CHAPTER 2
Project Background

This chapter provides an overview of the existing Los Vaqueros Reservoir facilities and operations, a history of the expansion project, a description of current Delta water supply facilities and operations, and a summary of ongoing planning and regulatory processes related to the Delta. This information provides context for understanding how expansion of the Los Vaqueros Reservoir could achieve the objectives outlined in Chapter 1, Purpose and Need.

2.1 Existing Los Vaqueros Reservoir

The Los Vaqueros Reservoir is a 100 thousand-acre-foot (TAF) offstream storage reservoir in southeastern Contra Costa County owned and operated by the Contra Costa Water District (CCWD). The reservoir is operated to improve water quality and provide emergency storage for CCWD’s 550,000 customers in central and eastern Contra Costa County. CCWD completed the reservoir and associated facilities (including a new intake on Old River near State Route 4 (SR 4)) in 1997. The reservoir facilities are operated as an integrated system with the Contra Costa Canal and Rock Slough Intake built as part of the federal Central Valley Project (CVP) in the 1940s. These facilities are described in more detail in the following sections. CCWD also owns the Los Vaqueros Watershed (watershed) which covers about 20,000 acres. The watershed lands are managed for water quality, conservation, and recovery of special-status species and their habitats, and recreation. The reservoir also provides flood control benefits on Kellogg Creek. More recently, CCWD has constructed or is constructing two facilities that will be operated integrally with the reservoir: the CCWD-East Bay Municipal Utility District (EBMUD) Intertie, completed in 2007, and a new intake on Victoria Canal known as the Alternative Intake Project (AIP), currently under construction. These new facilities are also described in the following sections.

1 CCWD is a public agency formed in 1936 to provide water for irrigation and industry. CCWD is now one of the largest urban water districts in California, serving treated and untreated water to about 550,000 customers in Antioch, Bay Point, Clayton, Clyde, Concord, Martinez, Oakley, Pacheco, Pittsburg, and portions of Brentwood, Pleasant Hill, and Walnut Creek in Contra Costa County. CCWD’s mission is to “strategically provide a reliable supply of high quality water at the lowest cost possible, in an environmentally responsible manner.” CCWD receives most of its water through the federal CVP.

2 Although this benefit is infrequently realized, in 1998, a wet year, flows of 400 cubic feet per second (cfs) were produced in Kellogg Creek downstream of the reservoir, the reservoir held back an additional 400 cfs, thereby protecting the community of Byron and other downstream areas.
Los Vaqueros Reservoir Expansion Project EIS/EIR . 201110

Figure 2-1

CCWD Service Area and Major Facilities

SOURCE: USGS, 1993 (base map); and ESA, 2005
2. Project Background

2.1.1 Los Vaqueros Reservoir and Associated Facilities

Los Vaqueros Dam and Reservoir

The Los Vaqueros Dam is a 190-foot-high zoned earthfill embankment dam with a crest elevation of 487 feet above mean sea level. The volume of the dam embankment is about 2.85 million cubic yards. The reservoir occupies about 1,462 acres when full (about 100 TAF). A spillway is located on the left abutment and the inlet/outlet structure is located on the right abutment. The dam was designed to withstand the maximum credible earthquake of moment magnitude (M) 6.5 on the Greenville Fault, about 4 miles west of the dam. The dam is in full compliance with all requirements of the California Department of Water Resources, Division of Safety of Dams.

When the dam was originally designed, no measures were incorporated to facilitate raising the dam in the future, but recent engineering analysis has concluded that a limited raise is feasible. The amount of raise is limited by a combination of topographic constraints and the design of the dam. Raising the dam by the maximum amount considered feasible would allow the reservoir water surface to be raised 88 feet, which would create an additional 175 TAF of reservoir storage.

Old River Intake and Pump Station

The Old River Intake and Pump Station diverts water from Old River through a fish screen with an area of 1,250 square feet and delivers it to the Old River Pipeline. The pump station has five 2,100-horsepower pumps that deliver up to 250 cubic feet per second (cfs). The Old River Intake and Pump Station has a design capacity of up to 320 cfs. The additional 70 cfs in intake capacity could be realized by changing to higher horsepower pumps and adding fish screen panels. The facility is on a 16.8-acre site near SR 4 and Discovery Bay.

The Old River fish screen was designed to meet approach velocity criteria established by National Marine Fisheries Service (NMFS), United States Fish and Wildlife Service (USFWS), and California Department of Fish and Game (CDFG). Specifically, the screen must have an average approach velocity of 0.2 foot per second (fps). The screen design was approved by NMFS as required in the 1993 Biological Opinion addressing the effects of the Los Vaqueros Project on winter-run chinook salmon. The screen is a vertical plate type, with stainless steel wedge wire screens with 3/32-inch vertical openings. It is oriented parallel to the ambient flow in Old River, allowing fish to move past the intake. It is equipped with a traveling rake automated cleaning system. A log boom and a debris deflector are also in place.

The Old River Intake and Pump Station fish screen facilities are shown in Figure 2-2. The Old River fish screen has successfully protected against entrainment since it began operation in 1997. In 11 years of monitoring, no salmon, one delta smelt, and one longfin smelt larva have been found to have passed through the screen.
Figure 2-2
Existing Old River Intake and Pump Station

SOURCE: GlobeXplorer, 2007; and ESA, 2007
Old River Pipeline, Transfer Facility, Transfer Pipeline and Los Vaqueros Pipeline

The Old River Pipeline connects the Old River Intake and Pump Station to the Transfer Facility. The pipeline is about 34,700 feet long and 78 inches in diameter and can convey up to 320 cfs. The pipeline is in a CCWD-owned 85-foot-wide permanent right-of-way. From the Transfer Facility, water can be pumped up to the reservoir through the Transfer Pipeline, or allowed to flow down to the Contra Costa Canal through the Los Vaqueros Pipeline.

The Transfer Facility includes the following facilities:

- **Transfer Pump Station.** An 8,400-horsepower plant that delivers up to 200 cfs to the reservoir
- **Transfer Reservoir.** A 4-million-gallon reservoir that provides water storage for flow control operations
- **Flow Control Station #1.** Regulates flow from the Transfer Pipeline into the Los Vaqueros Pipeline

The Transfer Pipeline consists of about 19,600 feet of 72-inch-diameter pipe and connects the Transfer Facility to the reservoir. The Transfer Pipeline can convey up to 200 cfs from the Transfer Facility to the reservoir and up to 400 cfs from the reservoir to the Transfer Facility. The pipeline is in an 85-foot-right-of-way.

