20 **2.4.3.2 Sites Reservoir Conveyance Alternatives**

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

- 1 It was determined that, to maximize operational flexibility, the diversion and conveyance facilities would
 2 need to be able to:
- 3 • Release water directly from Sites Reservoir to meet local needs in the vicinity of the existing GCID
 4 and Tehama-Colusa (T-C) canals
 - 5 • Release water in an integrated manner with existing CVP and SWP operations to facilitate meeting
 6 additional needs throughout the Bay-Delta system
 - 7 • Release water directly to the Sacramento River to meet additional needs throughout the Bay-Delta
 8 system and provide downstream benefits for Delta water quality and water supply reliability (through
 9 additional supplies or alternative source) for CVP, SWP, and Level 4 wildlife refuge water supply.
 10 Additionally, the ability to release water directly to the Sacramento River would allow Sites Reservoir
 11 to respond to Delta conditions, including releasing flows to repel saltwater intrusion following a Delta
 12 levee failure. This factor became one of the most important criteria in evaluating conveyance
 13 concepts due to the ongoing system need for flexibility, water supply reliability, and ability to
 14 improve habitat along the Sacramento River and at the wildlife refuges.
- 15 Conveyance facilities alternatives that would divert water from the Sacramento River included the
 16 existing GCID and T-C canals and a new proposed Delevan Pipeline. Tributary source conveyance
 17 facilities alternatives included new pipelines from the CBD and Stony Creek. Conveyance facilities
 18 alternatives that were evaluated initially had a range of capacity sizes, known as options (Table 2-5), and
 19 are illustrated schematically on Figure 2-4.

Table 2-5
Conveyance Facilities Alternatives Considered for Sites Reservoir

Conveyance Facility Alternative	Source	Option Capacity Description
GCID 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
T-C 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

^aExisting conveyance facility.

^bProposed new conveyance facility.

Notes:

cfs = cubic feet per second

GCID = Glenn-Colusa Irrigation District

T-C = Tehama-Colusa

Source: DWR and Reclamation, 2008.

1 The options for the conveyance alternatives were evaluated based on the importance of providing direct
 2 release to the Sacramento River and preliminary assessments of potential habitat and cultural resources
 3 impacts. Table 2-6 summarizes the ability of the option to provide direct releases to the Sacramento
 4 River.

Table 2-6
Preliminary Cost and 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 Canal ^a	Existing 1,800-cfs capacity	No
	Expand to 3,000-cfs capacity	No
	Expand to 4,000-cfs capacity	No
	Expand to 5,000-cfs capacity	No
T-C Canal ^a	Existing 2,100-cfs capacity	No
	Modify to 2,700-cfs capacity	No
	Expand to 4,000-cfs capacity	No
	Expand to 5,000-cfs capacity	No
Delevan Pipeline ^b	1,500-cfs capacity	Yes
	2,000-cfs capacity	Yes
	3,000-cfs capacity	Yes
	4,000-cfs capacity	Yes
	5,000-cfs capacity	Yes
Colusa Basin Pipeline ^b	1,000-cfs pipeline capacity	No
	3,000-cfs pipeline capacity	No
Stony Creek Pipeline ^b	1,000-cfs capacity	No
	2,100-cfs capacity	No

^aExisting conveyance facility.

^bProposed new conveyance facility.

Notes:

cfs = cubic feet per second

GCID = Glenn-Colusa Irrigation District

T-C = Tehama-Colusa

Source: DWR and Reclamation, 2008.

