

Appendix A

Alternatives Development

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Long-Term Water Transfers

Environmental Impact Statement/Environmental Impact Report

Alternatives Development Report Final Draft

Prepared by

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Abbreviations and Acronyms

AF	acre-feet
BARDP	Bay Area Regional Desalination Project
BDCP	Bay Delta Conservation Plan
BMPs	best management practices
CALFED	State (CAL) and Federal (FED) agencies participating in the Bay-Delta Accord
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
Delta	Sacramento-San Joaquin Delta
DWR	Department of Water Resources
EA	Environmental Assessment
EIS/EIR	Environmental Impact Statement/Environmental Impact Report
ETAW	evapotranspiration of applied water
FONSI	Finding of No Significant Impact
IPR	indirect potable reuse
M&I	municipal and industrial
MUD	Municipal Utility District
NEPA	National Environmental Policy Act
NOAA Fisheries	National Oceanic and Atmospheric Administration Fisheries Service
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
RPA	Reasonable and Prudent Alternative
SLDMWA	San Luis & Delta-Mendota Water Authority
SWP	State Water Project
USFWS	U.S. Fish and Wildlife Service
WaterSMART	Sustain and Manage America's Resources for Tomorrow
WD	Water District
WUE	water use efficiency

Chapter 1

Introduction

This report describes the alternatives development process and proposed alternatives for the Long-Term Water Transfers Environmental Impact Statement/Environmental Impact Report (EIS/EIR).

1.1 Background

Hydrologic conditions, climatic variability, and regulatory requirements for operation of water projects commonly affect water supply availability in California, making advance planning for water shortages necessary and routine. This variability can strain water supplies in areas that are dependent on delivery of Central Valley Project (CVP) supplies to meet most, if not all, of the water demand. In the past decades, water entities have been implementing water transfers to supplement decreased water supplies and transfers have become a common tool in water resource planning.

The Bureau of Reclamation and the San Luis & Delta-Mendota Water Authority (SLDMWA) are completing a joint EIS/EIR to provide National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) compliance for water transfers from 2015 through 2024. Reclamation is serving as the Lead Agency under NEPA and SLDMWA is the Lead Agency under CEQA. This report refers to Reclamation and SLDMWA jointly as the Lead Agencies.

The EIS/EIR will evaluate water transfers from willing sellers upstream from the Sacramento-San Joaquin Delta (Delta) to buyers that export water from the Delta. Alternatives in this document only analyze transfers of CVP water supplies that require use of CVP or State Water Project (SWP) facilities and transfers of non-CVP water supplies that require use of CVP facilities. The cumulative analysis will include all potential transfers including SWP transfers. The water would be transferred to water users that are at risk of experiencing water shortages and require supplemental water supplies to meet anticipated demands. Water transfers would only be used to help meet existing demands and would not serve any new demands in the buyers' service areas.

In addition to SLDMWA, several other agencies have identified interest in purchasing transfer water to reduce potential water shortages. These agencies have requested to be included in the EIS/EIR. Table 1-1 summarizes all purchasing agencies, further referred to as buyers in this report. Figure 1-1 on the next page shows the location of buyers (referred to as Buyer Service Area) and the sellers (referred to as Seller Service Area).

Table 1-1. Potential Buyers

Contra Costa Water District
East Bay Municipal Utility District
San Luis & Delta Mendota Water Authority Participating Members
<i>Byron-Bethany Irrigation District</i>
<i>Del Puerto Water District</i>
<i>Eagle Field Water District</i>
<i>Mercy Springs Water District</i>
<i>Pacheco Water District</i>
<i>Panoche Water District</i>
<i>San Benito County Water District</i>
<i>San Luis Water District</i>
<i>Santa Clara Valley Water District</i>
<i>Westlands Water District</i>

To make water available, the seller must take an action to reduce beneficial use. Water transfers must be consistent with Federal and State law. Transfers in the Sacramento and San Joaquin area are governed by existing water rights, Delta pumping capacity, and reservoir storage capacity. The following sections describe past water transfers and regulations applicable to implementing water transfers.

1.1.1 History

The Lead Agencies have participated in water transfers through various past programs or agreements. The Central Valley Project Improvement Act (CVPIA), signed into law in 1992, authorizes water transfers between willing parties as long as transferred water is to be used for project purposes or other beneficial uses recognized under State law (Section 3405). As a result, Reclamation has facilitated and implemented CVP-related water transfers between willing sellers and buyers in need of supplemental water supplies. Transfers have included both in-basin and through-Delta transfers.