The Los Vaqueros Pipeline connects the Transfer Facility to the Contra Costa Canal at the Neroly blending basin in Oakley. The pipeline consists of two continuous segments: the first is about 18,000 feet long with a 96-inch-diameter pipe and the second is 29,000 feet long with a 90-inch-diameter pipe. The pipeline is in an 85-foot-right-of-way and has a capacity of 400 cfs. The Neroly blending basin includes a flow control station that dissipates excess water pressure from the pipeline in order to control the amount of water entering the canal. As part of CCWD’s capital improvement program, an energy recovery system is being designed to capture the energy released in this process and transmit it to other CCWD facilities to offset existing electrical loads.

Contra Costa Canal and Rock Slough Intake

The Contra Costa Canal was completed by the U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region (Reclamation) in 1948. The canal is owned by Reclamation and operated by CCWD. The canal is the primary conveyance facility for CCWD’s untreated water supply, carrying water from both the Rock Slough Intake and the Old River Intake (via the Los Vaqueros Pipeline) for deliveries to treatment plants, large industries, and irrigation customers throughout CCWD’s service area. The canal is 48 miles long with capacities ranging from 350 cfs at the Rock Slough Intake to 22 cfs at its western terminus at the Martinez Reservoir. The first 4 miles of the canal are earth lined, while the remaining 44 miles are concrete lined. The earth-lined portion of the canal is subject to water quality degradation due to seepage into the canal from saline groundwater in the area. CCWD is undertaking a project to encase this portion of
the canal to stop the degradation. A series of four pumping plants lift the water from Rock Slough to 126 feet above sea level, after which the water flows by gravity to the terminus.

The Rock Slough Intake has a capacity of 350 cfs and is currently unscreened. Because water quality at Old River is generally better than at Rock Slough, and because the Old River Intake is screened, Rock Slough is used less frequently than it was before the Los Vaqueros Reservoir was completed. When AIP is operational, use of Rock Slough will be reduced even further. However, the Old River Intake and AIP do not have sufficient capacity to meet all CCWD’s demands now and in the future, so Rock Slough continues to be an important component of CCWD’s system. Reclamation, in collaboration with CCWD, is responsible for constructing a fish screen at Rock Slough under the CVP Improvement Act and the 1993 USFWS Biological Opinion for the Los Vaqueros Project. Reclamation has received an extension on fish screen construction until December 2008, and is preparing a request for further extension until 2018 because the requirements for screen design will change when CCWD completes the ongoing project to encase the earth-lined portion of the canal.

**Intertie with EBMUD**

The EBMDU-CCWD Intertie connects the Los Vaqueros Pipeline with the Mokelumne Aqueduct in Brentwood, enabling CCWD to wheel a portion of its CVP contract water supply through Freeport Regional Water Authority (FRWA) and EBMUD facilities to the reservoir. Under an agreement between CCWD, EBMUD, and FRWA, CCWD can wheel up to 3,200 acre-feet per year through the intertie. The intertie also functions as an emergency connection between EBMUD and CCWD, enabling the districts to share water resources in an emergency or during planned outages. The capacity of the intertie is 155 cfs.

The Freeport Regional Water Project (FRWP) is currently under construction. Environmental review for the FRWP was completed in January 2005. Facilities include a water intake and pumping plant in the Sacramento River, a pipeline connecting to the Mokelumne Aqueduct, and a pumping plant at the southern end of the Folsom South Canal. Construction is expected to be completed in December 2009. When completed, EBMUD will take its dry-year CVP contract water through the FRWP.

**Alternative Intake Project**

The AIP adds a new 250-cfs intake on Victoria Canal that is connected to the Old River Pipeline via a 2.5-mile buried pipeline across Victoria Island and through a tunnel beneath Old River. The new intake will be equipped with a state-of-the-art positive barrier fish screen. The AIP fish screen has been designed to meet all standards set by NMFS, USFWS, and CDFG. The screen would have a maximum flow velocity of 0.2 fps at any flow level in Victoria Canal, 2/32-inch screen openings, and a mechanical cleaning system.

The AIP will increase CCWD’s access to high quality water year-round, especially in the fall and during drought periods. It will also help to ensure that the investment CCWD customers have made in water quality improvements and infrastructure, including the reservoir, will be protected as
water quality in the Delta deteriorates. The AIP does not increase the total amount of water diverted from the Delta, but provides additional flexibility to optimize diversions to maximize water quality and fish protection. Environmental review for the AIP was completed in 2006. The AIP is expected to be operational in 2010.

Los Vaqueros Reservoir Facilities Power Supply
Power is transmitted to the Old River Intake and Pump Station over lines owned and operated by Western Area Power Administration (Western). A 230-kV line being operated at 69 kV runs from the Tracy substation near the CVP Jones Pumping Plant to the Old River Intake and Pump Station, and is being extended to the AIP. The delivered power is from one of two sources: CVP power and Modesto Irrigation District (MID) power. CVP power used by CCWD is exclusively hydroelectric power. MID power is generated from a variety of sources including renewables and large hydropower (48 percent), coal (28 percent), and natural gas (24 percent) (Smith, 2007). Power needs at the Transfer Facility and within the watershed are met by Pacific Gas & Electric (PG&E) through their Brentwood substation. PG&E’s portfolio includes natural gas (40 percent), renewables and large hydropower (34 percent), and nuclear (24 percent) (PG&E, 2008).

Los Vaqueros Watershed Recreation Facilities
Recreational facilities that provide both water-oriented and upland recreational opportunities were constructed and have been operated since 2001. These include 55 miles of trails, a marina, fishing piers, an interpretive center, and picnic areas. Recreation facilities and programs are managed in a manner consistent with the Resource Management Plan adopted by the CCWD Board of Directors in 1999 and with biological opinions issued by USFWS and CDFG covering San Joaquin kit fox, bald eagle, California red-legged frog, and Alameda whipsnake, among other threatened and endangered species in the watershed.