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

- 7 • **GCID Canal Expansions:** Expansion of the GCID Canal would require the acquisition of temporary
 8 and permanent rights-of-way. For example, the larger GCID Canal expansion options would require
 9 approximately 1,890 acres of land during construction. Permanent land area acquired for the canal
 10 expansion would be 940 acres, of which 727 acres are classified as prime agricultural land
 11 (preliminary estimates based on field survey). California's desire to preserve agricultural land is
 12 reflected in the California Land Conservation Act, also known as the Williamson Act. Other
 13 environmental considerations in the canal expansion footprint would include the loss of
 14 286 elderberry stems greater than 1-inch in diameter, adverse effects to salmon and steelhead related
 15 to siphon enlargements, loss of giant garter snake habitat, disturbance of nesting habitat for the
 16 Swainson's hawk, and extensive loss of jurisdictional wetlands, including vernal pools. The potential
 17 impacts to prime agricultural land and environmental resources associated with these facilities
 18 support the recommendation not to further evaluate GCID Canal expansions.

- 1 • **T-C Canal Modification and Expansions:** There were 2,468 acres of agricultural land determined to
 2 be within 100 feet of the T-C Canal modification and expansion area footprint; of these, 1,244 acres
 3 are classified as prime agricultural land (preliminary estimates based on field survey). Environmental
 4 considerations in the expansion area footprint would include the loss of vernal pool plants and
 5 invertebrates, loss of California tiger salamander habitat, loss of 170 elderberry stems greater than
 6 1-inch in diameter, adverse effects to salmon and steelhead related to siphon enlargements, potential
 7 giant garter snake habitat loss, disturbance of nesting habitat for the Swainson's hawk, and loss of
 8 jurisdictional wetlands, including vernal pools. These potential impacts to prime agricultural land and
 9 environmental resources support the recommendation not to further evaluate T-C Canal modifications
 10 or expansion.
- 11 • **4,000- and 5,000 cfs Delevan Pipeline:** These options were determined to be inefficient due to the
 12 additional construction disturbance that would occur along the alignment and need for additional
 13 construction materials and duration of construction period as compared to the water supply benefits,
 14 especially when compared to smaller conveyance facilities. The smaller pipeline sizes were
 15 determined to be able to reliably fill and drain Sites Reservoir when combined with other conveyance
 16 options, such as use of existing GCID and T-C canals.
- 17 • **Colusa Basin Pipeline:** The Colusa Basin Pipeline was considered to convey water from the CBD to
 18 Sites Reservoir. The water from the CBD is considered to be of relatively poor water quality when
 19 compared to Sacramento River water and is, therefore, less desirable. The CBD is the single largest
 20 source of agricultural return flows to the Sacramento River; as a result, it has elevated values for
 21 alkalinity, electrical conductivity, and total dissolved solids. Nitrogen and phosphorus concentrations
 22 also are generally higher in the CBD. Water taken from the CBD into Sites Reservoir and then
 23 released back through the conveyance system could cause water quality impacts to local agricultural
 24 users and create a new point source of relatively lower quality water when discharged into the
 25 Sacramento River. Therefore, the Colusa Basin Pipeline conveyance options were not recommended
 26 for further consideration.
- 27 • **Stony Creek Pipeline:** The Stony Creek Pipeline conveyance options would rely on increased
 28 capacity of the T-C Canal downstream of Orland. The T-C Canal modification and expansion
 29 conveyances were eliminated from further consideration (as indicated above); therefore, the Stony
 30 Creek Pipeline conveyance options were also eliminated from further consideration.

31 The conveyance options retained were:

- 32 • T-C Canal at its existing capacity of 2,100 cfs
 33 • GCID Canal at its existing capacity of 1,800 cfs
 34 • A new Delevan Pipeline at capacities of 1,500 cfs, 2,000 cfs, and 3,000 cfs

35 The T-C and GCID canals at their existing capacities were retained because they could be combined to
 36 provide conveyance packages with up to 6,900 cfs total capacity for use in alternative development. In
 37 addition, these conveyance options allowed for an evaluation of benefits associated with the proposed
 38 Delevan Pipeline's ability to return water directly to the Sacramento River.