Figure 1-1. Buyer and Seller Service Areas

Reclamation is required to complete NEPA documentation for water transfers. NEPA compliance for transfers has varied in the past decade. Reclamation has developed the following NEPA documents to evaluate multiple through-Delta water transfers:

- Environmental Water Account EIS/EIR - evaluated water transfers from 2003 through 2007.
- Environmental Water Account Supplemental EIS/EIR - evaluated transfers for the 2008 transfer season.
- 2009 Drought Water Bank Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) - evaluated CVP-related transfers that occurred under the 2009 Drought Water Bank.
- 2010-2011 Water Transfer Program EA and FONSI – evaluated through-Delta water transfers for 2010 and 2011 water years. Because of wetter hydrologic conditions, no transfers occurred in 2010 or 2011.
- 2013 Water Transfers EA and FONSI – evaluated through-Delta groundwater substitution transfers in 2013.
- 2014 SLDMWA Water Transfers EA and FONSI – evaluated through Delta transfers made available from groundwater substitution or cropland idling.

Reclamation has also completed multiple EAs that focus on in-basin transfers. In 2010, Reclamation signed two FONSIIs for accelerated water transfers and exchanges from 2011 through 2015. One covered transfers between CVP South of Delta Contractors and the other covered transfers between Friant Division and Cross Valley CVP Contractors. Reclamation also worked with the Exchange Contractors, the CEQA lead agency, to complete an EIS/EIR to examine the environmental impacts of the transfer and exchange of the Exchange Contractors CVP water (up to 130,000 acre-feet [AF] per year for the next ten years) within the SLDMWA service area from 2005 through 2014. In 2014, Reclamation completed the 2014 Tehama-Colusa Canal Authority EA and FONSI to assess groundwater substitution and cropland idling transfers within from Sacramento Valley water users to the Tehama-Colusa Canal Authority. Other EAs have been completed for individual, in-basin and out-of-basin transfers.

Reclamation works cooperatively with the California Department of Water Resources (DWR) to develop the *Technical Information for Preparing Water Transfer Proposals* document that provides sellers and buyers with transfer information needed for Reclamation and DWR to facilitate transfers according to CVPIA and State law. Reclamation and DWR have published the paper each

year since 2009 and plan to release it annually in the future with updated information on water transfers.

SLDMWA has negotiated water transfers in past years on behalf of the member agencies. SLDMWA member agencies have been identified as a potential buyer in all Reclamation's past transfer programs and many have purchased water in previous years.

While not the subject of this analysis except with regard to cumulative effects, transfers of SWP water have also occurred frequently in the past. DWR facilitates transfers for SWP contractors. DWR has operated several Drought Water Banks to support water transfers during drier hydrologic years, the most recent in 2009. For the 2009 Drought Water Bank, DWR solicited participants and helped connect buyers and sellers. DWR does not plan to implement banks in the future, but continues to facilitate water transfers for SWP contractors. SWP contractors currently identify and negotiate water transfers and submit transfer proposals to DWR.

1.1.2 Regulations Regarding Transfers

1.1.2.1 Federal

The Biological Opinions¹ on the Coordinated Operations of the CVP and SWP (U.S. Fish and Wildlife Service [USFWS] 2008; National Oceanic and Atmospheric Administration Fisheries Service [NOAA Fisheries] 2009) analyze transfers through the Delta from July to September that are up to 600,000 AF in critical and dry years. For all other year types, the maximum transfer amount is up to 360,000 AF. Transfers that exceed these amounts or are outside the transfer window would require new biological opinions. For this EIS/EIR, annual transfers would not reach this capacity and would likely stay in the range of up to 100,000 to 200,000 AF of water transferred annually to buyers.

Several lawsuits were filed challenging the validity of the 2008 USFWS and 2009 NOAA Fisheries Biological Opinions and Reclamation's acceptance of the Reasonable and Prudent Alternative (RPA) included with each (Consolidated Salmonid Cases, Delta Smelt Consolidated Cases). The District Court issued findings that concluded Reclamation had violated NEPA by failing to perform any NEPA analysis before provisionally adopting the 2008 USFWS RPA and 2009 NOAA Fisheries RPA. On December 14, 2010, the District Court found the 2008 USFWS Biological Opinion to be unlawful and remanded the Biological Opinion to USFWS. The District Court issued a similar ruling for the 2009 NOAA Fisheries Biological Opinion on September 20, 2011. On March 13, 2014, the United States Court of Appeals for the Ninth Circuit affirmed in part and reversed in part the finding from the District Court on the USFWS Biological Opinion. The Court of Appeals upheld the determination

¹ A written statement setting forth the opinion of the USFWS or the NOAA Fisheries Service as to whether a federal action is likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of a critical habitat. See 16 USCA 1536(b).

that Reclamation must complete NEPA analysis, but it reversed the finding that the scientific basis for the Biological Opinion was arbitrary and capricious. The NOAA Fisheries Biological Opinion is the subject of a future review from the Court of Appeals. Until the legal issues are resolved and new biological opinions are completed (if necessary), the 2008 USFWS and 2009 NOAA Fisheries biological opinions will guide operations of potential water transfers.