2.1.2 Los Vaqueros Reservoir Operations
CCWD operates the reservoir together with its intakes to provide high quality, low-salinity water to its customers. In winter and spring, when the Delta is relatively fresh (generally January through July), customer demand is supplied by direct diversion from the Delta. In the late summer and fall months, CCWD releases water from the Los Vaqueros Reservoir to blend with higher-salinity direct diversions from the Delta to meet CCWD water quality goals. The reservoir is re-filled during winter and spring, when chloride concentrations at Old River are low, generally less than 50 milligrams per liter (mg/L).

The reservoir is operated in a manner consistent with the biological opinions for the reservoir, which require numerous fish protection measures, including an annual 75-day “no-fill” period and a concurrent 30-day “no-diversion” period. The default dates for the no-fill and no-diversion periods are March 15 through May 31 and April 1 through April 30, respectively; USFWS, NMFS, and CDFG can change these dates to best protect covered species. Customer demand during the no-diversion period is met through releases from the reservoir. CCWD also
preferentially uses the screened Old River Intake over unscreened Rock Slough from January through August to further protect fish.

CCWD diverts unregulated flows and regulated flows from CVP storage facilities releases as a contractor of Reclamation’s CVP. Under Water Service Contract No. 175r-3401A-LTR1 (renewed May 10, 2005) with Reclamation, CCWD can divert and re-divert up to 195 TAF per year of water from its Rock Slough and Old River intakes (and AIP under a letter approval from Reclamation expected in 2009) for direct use or to storage in Los Vaqueros Reservoir. CCWD also diverts from Old River to storage in the reservoir under its own Los Vaqueros water right permit (Permit No. 20749).

Los Vaqueros Project Water Right (Permit No. 20749)

The terms and conditions governing CCWD’s diversion to storage in Los Vaqueros Reservoir under Permit No. 20749 are given in California State Water Resources Control Board (SWRCB) Decision 1629 (D1629). D1629 provides that CCWD may divert water under Permit No. 20749 from Old River to Los Vaqueros Reservoir from November through June during excess conditions in the Delta, as defined in the State Water Project (SWP)/CVP Coordinated Operations Agreement, when those diversions will not adversely impact the operations of the SWP and CVP; CCWD may also divert water under its CVP water supply contract to storage in Los Vaqueros Reservoir throughout the year, subject to the operational restrictions discussed below. D1629 specifies the maximum diversion rates at 250 cfs and annual diversion to storage (95,800 acre-feet annually at a rate of 200 cfs) by CCWD to Los Vaqueros Reservoir.

CCWD’s operations are governed in part by three biological documents: (1) 1993 NMFS Biological Opinion for winter-run chinook salmon, (2) 1993 USFWS Biological Opinion for Delta Smelt, and (3) 1994 Memorandum of Understanding between CDFG and CCWD regarding the Los Vaqueros Project. The biological documents specify the following:

- **No-Fill Period.** CCWD will avoid filling Los Vaqueros Reservoir for 75 days each spring. The default no-fill period is March 15 through May 31. This condition is also included in D1629.

- **No Diversion Period.** CCWD will avoid Delta diversions for 30 days each spring, concurrent with part of the no-fill period. The default no-diversion period is the month of April. This condition is also included in D1629.

- **Emergency Storage.** The no-fill and no-diversion restrictions are in effect only when Los Vaqueros Reservoir is above emergency storage levels. Emergency storage is defined as 70,000 acre-feet in below-normal, above-normal, and wet years, and 44,000 AF in dry and critical years. This condition is also included in D1629.

- **X2 Restrictions.** Los Vaqueros Reservoir may be filled when X2 (the location of the 2 parts-per-thousand salinity line) is west of Chipps Island in February through May, and Collinsville in January, June through August, and December. X2 restrictions on filling in December

---

3 At the same time, the SWRCB also issued Permit No. 20750 to CCWD for diverting and storing the water from Kellogg Creek in Los Vaqueros Reservoir.
only exist when adult delta smelt are present at the Old River Intake. In 2005, CDFG and USFWS granted a temporary waiver on the July and August X2 restrictions, allowing 5 years to evaluate bringing CCWD’s operating restrictions in line with D1641, during which X2 standards apply from February to June only.

Biological opinions issued for the AIP by both USFWS and NMFS integrate operations of the AIP into operations of the facilities previously described to minimize take of sensitive fish species. Under the USFWS biological opinion, the combined diversion rate of Old River Intake and AIP is 320 cfs.

**Mallard Slough Water Right**

CCWD has a license and a permit for diversions at Mallard Slough for up to 26,780 AF per year. However, Mallard Slough diversions are unreliable during most of the year because of high salinity in the San Joaquin River at the point of diversion. Over the last 10 years, diversions by CCWD from Mallard Slough have averaged less than 3,000 AF per year. Diversions from Mallard Slough substitute for other diversions, principally CVP supplies from Rock Slough.

Water use within CCWD’s service area is currently between 125 and 140 TAF per year, depending on weather conditions. These demands are met with a combination of reservoir releases and direct diversions of CVP contract water, as well as diversions under other water rights held by CCWD customers for their own use (e.g., the City of Antioch has its own pre-1914 water rights), groundwater, conservation, and recycled water. Table 2-1 shows water use by source with the CCWD service area.

**Table 2-1**

<table>
<thead>
<tr>
<th>Year</th>
<th>CVP direct diversion</th>
<th>Releases from Los Vaqueros Reservoir</th>
<th>Other Water Rights</th>
<th>Groundwater</th>
<th>Recycled water</th>
<th>Water Transfer Purchases</th>
<th>Total water use</th>
<th>Quantifiable Direct and Other Conservation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>90,800</td>
<td>10,850</td>
<td>9,750</td>
<td>1,450</td>
<td>7,600</td>
<td>2,300</td>
<td>122,750</td>
<td>3,300; 30,000</td>
</tr>
<tr>
<td>2007</td>
<td>73,100</td>
<td>34,900</td>
<td>4,800</td>
<td>2,170</td>
<td>8,700</td>
<td>7,000</td>
<td>130,670</td>
<td>3,400; 30,000</td>
</tr>
</tbody>
</table>

| a Los Vaqueros water rights water  
| b Other water rights include CCWD’s Mallard Slough water rights and diversions by the City of Antioch.  
| c Groundwater usage of Diablo Water District, Golden State Water Company, and City of Pittsburg.  
| d The first figure is estimated savings from CCWD conservation programs that are directly quantifiable. Savings related to plumbing codes, regulation, changing industry standards, or actions taken by CCWD and its customers for which the savings are not directly quantifiable are estimated to be 30,000 acre-feet annually. |