39 **2.4.3.3 Sites Reservoir Operational Alternatives**

40 Eight initial Sites Reservoir operational alternatives, each with a range of conveyance packages and
 41 operational emphases, were considered and evaluated with the CalSim-II operations model in the NODOS

1 Plan Formulation Report (DWR and Reclamation, 2008). The operational alternatives assumed a Sites
2 Reservoir storage size of 1.8 MAF. All of the initial Project operational alternatives evaluated met the
3 proposed Project's primary objectives, but to varying degrees. The proposed Project operational
4 alternative that emphasized a balanced mix of benefits to water supply reliability, water quality, and
5 ecosystem enhancement and minimized environmental impacts was selected as the operational scenario
6 for detailed evaluation in this EIR/EIS. The other operational alternatives only prioritized one benefit
7 category (i.e., water supply reliability, water quality, or ecosystem enhancement) instead of multiple
8 benefit categories and, therefore, were eliminated from further consideration.

9 **2.4.3.4 Sites Reservoir Storage, Conveyance, and Operations Formulation**

10 Based on the initial evaluation of storage, conveyance and operational alternatives, the following
11 proposed Project features were retained for further evaluation:

- 12 • Sites Reservoir Storage Range of Capacities:
 - 13 – 800 TAF
 - 14 – 1.27 MAF
 - 15 – 1.81 MAF
- 16 • Sites Reservoir Conveyance Concepts:
 - 17 – Existing T-C Canal (2,100-cfs capacity)
 - 18 – Existing GCID Canal (1,800-cfs capacity)
 - 19 – New Delevan Pipeline (1,500-cfs, 2,000-cfs, and 3,000-cfs capacity)
- 20 • Operational scenario that emphasizes a balance of multiple benefits related to water supply reliability,
21 water quality, and ecosystem enhancement

22 To further evaluate and optimize reservoir storage and conveyance options, preliminary costs were
23 estimated and operations modeling was performed. Table 2-7 identifies the reservoir storage and
24 conveyance facility options that were evaluated.

25 The purpose of the operations modeling was to reduce the number of possible Project combinations and to
26 help formulate Sites Reservoir alternatives with the most efficient conveyance options and reservoir
27 storage capacities. The operations simulations modeling was performed using an assumed operational
28 scenario that provided a balanced mix of water supply reliability, water quality, and ecosystem
29 enhancement. The water supply yield of the conveyance options and Sites Reservoir storage combinations
30 was analyzed for long-term average and driest-period average hydrologic conditions, as shown in
31 Table 2-8.

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

**Table 2-7
Sites Reservoir Storage and Conveyance Options Combinations**

Reservoir Storage	Conveyance			Total Diversion Capacity (cfs)
	T-C and GCID Diversion Capacity (cfs)	Delevan Pipeline		
		Diversion Capacity (cfs)	Release 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
1.27 MAF	3,900	0	0	3,900
1.27 MAF	3,900	1,500	1,125	5,400
1.27 MAF	3,900	0	1,500	3,900
1.27 MAF	3,900	2,000	1,500	5,900
1.27 MAF	3,900	3,000	2,250	6,900
1.81 MAF	3,900	0	0	3,900
1.81 MAF	3,900	1,500	1,125	5,400
1.81 MAF	3,900	0	1,500	3,900
1.81 MAF	3,900	2,000	1,500	5,900
1.81 MAF	3,900	0	2,250	3,900
1.81 MAF	3,900	3,000	2,250	6,900

Notes:

cfs = cubic feet per second

GCID = Glenn-Colusa Irrigation District

T-C = Tehama-Colusa

TAF = thousand acre-feet

Source: DWR, 2011.