Reclamation approves transfers consistent with provisions of the CVPIA and State law that protect against injury to third parties as a result of water transfers. According to the CVPIA Section 3405(a), the following principles must be satisfied for any transfer:

- Transfer may not violate the provisions of Federal or state law;
- Transfer may not cause significant adverse effects on Reclamation's ability to deliver CVP water to its contractors;
- Transfer will be limited to water that would be consumptively used or irretrievably lost to beneficial use;
- Transfer will not have significant long-term adverse impact on groundwater conditions;
- Transfer will not adversely affect water supplies for fish and wildlife purposes. Reclamation will not approve any water transfer for which these basic principles have not been adequately addressed; and
- Transfer water must be made available in accordance with the seller's surface water monthly diversion schedule. For example, if the seller's monthly diversion for July is 10,000 AF, then only up to that amount can be transferred in July.

1.1.2.2 State

Several sections of the California Water Code provide authority to carry out transfers. Importantly, Section 1745.07 specifically indicates that transfers fitting within that portion of the Water Code are deemed to be a beneficial use of water and not to interfere with water rights. Section 1745 et seq. also defines types of transfers allowed and protections of water rights and third parties against water transfers. Water Code Section 1810 prohibits owners of conveyance facilities from denying use of unused capacity for transfers upon fair compensation and further specifies that "use of a water conveyance facility is to be made without injuring any legal user of water and without unreasonably affecting fish, wildlife, or other in-stream beneficial uses and without unreasonably affecting the overall economy or the environment of the county from which the water is being transferred."

1.1.2.3 Local

County governments also have requirements related to transferring water outside of the county, primarily related to groundwater extraction. Reclamation requires transfer participants to comply with local requirements (including ordinances relating to well drilling, well spacing, and groundwater extraction) and local groundwater management plans, as well as compliance with adjudications and with the overdraft protections in Water Code Section 1745 et seq.

1.2 Purpose of the Report

This Alternatives Development Report documents the process to develop the EIS/EIR alternatives. The Lead Agencies are using this structured planning process to delineate a reasonable range of alternatives for evaluation in the EIS/EIR in compliance with NEPA and CEQA.

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Chapter 2

Alternatives Development Process

Both NEPA and CEQA require EISs and EIRs, respectively, to identify a reasonable range of alternatives. To identify and screen alternatives, a structured, documented process was developed that included internal and public scoping (Figure 2-1).



Figure 2-1. Alternatives Development and Screening Process

2.1 NEPA Purpose of and Need for Action/CEQA Project Objectives

The purpose and need statement (under NEPA) and project objectives (under CEQA) describe the underlying need for and purpose of a proposed project. This statement is a critical part of the environmental review process because it helps to set the overall direction of an EIS/EIR, identify the range of reasonable alternatives, and focus the scope of analysis. The Lead Agencies developed the following purpose and need/basic project objectives statement.

2.1.1 Purpose and Need

The purpose of the Proposed Action is to facilitate and approve voluntary water transfers from willing sellers upstream of the Delta to water users south of the Delta and in the San Francisco Bay Area. Water users have the need for immediately implementable and flexible supplemental water supplies to alleviate shortages.

2.1.2 Project Objectives

As required by CEQA, a lead agency must identify the objectives sought by the proposed project. SLDMWA has developed the following objectives for long-term water transfers through 2024:

- Develop supplemental water supply for member agencies during times of CVP shortages to meet existing demands.

- Meet the need of member agencies for a water supply that is immediately implementable and flexible and can respond to changes in hydrologic conditions and CVP allocations.

Because shortages are expected due to hydrologic conditions, climatic variability, and regulatory requirements, transfers are needed in most, if not all years.

2.2 Measure Identification

The public provided comments on the scope of the EIS/EIR during the public scoping period. Some of these comments include suggestions for specific measures intended to address the purpose and need/basic project objectives. The Lead Agencies reviewed the purpose and need/basic project objectives, public scoping comments, scientific data, and previous studies in their initial effort to brainstorm measures. This resulted in an initial list of measures in Table 2-1 (described in more detail in Chapter 3).