Between 44 TAF and 70 TAF of reservoir capacity is used for emergency storage (depending on hydrological conditions) that would provide from 3 to 6 months of supply for CCWD at current demand levels during times when water from the Delta is unavailable due to natural disaster, toxic spill, levee failure, or other significant event.
CCWD Water Quality Goals

CCWD’s long-term water quality goal is to deliver water with chloride concentrations of 65 mg/L or less to its customers. To achieve this delivered quality, reservoir filling usually targets water with less than 50 mg/L of chloride. On average, chloride concentrations in the reservoir are about 35 mg/L. Reservoir water released from storage is blended with water from Old River and Rock Slough intakes that can have chloride concentrations as high as 210 mg/L and 275 mg/L, respectively, depending on season, annual hydrology, discharges to and exports from the Delta; by blending, CCWD is able to deliver high quality water to its customers throughout the year.

Other source water quality constituents of concern for CCWD due to its reliance on Delta water include bromide, total organic carbon (TOC), and pathogens. Delta water must be disinfected to meet federal drinking water regulations, which impose stringent limits on disinfection by-products in treated water. Bromide and TOC are precursors of regulated disinfection by-products. Currently, CCWD’s primary means of ensuring that disinfection by-product standards are met in the treated water is to ensure that bromide and TOC levels in the source water from the Delta are maintained below certain levels (reducing the need for disinfectant, and the resulting by-products). Bromide levels in the Delta correspond closely to chloride levels; thus, by managing for chloride, CCWD effectively manages for bromide. CCWD’s source water quality goal for bromide is 50 micrograms per liter. TOC levels in the Delta vary seasonally and tend to increase during periods when chloride and bromide are decreasing. CCWD’s source water quality goal for TOC is less than 3.0 mg/L. When necessary, CCWD reduces high TOC levels by the addition of coagulant at its treatment plants.

CCWD monitors for all of these constituents, as well as turbidity, algae, and taste and odor-causing compounds and adjusts operations daily to meet its water quality goals.

2.1.3 CCWD Long-Range Water Supply Planning

CCWD conducts long-range water supply planning in coordination with its wholesale customers and the cities to which it provides retail water service. This plan, the Future Water Supply Study (FWSS), identifies the specific sources and programs CCWD plans to implement to accomplish its mission of providing a reliable supply of high quality water at the lowest cost possible, in an environmentally responsible manner (CCWD, 1998). In addition to the surface water supplies obtained through its CVP contract and its Los Vaqueros and Mallard Slough Water Rights, CCWD has identified conservation, recycled water, and water transfers as other important sources of supply in the FWSS.

In 1999, CCWD certified a program-level Environmental Impact Report (EIR) addressing the impacts of implementing the FWSS (Future Water Supply Implementation (FWSI) EIR) (CCWD, 1999). The FWSI EIR assessed the broad environmental effects associated with conserving water and providing additional water supplies to meet the demands of growth and diverting additional water from the Delta. The effects of individual implementation projects, such as specific water transfers, were not covered in this programmatic document, although the effects of programmatically providing sufficient supplies for the growing population were covered. A key
2. Project Background

2.2 Development of the Los Vaqueros Reservoir Expansion Project

The Los Vaqueros Reservoir Expansion Project (reservoir expansion project) is a multi-agency effort that would provide local, regional, and state-wide environmental, water supply, and water quality benefits. The project grew out of the comprehensive federal/state cooperative program known as CALFED Bay-Delta Program (CALFED) that seeks to improve the quality and reliability of California’s water supplies while restoring the Bay-Delta. In August 2000, CALFED published the CALFED Record of Decision, which laid out a plan for restoring the Bay-Delta ecosystem and improving water supply reliability and water quality. Expansion of Los Vaqueros Reservoir was included as one of five water storage programs identified for further investigation. Since that time, CCWD, Reclamation, and the California Department of Water Resources (DWR) have developed and refined the Los Vaqueros Reservoir Expansion Project through detailed studies and extensive public outreach.

2.2.1 Project Leadership

CCWD, as owner-operator of the reservoir, is the lead agency under the California Environmental Quality Act (CEQA) and has been managing the reservoir expansion project studies with funding from both Reclamation and DWR. Reclamation is the lead agency under the National Environmental Policy Act (NEPA). Reclamation’s involvement is authorized by Congress through Public Laws 108-7 and 108-361, which authorized Reclamation to undertake a feasibility study of expanding the reservoir and to pursue its development, along with other ongoing environmental and storage projects, in a balanced manner. DWR’s interest in the reservoir expansion project started with the state’s commitment to the CALFED Storage Program and continues based on recognized needs to restore reliability to SWP contractors in the Bay Area while meeting CALFED goals of ecosystem restoration in the Delta.

Many federal, state, and local agencies participate in the reservoir expansion project through the Los Vaqueros Memorandum of Understanding (LV MOU) regarding preliminary studies (feasibility studies, environmental review, and preliminary design) for the reservoir expansion project. The LV MOU agencies are periodically updated on project development through an element of the FWSS was that implementation would be accomplished incrementally so that growth was not encouraged beyond that which was already planned and permitted by local land use agencies with land use authority.

CCWD also consulted with USFWS and received a biological opinion for the FWSI in conjunction with an infrastructure project being undertaken at the same time (the Multi-Purpose Pipeline) (USFWS, 2000). A conservation measure in the Biological Opinion required CCWD to initiate and help fund a Habitat Conservation Plan for the East Contra Costa County area to offset the effects of urban development on listed and proposed plant and wildlife species in east Contra Costa County. CCWD was also required to ensure that the proponents for annexation to CCWD had all environmental approvals in place, including approval from USFWS, before providing CVP water.
Agency Coordination Work Group, and are given opportunities to review and comment on early drafts of studies. This early involvement helps ensure that these studies provide the LV MOU agencies with information relevant to future decisions they may make related to the reservoir expansion project such as granting a permit or becoming a beneficiary (DWR et al., 2001).