- 1 As shown in Table 2-8, the first three reservoir storage and conveyance options combinations are
2 estimated to perform much better than the remainder of the reservoir storage and conveyance options
3 combinations that were considered. These three reservoir size and conveyance options combinations were
4 combined with new hydropower facilities to develop four configurations of Sites Reservoir denoted as
5 Alternatives A, B, C, and D in this EIR/EIS. In addition, Alternative C₁ has been added, which includes
6 the facilities and operational assumptions of Alternative C but assumes no or delayed hydropower
7 generation.
- 8 These action alternatives and the No Project/No Action Alternative provided a range of alternatives for
9 further refinement and detailed analysis in the Feasibility Report and DEIR/EIS. Following is a brief
10 description of the No Project/No Action Alternative and Alternatives A, B, C (and C₁), and D that are
11 evaluated in this DEIR/EIS:
- 12 • **No Project/No Action Alternative:** The No Project/No Action Alternative assumes that no actions
13 would be taken to provide storage north of the Delta to improve water supply reliability, to enhance
14 the survivability of anadromous fish or drinking water quality in the Delta, or to improve flexible
15 hydropower generation.
 - 16 • **Alternative A – 1.27-MAF Sites Reservoir with Delevan Pipeline:** Alternative A includes a
17 1.27-MAF Sites Reservoir with conveyance to and from the reservoir provided by the existing T-C
18 and GCID canals and a new Delevan Pipeline (2,000-cfs diversion/1,500-cfs release). This alternative
19 also includes new hydropower facilities.

- 1 • **Alternative B – 1.81-MAF Sites Reservoir with Release-only Delevan Pipeline:** Alternative B
2 includes a 1.81-MAF Sites Reservoir with conveyance to and from the reservoir provided by the
3 existing T-C and GCID canals, and a new release-only Delevan Pipeline (1,500-cfs release). This
4 alternative also includes new hydropower facilities.
- 5 • **Alternative C – 1.81-MAF Sites Reservoir with Delevan Pipeline:** Alternative C includes a
6 1.81-MAF Sites Reservoir with conveyance to and from the reservoir provided by the existing T-C
7 and GCID canals and a new Delevan Pipeline (2,000-cfs diversion/1,500-cfs release). This alternative
8 also includes new hydropower facilities.
- 9 – **Alternative C₁ – 1.81-MAF Sites Reservoir with Delevan Pipeline without Hydropower**
10 **Facilities:** Identical to Alternative C but assumes no or delayed hydropower generation.
- 11 • **Alternative D – 1.81-MAF Sites Reservoir with Delevan Pipeline:** Alternative D includes a
12 1.81-MAF Sites Reservoir with conveyance to and from the reservoir provided by the existing T-C
13 and GCID canals and a new Delevan Pipeline (2,000-cfs diversion/1,500-cfs release). This alternative
14 also includes new hydropower facilities. Operations would be the same as Alternative C other than a
15 portion of Sites Reservoir water would be made available for local Sacramento Valley water users
16 with the remaining portion made available to other water users in California.

**Table 2-8
Preliminary N Sites Reservoir Storage and Conveyance Options Combinations**

Reservoir Storage	Conveyance			Total Diversion Capacity (cfs)
	T-C and GCID Capacity (cfs)	Delevan Pipeline		
		Diversion Capacity (cfs)	Release Capacity (cfs)	
1.81 MAF	3,900	0	1,500	3,900
1.27 MAF	3,900	2,000	1,500	5,900
1.81 MAF	3,900	2,000	1,500	5,900
1.27 MAF	3,900	1,500	1,125	5,400
1.81 MAF	3,900	1,500	1,125	5,400
1.81 MAF	3,900	0	2,250	3,900
1.27 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
1.27 MAF	3,900	0	0	3,900
800 TAF	3,900	0	0	3,900
1.81 MAF	3,900	0	0	3,900

Notes:

cfs = cubic feet per second

GCID = Glenn-Colusa Irrigation District

T-C = Tehama-Colusa

TAF = thousand acre-feet

Source: DWR, 2011.

- 17 Maps and detailed descriptions of each of the proposed Project action alternatives, including descriptions
18 of construction, operation, and maintenance activities associated with each proposed Project feature, as

1 well as a description of assumed Project operations, are provided in Chapter 3 Description of the
2 Proposed Project/Proposed Action and Alternatives.

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