Table 2-1. Initial Measures

Measures	Measure Description
Agricultural Water Use Efficiency (Buyer Service area)	Increase agricultural water use efficiency in buyer service area to reduce agricultural water use, including improvements to agricultural systems to increase recapture and reuse of irrigation water
Agricultural Water Use Efficiency (Upstream from Delta Region)	Increase agricultural water use efficiency in seller service area to reduce agricultural water use
Conservation – Municipal & Industrial	Increase water conservation for municipal and industrial uses in buyer service area to reduce water demands
Desalination - brackish	Desalinate brackish groundwater supplies and distribute to Buyer Service area to develop new supply
Desalination - seawater	Desalinate seawater and distribute to Buyer Service area to develop new water supply
Reclamation - nonpotable reuse	Treat wastewater for agricultural water use in Buyer Service area
Reclamation - indirect potable reuse (IPR)	Advance treat wastewater and store in groundwater basins for future potable reuse
Cropland Idling Transfers-rice, field crops, and grains	Idle croplands and transfer irrigation water to buyers
Cropland Idling Transfers-pasture and alfalfa	Idle pasture and alfalfa fields and transfer irrigation water to buyers
Land retirement in San Joaquin Valley	Permanently retire lands in San Joaquin Valley and transfer irrigation water to other croplands
Groundwater substitution	Pump groundwater for irrigation rather than use surface water supplies, and transfer surface water to buyers
New surface storage	Build new surface storage facilities to store water for buyers
Groundwater storage	Build new facilities to recharge and extract groundwater for use in Buyer Service area, or expand existing groundwater storage programs by expanding recharge and extraction facilities
Water rights purchase	Purchase water rights for permanent transfer of water

Measures	Measure Description
Crop shifting	Shift from a higher water use crop to a lower water use crop and transfer incremental decrease in water use to buyers
Rice decomposition water	Use alternate method to decompose rice straw and transfer rice decomposition water to buyers
Reservoir release	Transfer available water stored in existing, non-CVP or SWP reservoirs
Transfers within the Buyer Service Area	Implement water transfers between buyers and sellers within the Buyer Service area
Groundwater development	Develop new groundwater supplies by constructing new wells and pumps in the Buyer Service area
Modify CVP and SWP contracts	Change CVP and SWP contracts to limit water use in the Buyer Service area
Change cropping patterns in San Joaquin Valley	Plant lower water use crops or increase fallowed land in the Buyer Service area
Limit dairy and cattle ranches in San Joaquin Valley	Limit dairy and cattle ranches in San Joaquin Valley to decrease water use
Enforce seniority system to manage deliveries	Deliver water supplies based on seniority of water rights
Implement policy of no net increase in water availability for expansion	Prohibit use of CVP supplies for newly developed urban or agricultural lands
Pipe water from Canada and northern states	Purchase water and build distribution system to deliver water from northern states to buyers
Fix Owens Valley	Increase water supply available from Owens Valley

2.3 Screening Methods

The Lead Agencies determined that they should screen the initial list of measures before combining the measure into alternatives. The agencies wanted to carry forward measures that had some potential to contribute to the purpose and need/basic project objectives. They based the measure evaluation and screening on NEPA and CEQA guidance:

- NEPA requires that agencies shall “rigorously explore and objectively evaluate all the reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated” (40 Code of Federal Regulations [CFR] Part 1502.14(a)). The Department of the Interior NEPA procedures (43 CFR Part 46.420(b)) define reasonable alternatives as “alternatives that are technically and economically practical or feasible and meet the purpose and need of the proposed action.”
- CEQA Guidelines section §15126.6(a) states, “An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project...” An EIR need not consider every conceivable alternative to a project or alternatives that are infeasible. (CEQA Guidelines, §15126.6(a).) State CEQA Guidelines section 15364

defines feasible as “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors.”

Both NEPA and CEQA include provisions that alternatives meet (or meet most of) the purpose and need/basic project objectives, and be potentially feasible. Some alternatives do not fully meet the purpose and need/project objectives, but may be carried forward for additional analysis because they have potential to minimize some types of environmental effects or help create a reasonable range of alternatives for consideration by decision-makers.

The Lead Agencies determined that they would screen the alternatives based on their ability to meet key elements of the purpose and need/basic project objectives:

- Immediate: the term proposed for this EIS/EIR is 2015 through 2024. This period is relatively short, and measures need to be able to provide some measurable benefit within this time period.
- Flexible: project participants need water in some years, but not in others. They need measures that have the flexibility to be used only when needed.
- Provide Water: project participants need measures that have the capability of providing additional water to regions that are experiencing shortages.

Measures need to meet these three criteria to move forward for further evaluation.

2.4 Alternatives Development

The Lead Agencies screened the measures by applying the screening criteria to each measure based on available information and best professional judgment. The measures that will move forward for more detailed analysis in the EIS/EIR are those that best meet the NEPA purpose and need and CEQA basic project objectives, minimize negative effects, are feasible, and represent a range of reasonable alternatives. Chapter 4 describes the screening results in more detail.

The Lead Agencies combined the remaining measures into alternatives. The remaining measures represent potential methods to transfer water. The alternatives examine different combinations of transfer types, with different potential maximum quantities of transfers.

Chapter 3 Measures

This chapter describes measures identified for the alternatives development process. As described in Section 2.2, these measures were developed based on existing studies, past water transfer actions, and public comments received during the scoping period. Chapter 4 includes an evaluation of the measures relative to the purpose and need for long-term water transfers.