Western is a cooperating agency under NEPA and will rely on this document in making decisions regarding providing power to new and expanded facilities proposed as part of the reservoir expansion project.

### 2.2.2 Project Approval Process

Approving one of the Los Vaqueros Reservoir Expansion Project alternatives evaluated in this Environmental Impact Statement (EIS)/EIR will require completion of the CEQA/NEPA process by the lead agencies, a determination by the CCWD Board of Directors that the proposed project is consistent with their adopted Principles for Expansion (set forth below), and decisions by potential beneficiaries as to the nature and extent of their participation. The latter decisions depend in part on the outcomes of federal and state feasibility studies and regional evaluations of benefits and costs, being conducted by the potential participants in parallel with the environmental review process.

### CCWD Board Principles for Expansion

In June 2003, the CCWD Board of Directors adopted a set of principles by which CCWD would consider participating in a proposal for a Los Vaqueros Reservoir Expansion Project. The Board will consider participating in an expansion project if it meets the following conditions:

1. Improves drinking water quality for CCWD customers beyond that available from the existing Los Vaqueros Project;
2. Improves the reliability of water supplies for CCWD customers during droughts;
3. Enhances Delta habitat and protects endangered Delta fisheries and aquatic resources by installing state-of-the-art fish screens on all new intakes and creating an environmental asset through improved location and timing of Delta diversions and storage of water for environmental purposes;
4. Increases the protected land and managed habitat for terrestrial species in the Los Vaqueros Watershed and the surrounding region;
5. Improves and increases fishing, boating, hiking, and educational opportunities in the Los Vaqueros Watershed, consistent with the protection of water quality and the preservation of the watershed’s unique features;
6. CCWD continues as owner and manager of the Los Vaqueros Watershed;

---

4 These CCWD Board Principles expand upon an earlier set of principles from April 2000 that were directed at formulating the concept of a Los Vaqueros Reservoir expansion. As a result of preliminary engineering and environmental studies, CCWD determined that an expansion project could be defined that met its principles. The 2003 CCWD Board Principles provide guidance for continued refinement of such an expansion project and provide conditions for CCWD’s participation.
7. CCWD maintains control over recreation in the Los Vaqueros Watershed;

8. CCWD continues as operator of the Los Vaqueros Reservoir system;

9. CCWD will be reimbursed for the value of the existing Los Vaqueros Project assets shared, replaced, rendered unusable, or lost with the expansion project and said reimbursement will be used to purchase additional drought supply and water quality benefits or reduce debt on the existing Los Vaqueros Project;

10. Water rates for CCWD customers will not increase as a result of the expansion project.

In March 2004, the CCWD Board of Directors placed an advisory measure on the ballot asking voters in its service area whether CCWD should expand the Los Vaqueros Reservoir under these principles. The measure won approval of 62 percent of voters.

2.2.3 Los Vaqueros Reservoir Expansion Studies to Date

The planning phase of the Los Vaqueros Reservoir Expansion Project began in January 2001. Most of this early work focused on determining whether an expanded reservoir could meet state and federal program goals (i.e., CALFED goals) and the CCWD Board Principles. The Project Concept Report prepared by CCWD in 2002 was the first report to present preliminary information on initial alternatives and potential benefits of the expansion project (CCWD, 2002). As alternatives were better defined, a federal feasibility study was started. Some of the preliminary analyses for the federal feasibility study have been published as separate studies, such as the Initial Economic Evaluation for Plan Formulation Report (IEEPF) summarized below (Reclamation, 2006). The EIS/EIR process began with publishing the Notice of Intent (NOI) in the Federal Register in December 2005 and issuing the Notice of Preparation (NOP) in January 2006. The studies or publications summarized here can be accessed on the project website at www.lvstudies.com.

Feasibility-Related Studies

April 2004 Final Draft Planning Report. The Final Draft Planning Report prepared by CCWD presents the information developed during this planning phase of the Los Vaqueros Reservoir Expansion Studies and incorporates comments received to date (CCWD, 2004).

September 2005 Initial Alternatives Information Report (IAIR). The primary purpose of the IAIR is to document the first phase of the Federal Feasibility Study for the Los Vaqueros Expansion Investigation (Reclamation, 2005). Specifically, this report describes formulation of initial alternative plans to address the identified problems, opportunities, and planning objectives that primarily involve enlarging the reservoir.

July 2006 IEEP. As part of the Federal Feasibility Study, Reclamation published the IEEP which evaluates whether a project alternative could meet federal interests and therefore warrant continued federal funding. The report provides an economic and plan formulation update to support a federal decision. Based on this initial evaluation, the IEEP concluded that expansion of Los Vaqueros Reservoir is cost effective and can be implemented while meeting the CCWD Board Principles.
EIS/EIR Process

December 2005 NOI. The NOI published by Reclamation in the Federal Register notified agencies of the preparation of the EIS for the project.

January 2006 NOP. The NOP published by CCWD described the proposed project alternatives under consideration for review in the EIS/EIR and identified the main environmental issues to be addressed during the environmental review. (Note that at the time of the NOP, the maximum size reservoir under consideration was 500 TAF. Based on preliminary feasibility and environmental studies, the maximum size reservoir now under consideration is 275 TAF. Other project facilities such as pumps and pipelines are commensurately smaller as well.)

Four public scoping meetings were held in January 2006 to solicit input on the EIS/EIR. A Scoping Report that documents the scoping meetings, the comments received and responses to the comments is included as Appendix A to this EIS/EIR.

2.3 Delta Water Supply Facilities and Operations

Many small water diversion facilities in the Delta serve in-Delta agricultural needs as well as some urban needs like CCWD’s, but the most significant facilities due to their size and influence on Delta conditions, as well as the number of water users they serve, are the federal and state water supply facilities that export water for the CVP and the SWP, respectively. The following sections describe these two projects and give an overview of the coordinated operations of the projects. In-Delta water use is also summarized.

2.3.1 Central Valley Project

The federal CVP is the largest water storage and delivery system in California, with its facilities and service area extending over 29 counties. The CVP’s features include 18 federal reservoirs, plus 4 additional reservoirs jointly owned with the SWP (primarily, San Luis Reservoir). Figure 2-3 shows the locations of major CVP features.