3.1 Agricultural Water Use Efficiency (Buyer Service Area)

For the agricultural water use efficiency (WUE) measure in the Buyer Service Area, districts or farmers would increase irrigation efficiency by implementing best management practices (BMPs) to reduce applied water on crops. This measure would also include improvements to agricultural systems to increase recapture and reuse of irrigation water. Reclamation requires CVP contractors to implement cost-effective, BMPs to manage water use. The CVPIA of 1992 and Section 210(b) of the Reclamation Reform Act of 1982 requires the preparation and submittal of a Water Management Plan from certain entities that enter into a repayment contract or water service contract with the Reclamation. Each plan is required to be updated every five years. Reclamation develops criteria to evaluate plans prepared by CVP contractors to meet the water conservation requirements. Criteria require contractors to identify BMPs for efficient water use and an implementation plan.

This measure would increase WUE above current and proposed practices identified in the water management plans. Districts and farmers would need to identify and invest in additional district-level or on-farm practices to improve irrigation efficiencies.

3.2 Agricultural Water Use Efficiency (Upstream from Delta)

Under this measure, districts or farmers could implement agricultural WUE practices and transfer water savings to the Buyer Service Area. Water savings would be transferrable only if it is considered irrecoverable. Irrecoverable losses include water that currently flows to a salt sink, the ocean, an inaccessible or degraded aquifer, or the atmosphere (CALFED 2000). If the water saving is recoverable, the water can be reused and is not a true savings. Water can only be transferred if there is a reduction in beneficial use; therefore, recoverable losses do not qualify for a transfer. Sellers must prove that the water savings is irrecoverable in order to sell the water for transfer. This measure would also include improvements to agricultural systems to increase

recapture and reuse of irrigation water. This measure would increase WUE above the current practices, and for CVP contractors, above the current and proposed practices identified in the water management plans (see Section 3.1).

3.3 Conservation - Municipal and Industrial

Under this measure, agencies in the Buyer Service Area would implement municipal and industrial (M&I) conservation actions to reduce water demands above those that are ongoing or proposed. Santa Clara Valley Water District (WD), East Bay Municipal Utility District (MUD), and Contra Costa WD serve large urban areas in the San Francisco Bay Area and currently implement M&I conservation programs and include demand reduction measures in long-term planning documents:

- In its *2009 Water Use Efficiency Strategic Plan*, Santa Clara Valley WD set numeric targets for water conservation by year 2030 (Santa Clara Valley WD 2008). To achieve conservation targets, Santa Clara Valley WD launched several programs to encourage conservation in homes, businesses, and for landscaping, including a rebate program. Details can be found on the Water Conservation website (www.scvwd.dst.ca.us/programs/waterconservation.aspx).
- East Bay MUD summarized conservation efforts in the *East Bay Water 2010-A Status report on Local Water Use and Water Supplies* (East Bay MUD 2010). To meet the state-wide goal for a 20 percent reduction in water use by 2040, East Bay MUD has implemented the WaterSmart Center (East Bay MUD 2011a). The WaterSmart Center serves as a platform for residential and commercial rebates and programs focused on conservation.
- Contra Costa WD offers several programs for the water consumer to encourage water conservation practices, including rebates for water-smart appliances, lawn & landscaping schedules, and a home water survey. Water conservation program details can be found on the Contra Costa WD conservation website (www.ccwater.com/conserves).

These agencies have determined that they have a demand for transfers in addition to the actions that they are already undertaking related to conservation. For conservation to address potential shortages, it would need to be above the conservation efforts already planned by each agency.

3.4 Desalination

Desalination would create additional water supply through the treatment of seawater or brackish groundwater. Desalination would require water agencies to either construct a new facility or expand an existing facility. Buyers would use the desalinated water to make up for reduced deliveries of CVP water.

3.4.1 Desalination - Brackish

A brackish groundwater desalination facility would require new wells and a reverse osmosis treatment plant to pump and treat brackish groundwater from a basin within the Buyer Service Area. The treated water then would need to be conveyed to water users through new or existing distribution systems. The desalination facility would need to dispose of brine left over from the treatment process. Brine is typically discharged into the ocean; however, alternative inland brine disposal processes may be available such as evaporation ponds, deep well injection, or disposal to a salt sink.

3.4.2 Desalination - Seawater

Seawater desalination is fundamentally similar to brackish groundwater desalination but utilizes a coastal treatment plant that draws nearby seawater as the source. The Bay Area Regional Desalination Project (BARDP) is currently being developed by the Contra Costa WD, East Bay MUD, San Francisco Public Utilities Commission, and Santa Clara Valley WD. The BARDP evaluation selected three potential locations for desalination. The highest ranking plant would be co-located with the existing Mirant Power Plant near the confluence of the Sacramento River, New York Slough, and the San Joaquin River. A pilot study was conducted at Mallard Slough from October 2008 through April 2009, to evaluate potential treatment types for the BARDP. Results from the study indicated that desalination is feasible in the region and that site selection is an important part of the design process (MWH 2010). Three potential transfer buyers are participating in the BARDP.