The reservoirs in this system provide a total storage capacity of slightly over 12 million acre-feet (MAF), nearly 30 percent of the total surface storage in California, and deliver about 7.3 MAF annually to agricultural, urban, and wildlife uses. The keystone of the CVP is the 4.6-MAF Lake Shasta, the largest reservoir in California. Other key features include Friant Dam, Folsom Dam, New Melones Dam, Jones Pumping Plant (formerly known as the Tracy Pumping Plant), and the Contra Costa, Delta-Mendota, and Friant-Kern Canals, and the San Luis Unit. Construction of the CVP began in the late 1930’s.

The CVP supplies water to more than 250 long-term water contractors in the CVP service area, whose contracts total 9.3 MAF. Of the 9.3 MAF, 3.1 MAF is water-right settlement water that is delivered to senior water-rights holders.
Figure 2-3
Major Components of the Central Valley Project

SOURCE: ESA, 2008
Water-right settlement water is water covered in agreements with water-rights holders whose diversions existed before the CVP was permitted and constructed. Because the construction of CVP reservoirs altered the natural flow of rivers upon which these diverters had relied, contracts were negotiated to serve stored water to the users to supplement river flows available under their rights. CVP water-right settlement contractors (called “prior right holders”) on the upper Sacramento River receive their supply from natural flow and storage regulated at Shasta Dam; settlement contractors on the San Joaquin River (called “exchange contractors”) receive Delta water via the Delta-Mendota Canal.

The remaining 6.2 MAF is delivered to water contractors as CVP project water supplies. About 90 percent of CVP water has gone to agricultural uses, including water delivered to the prior right holders. CVP water is used to irrigate some 19,000 farms covering 3 million acres. Currently, increasing quantities of water are being served to municipal customers. Urban areas receiving CVP water supply include Redding, Sacramento, Folsom, Tracy, most of Santa Clara County (served by Santa Clara Valley Water District (SCVWD)), north-central and eastern Contra Costa County (served by CCWD), and Fresno. With completion of the FRWP, CVP water supplies would be delivered to portions of Alameda and Contra Costa Counties served by EBMUD during drier years.

Water stored in the northern CVP reservoirs is released to the Sacramento River and eventually enters the Delta. Supplies contracted for delivery are diverted from the Delta via the Contra Costa Canal and the Delta-Mendota Canal. CCWD diversions were described above; the 4,600-cfs Jones Pumping Plant diverts water to the Delta-Mendota Canal. The other CVP supplies are diverted upstream of the Delta by CVP contractors such as Glenn-Colusa Irrigation District and Tehama Colusa Irrigation District. In the future, EBMUD, Sacramento County, and possibly other agencies will also divert CVP water from the Delta at Freeport.

During the winter, unstored water is diverted and conveyed to offstream San Luis Reservoir, on the western side of the valley, for subsequent delivery to the San Luis and San Felipe Units. A portion of the Delta-Mendota exports are returned to the San Joaquin River at Mendota Pool to serve (by exchange) water users who have long-standing historical rights to the use of San Joaquin River flow. This exchange enabled the diversion of a major portion of the flow farther south in the Friant-Kern Canal (and some water northward in the Madera Canal) through the construction of Friant Dam northeast of Fresno.

Operations of the federal facilities in the Delta are coordinated with the SWP to meet water quality and other standards set by the SWRCB, and more recently, pumping limits set by federal fish management agencies such as NMFS and USFWS, and by court order.

**Central Valley Project Improvement Act**

In 1992, Congress passed the CVP Improvement Act, which added fish and wildlife protection, restoration, enhancement, and mitigation as project purposes with equal priority to existing project purposes of power generation, irrigation, and domestic uses. The CVP Improvement Act requires the Secretary of the Interior, through Reclamation and the USFWS, “to operate the
2. Project Background

CVP consistent with the purposes of the act, to meet the federal trust responsibilities to protect the fishery resources of affected federally recognized Indian tribes, and to achieve a reasonable balance among competing demands for the use of CVP water” (Reclamation, 2005).

Reclamation and USFWS, in coordination with the State of California, participating CALFED agencies, and other partners, have implemented numerous programs to meet the goals of the Act. Two areas of focus have been increasing the number of anadromous fish in Central Valley rivers and streams, and supplying water to Central Valley refuges and other waterfowl habitats.

The goal of the anadromous fish program, as specified in section 3406(b)(1) of the CVP Improvement Act, was for the Department of the Interior “to make all reasonable efforts to at least double, by the year 2002, the “natural” production of six species of anadromous fish in Central Valley rivers and streams over the average levels that existed between 1967 and 1991” (Reclamation, 2005). Many of the programs implemented to achieve this goal focus on the Delta because many species and runs of anadromous fish pass through the Delta and because the Delta environment has been significantly altered in ways that impact fish habitat. The anadromous fish doubling program in the Delta emphasizes operational changes that result in increased stream flows and reduced diversions during sensitive periods for fish. Other measures include installation of a seasonal barrier at the head of Old River (Reclamation, 2005).

The goal of the CVP Improvement Act refuge water supply program is to provide “firm water supplies of suitable quality to maintain and improve wetland habitat areas” on certain Central Valley wildlife refuges (see section 3406(d)). The Act required about 430,000 acre-feet of base refuge supply to be provided immediately, and set a target for supplying an additional 130,000 acre-feet of supplemental water within 10 years. The base supply is routinely provided, but supplemental supplies are not fully provided due to a variety of constraints, including cost and availability of water, pumping capacity, and storage and conveyance infrastructure.

2.3.2 State Water Project

The SWP is the primary state entity for storing and conveying water to supply-deficient areas in California. Water is contracted to 29 local water agencies that are obligated to pay for the SWP’s construction and continued operation. Of the 29 contractors, 25 use SWP water primarily for Municipal and Industrial (M&I) purposes, while the remaining 5 use SWP water for primarily agricultural purposes. The water supply contracts were originally entered into in the 1960s. Contracts were signed for an eventual annual delivery of 4.17 MAF (referred to in the contracts as “Table A” water). For the 10-year period from 1995 through 2004, average annual deliveries of Table A water were 2.4 MAF, with a maximum of 3.2 MAF and a minimum of 1.5 MAF (DWR, 2006).