3.5 Water Recycling and Reuse

Water recycling creates new water supply through either the treatment of wastewater for non-potable uses or by recharging groundwater aquifers with advanced treated wastewater for future extraction for potable uses (indirect potable reuse [IPR]). Both recycling and reuse options require a wastewater source, treatment, and distribution facilities.

3.5.1 Reclamation - Nonpotable Reuse

This measure would provide recycled water for irrigation, landscaping, or other suitable uses. A new or expanded existing tertiary treatment plant would be needed to treat wastewater. This measure would also require construction of pipelines to convey recycled water to new users. Most of the urban districts in the Buyer Service Area have existing wastewater treatment plants and use

recycled water within their service area. Plans also exist to increase recycled water use. East Bay MUD developed the Water Supply Management Program 2040 long-term plan to meet future water supply needs, which includes the goal of increasing recycled water use to 11 million gallons per day (East Bay MUD 2011b). Santa Clara Valley WD works with wastewater authorities that operate four wastewater treatment plants in Santa Clara County. Santa Clara Valley WD also has plans to expand recycled water use in the coming years, including working with the City of San Jose to build an advanced water treatment facility that will produce up to ten million gallons per day (Santa Clara Valley WD 2011).

3.5.2 Reclamation - Indirect Potable Reuse

In an IPR project, wastewater that has undergone advanced treatment is stored in a groundwater basin for future potable use. This measure would require construction of an advanced wastewater treatment plant, groundwater recharge and extraction facilities, and a transmission system to connect the facilities. The term “indirect” implies that the highly-treated recycled water does not enter the potable distribution system directly. The treated wastewater would be injected into the groundwater basin through wells or placed in spreading basins to percolate into an aquifer. With adequate residence time, the treated water and groundwater would blend, undergo natural settling/treatment, and then be extracted for potable water supply. Extracted water quality must meet Regional Water Quality Control Board standards.

3.6 Cropland Idling Transfers

This measure involves idling cropland and transferring the irrigation water to the Buyer Service Area. Cropland idling water would be available on the same pattern throughout the growing season as it would have been consumed had a crop been planted. The quantity of water made available from cropland idling is determined based on the evapotranspiration of applied water (ETAW). ETAW is the portion of applied surface water that is utilized by the crop and evaporated from the soil and plant surfaces.

For this alternatives development process, cropland idling measures are separated into two categories based on type of crops eligible for transfers. The first crop idling measure includes rice, field crops, and grain crops, which have been idled in past transfer programs. The second crop idling measure includes pasture and alfalfa, which Reclamation has generally not allowed to participate in transfers in the past because of water accounting challenges.

3.6.1 Cropland Idling Transfers - Rice, Field Crops, and Grains

Table 3-1 shows ETAW values for rice, field, and grain crops that are eligible for idling. The ETAW value, less carriage water losses, would be transferred to the buyer. The irrigation season generally extends from April through September; surface water could be made available during the entire irrigation

period. However, because of the regulated transfer period, water can only be moved through the Delta during July through September. Reclamation does not guarantee water prior to July can be stored in CVP reservoirs; therefore, the buyer may only receive a portion of the cropland idling transfer water (ETAW from July through September).

Table 3-1. Estimated ETAW Values (in AF/acre) For Various Crops Suitable for Idling

Crop	ETAW
Bean	1.5
Corn	1.8
Cotton	2.3
Melon	1.1
Milo	1.6
Onion	1.1
Pumpkin	1.1
Rice	3.3
Sudan Grass	3.0
Sugar Beets	2.5
Sunflower	1.4
Tomato	1.8
Vine Seed/ Cucurbits	1.1
Wild Rice	2.0

Source: DWR and Reclamation 2013

3.6.2 Cropland Idling Transfers - Pasture and Alfalfa

Alfalfa and pasture idling have been excluded from past transfer programs due to regional variation in ETAW values. Alfalfa is a perennial crop, and is typically grown for three to four years until yields decline. An alfalfa transfer program would require managers to follow typical harvest and growing practices in spring and early summer. Fields must then be completely disced by July 1 to prevent deep roots from using groundwater during summer months. Water that would have been used to irrigate in July through September would then be made available for transfer. Alfalfa has an ETAW of 1.7 AF/acre from July through September, but only alfalfa grown in the Sacramento Valley floor north of the American River would be allowed for transfers.

Pasture is also a multi-year crop, but the type and quality of pasture may vary significantly. This makes it difficult to assign a specific ETAW value for pasture idling. Like with alfalfa idling, pasture managers would irrigate through spring and early summer, disc fields by July 1, and then generate transfer water July through September. Pasture ETAW would need to be determined on a case-by-case basis.

3.7 Land Retirement in San Joaquin Valley

Land retirement in San Joaquin Valley involves permanently retiring lands from agricultural production and transferring the irrigation water to the buyer. Reclamation is implementing a land retirement program through the San Luis Unit Drainage Program, which retires land in drainage impaired areas of the San Joaquin Valley. The program aims to retire 194,000 acres of farmland (Reclamation 2006). This measure would retire land in addition to that proposed for the existing program.

3.8 Groundwater Substitution

This measure involves North of Delta sellers pumping groundwater for irrigation in lieu of using their surface water supply. Surface water would then be transferred to the buyer. Transfer water from groundwater substitution would be made available during the irrigation season from April through October. If Reclamation cannot store water prior to the transfer season, irrigators could use surface water from April through June and switch to groundwater in July when surface water can be transferred.

3.9 New Surface Storage

This measure includes building new surface storage facilities to store additional CVP water that could increase CVP deliveries to the Buyer Service Area and reduce potential shortages. Reclamation and DWR are partnering on five surface storage projects that were identified in the CALFED Record of Decision. One project (Los Vaqueros Reservoir Expansion) is already complete and fully utilized; therefore, it does not have available capacity to meet the purpose and need for this effort. The remaining project studies are in various phases of environmental review and feasibility study.

Shasta Lake Water Resources Investigation. This project proposes to raise Shasta Dam to increase water storage for agricultural, M&I, and environmental purposes and encourage Sacramento River salmon population growth. Reclamation has released a public draft EIS/EIR and feasibility report and is working to address comments and finalize these documents (Reclamation 2012).

North-of-the-Delta Offstream Storage. This project proposes to build Sites Reservoir, a new off-stream reservoir in Glenn County, to store additional CVP and SWP water supplies. Reclamation and DWR released a Preliminary Administrative Draft EIS/EIR and Preliminary Engineering Design Report in May 2014 (DWR 2014). The agencies are continuing work towards public draft documents.

In-Delta Storage Project. This project would construct new storage in the Delta region provided by two storage islands and two habitat islands. DWR and Reclamation completed the In-Delta Storage Program State Feasibility Study in 2004 and Draft Supplemental Feasibility Report in 2006. Further work on the In-Delta Storage Project has been suspended since July 2006 (DWR 2013).

Upper San Joaquin River Basin Storage Investigation. This project would construct new storage in the Upper San Joaquin River watershed to expand water storage capacity, increase reliability, and contribute to restoration efforts. Current efforts are focused on a new dam and reservoir between Friant and Kerckhoff dams (Reclamation 2014). Reclamation released a Draft Feasibility Report in February 2014 and is scheduled to complete a Draft EIS/EIR later in 2014 (Reclamation 2014).

3.10 Groundwater Storage

Groundwater storage could include construction of new groundwater storage facilities or becoming a banking partner with an existing groundwater bank. Groundwater banking is defined as the intentional storage of supplies in subsurface aquifers with the expectation of a subsequent retrieval for beneficial use by the depositor (Reclamation 2008). Groundwater storage would allow buyers to acquire and store water throughout the year and carry water over from a wet year to a subsequent dry year when they may experience shortages.

New groundwater storage includes the construction of new facilities to recharge and extract groundwater for use in Buyer Service Area. Groundwater storage requires the ability to recharge water into a groundwater basin and extract it later to return water to the banking partner. Buyers could also increase participation in existing groundwater banks, which would involve negotiating a lease agreement with an entity that operates a groundwater banking program. The agreement would require payment for use of recharge and extraction facilities, as well as charges for occupying or reserving the storage space.

3.11 Water Rights Purchase

A water rights purchase would involve the purchase of an appropriative water right from a private party for the permanent transfer of water to the buyer. The quantity and terms of the water right would become transferrable water. Water rights could either be purchased within the Buyer Service Area or upstream from the Delta. The water rights holder would cease use of the water, which could result in retired agricultural lands. A water rights purchase would require a legal contract and conveyance infrastructure to move water to the Buyer Service Area, if existing infrastructure or exchange agreement is not available. Few water rights purchases have occurred in the region.

3.12 Delta Conveyance

New Delta conveyance includes changes to the existing through Delta CVP and SWP conveyance system to improve water supply deliveries to south of Delta contractors. New conveyance facilities could address restrictions on Delta exports and help reduce associated shortages. The Bay Delta Conservation Plan (BDCP) is investigating potential options for Delta conveyance, including facilities that would divert water from the north Delta and move water it through tunnels to the south Delta. The Draft BDCP and associated Draft EIS/EIR are available for public review.

3.13 Crop Shifting in the Seller Service Area

Crop shifting is the practice of substituting a low water use crop for a high water use crop. The difference in water use from the shift would be available for transfer. Farmers generally rotate between several crops to maintain soil quality, and it may be difficult to predict what would have been planted absent a transfer. To calculate the amount of water made available from crop shifting, agencies would compare the change in consumptive water use (see ETAW values, Table 3.1) during the transfer year to the average water use during a five-year baseline period.