Planning for the multipurpose SWP began in the late 1940s and early 1950s, when it became evident that local and federal water development could not keep pace with California’s rapidly growing population. Passage of the Burns-Porter Act in 1960 authorized construction of the facilities. At that time, the plans recognized that there would be a gradual increase in water demand and that some of the supply facilities could be deferred until later. The SWP’s major
components include Oroville Dam and Reservoir on the Feather River, the Edmund G. Brown California Aqueduct, South Bay Aqueduct, North Bay Aqueduct, and a portion of San Luis Reservoir (shared with Reclamation), as well as the Banks Pumping Plant and Clifton Court Forebay located in the Delta. The Banks Pumping Plant has a capacity of 10,300 cfs; however, due to regulatory restrictions imposed in SWRCB Decision 1641, the pumping capacity is typically limited to 6,680 cfs with some exceptions (DWR, 2008).

Figure 2-4 shows the major components of the SWP, which extend from the Feather River in the north to the East Branch Extension in Riverside County in the south.

In 2004, the SWP delivered 2.6 MAF of Table A supplies, and about 1.8 MAF of other water including water to meet obligations to water right holders on the Feather River (DWR, 2006). About 75 percent of the Table A deliveries serve M&I land uses, while the remaining 25 percent is delivered for agricultural supplies (DWR, 2006). The volume of water available for delivery to SWP water users varies annually according to hydrologic conditions and system operations.

DWR issued its SWP Delivery Reliability Report 2007 in August 2008. The report indicates the probable volumes of water that could be relied upon during various dry-year conditions. The results of this study, shown in Table 2-2, indicate that the volume of water available for delivery during a 2-year drought would decline to about 54 percent of average deliveries under 2007 conditions, and to about 40 percent of average deliveries under 2027 conditions (DWR, 2008).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>63</td>
<td>6</td>
<td>34</td>
<td>54</td>
</tr>
<tr>
<td>2027</td>
<td>66 - 69</td>
<td>7</td>
<td>26 - 27</td>
<td>40</td>
</tr>
</tbody>
</table>


2.3.3 Coordinated Operations of the Central Valley Project and State Water Project

The federal government and the State of California entered into the Coordinated Operations Agreement in 1986. This agreement established a set of procedures for coordinated operations of the CVP and SWP, including formulas for sharing responsibility in meeting Delta water quality standards, sharing unstored flows, and exchanging water and services between the CVP and SWP. Because both the CVP and SWP use the Sacramento River and Delta as common conveyance facilities, upstream reservoir releases and diversions from the Delta must be coordinated to ensure each entity’s use of available water supplies and to meet obligations to protect other beneficial
uses (Reclamation, 2004). Compliance with Delta water quality standards and federal and state Endangered Species Acts (ESAs) drives much of the coordinated operations.

**Delta Water Quality Standards.** The 1995 *Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary*, prepared by the SWRCB, defines Delta water quality standards that must be met by the CVP and SWP. The SWRCB issued Decision 1641, which amended certain terms and conditions to the CVP and SWP water rights, including the water quality objectives adopted in the water quality control plan. The standards expressed in the plan and enforced through Decision 1641 are for the protection of fish and wildlife, M&I water quality, agricultural water quality, and Suisun Marsh salinity. The SWRCB adopted an amended Water Quality Control Plan for the Bay-Delta in December 2006 that addresses new issues such as Pelagic Organism Decline (SWRCB, 2006).

**ESA Compliance.** For purposes of consultation with USFWS and NMFS under Section 7 of the federal ESA for operation of the CVP, Reclamation prepared and periodically updates a CVP Operations Criteria and Plan (OCAP) that describes the facilities and operating environment of both the CVP and SWP. This plan identifies the factors influencing the physical, regulatory, and institutional conditions in which the coordinated projects operate. The plan identifies and evaluates typical operating strategies under various hydrologic conditions.

In 2004, Reclamation released an updated OCAP addressing the coordinated operations of the CVP and SWP. The corresponding biological opinions, issued by NMFS and USFWS, were found by a federal court to be deficient. The court issued an Interim Order setting flow requirements to be used until new biological opinions were issued. Reclamation reissued OCAP in 2008 and subsequently reinitiated Section 7 consultation in accordance with the federal ESA. A new OCAP biological opinion for delta smelt was issued by USFWS in December 2008, and a new OCAP biological opinion for salmon and steelhead is expected to be issued by NMFS in mid-summer 2009.

The analyses pertaining to operations of the SWP and CVP in this document are based on the Interim Order issued by the federal court and the 2004 OCAP. Because NMFS has not yet issued its biological opinion, it is not yet possible to assess the changes to SWP and CVP operations that may occur due to the combined effects of the USFWS and NMFS biological opinions for 2008 OCAP. Reclamation and DWR intend to complete an analysis of the effects that the new biological opinions will have on the operations of SWP and CVP. It is possible that the new opinions may result in moderate to severe fishery restrictions being imposed on Delta exports, depending on annual hydrologic conditions, above and beyond those caused by the Interim Order. The analysis of the effects of the new biological opinions on the operations of the SWP and CVP will be described in the Final Federal Feasibility Report and the Final EIS/EIR for this project.

For purposes of complying with the state and federal ESAs, DWR and Reclamation have initiated the Bay Delta Conservation Plan (BDCP), which is further described in Section 2.4.
2.3.4 In-Delta Water Uses

Water use in the Delta region averages about 1.7 MAF per year, with the majority used for agriculture. Most of the agricultural water is directly diverted by farmers through unscreened diversions under riparian or pre-1914 water rights. There are about 1,800 irrigation diversions in the Delta. Drainage water from farming operations is pumped back to the Delta waterways. A small amount of water also goes to urban uses, including diversions by CCWD, the City of Antioch, and industries along the Pittsburg-Antioch shoreline. The CVP and SWP are operated to meet water quality standards that are in place to protect water quality for in-Delta users (DWR, 2005).

2.4 Water Use Efficiency, Water Conservation, and Water Recycling

2.4.1 CCWD Service Area

CCWD recognizes the need for continuing efforts to improve water use efficiency and has a successful track record of reducing water use despite an increasing population. CCWD signed and adheres to the Urban Water Conservation Memorandum of Understanding (renewed in 1997), and has implemented conservation Best Management Practices since 1991.

From 1987 through 1990, the amount of water used within CCWD’s service area derived from Delta supplies was about 140,000 acre-feet per year. Water use efficiency efforts, including residential, commercial, industrial, and institutional conservation, and recycled water use in CCWD’s service area have reduced water use derived from Delta supplies to 118,000 acre-feet per year (2004 through 2007), despite a population increase of about 40 percent since 1986. Recycled water use in CCWD’s service area is about 8,500 acre-feet per year and is expected to climb to about 13,000 acre-feet per year by 2010. CCWD’s conservation savings are planned to more than double by 2020 (CCWD, 2005). CCWD has supported efforts to set a goal of reducing urban per capita water use by 20 percent by 2020.

2.4.2 Bay Area Region

The Bay Area as a whole has also reduced water use despite an increasing population. From 1986 to 2005, Bay Area population increased by about 21 percent, while M&I water use only increased by about 3 percent. Recycled water use within the region was about 56,000 acre-feet per year in 2005, with plans to double that by 2020 (BAWAC, 2005).

Agencies on the South Bay Aqueduct (Alameda County Flood Control and Water Conservation District, Zone 7 (Zone 7), Alameda County Water District, and SCVWD) have signed and adhere to the Urban Water Conservation Memorandum of Understanding and have implemented conservation Best Management Practices. All three agencies have aggressive water use efficiency programs and plans to increase water conservation and recycling efforts into the future.
2.5 Other On-going Planning Processes

2.5.1 Delta Vision

Delta Vision is a planning process initiated by the Governor of the State of California through Executive Order S-17-06 that established an independent Blue Ribbon Task Force responsible for development of a durable vision for sustainable management of the Delta. A cabinet-level Delta Vision Committee was appointed to oversee the process. The Delta Vision Committee appointed a 43-member Stakeholder Coordination Group and two science advisors to provide input to the Task Force and Committee.

The work of the Task Force included two phases: the Vision, which was completed in December 2007, and the Strategic Plan, which was completed by the Task Force and sent to the Committee in November 2008 (Delta Vision Blue Ribbon Task Force, 2007 and 2008). The Committee prepared its report to the Governor, which was released to the public on January 2, 2009 (Delta Vision Committee, 2008). Key recommendations include significant increases in conservation and water system efficiency and new water conveyance and storage facilities. The report also recommends actions that include improving flood protection, implementing high priority ecosystem restoration projects, and pursuing conveyance and storage system improvements as rapidly as possible. The Los Vaqueros Reservoir Expansion Project, like all the CALFED Program storage projects, is consistent with the Delta Vision recommendations, but independent of the planning effort. Decisions on whether and how to proceed with any of the alternatives evaluated in this EIS/EIR are not tied to implementation of the Delta Vision.

2.5.2 Bay Delta Conservation Plan

The BDCP is a conservation plan being prepared to meet the requirements of section 10 of the federal ESA, and either section 2835 or section 2081 of the State Fish and Game Code. DWR and state and federal water contractors intend to apply for Incidental Take Permits for water operations and management activities in the Delta. The BDCP will also be used, if feasible, by Reclamation as the basis for federal ESA section 7 compliance, resulting in the issuance of biological opinions and Incidental Take Permits to Reclamation for their participation and implementation of the BDCP. These incidental take authorizations will allow for the incidental take of threatened and endangered species resulting from covered activities and conservation measures associated with water operations of the SWP and CVP, including facility improvements and maintenance activities, operational activities related to water transfers, new Delta conveyance facilities, and habitat conservation measures included in the BDCP.

Entities seeking incidental take coverage through the BDCP include Reclamation, DWR, Metropolitan Water District of Southern California, Kern County Water Agency, SCVWD, Zone 7, San Luis Delta Mendota Water Authority, Westlands Water District and Mirant Delta. The BDCP will likely include capital improvements for water supply conveyance, ecological restoration, monitoring, and adaptive management.
2. Project Background

The BDCP is in the early stages of planning. A Notice of Preparation of a joint EIR/EIS was issued by DWR on March 17, 2008. A Notice of Intent to prepare an EIR/EIS and conduct scoping meetings was issued by Reclamation, USFWS, and NMFS on April 15, 2008.

The reservoir expansion project is not a covered activity in the BDCP; decisions on whether and how to proceed with any of the project alternatives evaluated in this EIS/EIR are not tied to completion or implementation of the BDCP.

2.5.3 OCAP Biological Opinions

USFWS and NMFS issued biological opinions for the OCAP in 2005 and 2004, respectively. These biological opinions covered the effect of the joint operations of the SWP and CVP on federally listed threatened and endangered species and their critical habitat. USFWS issued a new OCAP biological opinion in December 2008, as required by federal court order in *Natural Resources Defense Council v Kempthorne* (2007). NMFS is currently preparing a new OCAP biological opinion as required by federal court order in *Pacific Coast Federation of Fishermen’s Associations v Gutierrez* (2008). This biological opinion is expected in mid-summer 2009. The new OCAP biological opinions will cover current operations of the SWP and CVP. See section 2.3.3 above for additional information on OCAP and ESA compliance.

2.5.4 Integrated Regional Water Management

Numerous regional and local water supply planning efforts are ongoing within the Bay-Delta Area. CCWD participates in two Integrated Regional Water Management Plans (IRWMPs): the Bay Area IRWMP and the East Contra Costa County IRWMP. Both of these IRWMPs emphasize collaboration among water management agencies to provide multiple benefits, and cost-effective and sustainable solutions to water supply and water quality challenges.

The reservoir expansion project is not included in either of these IRWMPs because at the time those plans were being prepared the reservoir expansion project was being studied in coordination with the overall CALFED Storage Program. However, numerous projects to improve water supply reliability and water quality are included in the plans, such as conservation, recycled water, regional interties, desalination and groundwater development, treatment, and banking. Figure 2-5 shows the major regional water supply infrastructure serving the Bay Area agencies along with specific locations of system interties among agencies. Decisions on whether and how to proceed with any of the project alternatives presented in this EIS/EIR are not tied to the outcome of any IRWMPs.
Los Vaqueros Reservoir Expansion Project EIS/EIR  201110

Figure 2-5
Bay Area Water Agencies – Regional System Facilities and Interties

SOURCE: USGS, 1993 (base map); and ESA, 2008