3.14 Rice Decomposition Water

Traditional management practices for rice straw decomposition require surface water diversions in the fall and winter months to flood harvested fields. Under this measure, farmers would use alternate methods to decompose rice straw, such as mechanical chopping and discing or bailing, and would transfer the water that would have been used for flooding to the buyer. About one AF per acre is used for flooding fields. Rice decomposition water is used in the fall and winter after the July-September transfer window. If a transfer occurs, water would need to be stored until the following July, which would put it at risk of spill. The consumptive use of rice decomposition available for transfer is not yet determined.

3.15 Reservoir Release

Reservoir release transfers involve the transfer of available water stored in existing non-CVP or -SWP reservoirs. Transferred water would be limited to the quantity that would not have otherwise been released downstream.

When the willing seller releases stored reservoir water for transfer, these reservoirs are drawn down to levels lower than without the water transfer. To refill the reservoir, a seller must prevent some flow from going downstream.

Sellers must refill the storage at a time when downstream users would not have otherwise captured the water, either in downstream Project reservoirs or with Project pumps in the Delta. Typically, refill can only occur during Delta excess conditions when there is more water than the Projects can pump. Additionally, if the non-Project reservoir has a Project reservoir downstream, refill must occur at a time when the Project reservoir cannot capture the water because of flood storage requirements in the reservoir.

3.16 Transfers within the Buyer Service Area

This measure would transfer water from water users within the Buyer Service Area. Transfer participants would shift CVP water supplies to meet irrigation demand or M&I requirements. Transfers occur frequently within the Buyer Service Area. Reclamation has developed EAs to facilitate implementation of in-basin transfers without additional environmental analysis. The first EA covered transfers from 2006 through 2010 for CVP contractors south of the Delta and in the Friant Division. Reclamation has completed two new EAs to continue in-basin transfers from 2011 through 2015:

- 2011-2015 Accelerated Water Transfers and Exchanges between South of Delta Contractors for Contract Years 2011 to 2015 as outlined in 2010 EA (Reclamation 2010a).
- Accelerated Water Transfer Program for Friant Division and Cross Valley CVP Contractors from 2011 to 2015 as outlined in 2010 EA (Reclamation 2010b).

Reclamation also worked with the Exchange Contractors, the CEQA lead agency, to complete an EIS/EIR to examine the environmental impacts of the transfer and exchange of the Exchange Contractors CVP water (up to 130,000 AF per year for the next ten years) within the SLDMWA service area from 2005 through 2014. Other EAs have been completed for individual, in-basin transfers.

This measure contemplates transfers above those that are already implemented under existing programs.

3.17 Groundwater Development

Under this measure, additional groundwater development would be used to offset CVP delivery reductions. Groundwater development would require the construction of new wells and pumps in the Buyer Service Area to increase groundwater production.

Much of the groundwater resources in the region are already managed through ongoing activities such as the Westlands Water District Groundwater Management Plan (Westlands Water District 1996) and the Santa Clara Valley WD Groundwater Management Plan (Santa Clara Valley WD 2013). Generally, in the Buyer Service Area, groundwater levels fluctuate over time. Monitoring shows substantial drawdown in drier years when more users turn to groundwater supplies because surface water supplies are limited (Westlands Water District 2012, DWR 2006, Santa Clara Valley WD 2013). This action would include groundwater extraction in addition to what is already occurring under existing conditions.

3.18 Modify CVP Contracts

This measure would change CVP contracts to limit water use in the buyer service area. CVP contract modifications would focus on reducing demands in the Buyer Service Area to reduce potential shortages in the future. Such reduction would likely result in land retirement and reduced agricultural production.

3.19 Change Cropping Patterns in San Joaquin Valley

This measure would encourage farmers to plant lower water use crops or increase fallowed land to reduce water demands in the Buyer Service Area. San Joaquin Valley farmers would alter cropping patterns to reduce water deliveries during shortage periods. Such changes would be in addition to those implemented annually by farmers who select crops in response to both water and market conditions. The number of acres now improved with permanent crops either limits cropping pattern change flexibility in the short term or must consider the economic effects of sacrificing investments in the permanent crops.

3.20 Limit Dairies in San Joaquin Valley

This measure would limit the number of dairies in the Buyer Service Area to decrease water demand. Dairy operations would need to relocate to areas outside of the Buyer Service Area. The land could not be used for a different purpose that would involve consumptive use of water to allow the action to produce water to help address shortages.

3.21 Enforce Seniority System to Manage Deliveries

This measure would enforce seniority systems to manage deliveries and water supply would be delivered based on seniority of water rights. CVP deliveries are based on a seniority system where settlement contractors receive waters first

and M&I contractors typically receive a higher allocation than agricultural users when supplies are limited.

3.22 Implement Policy of No Net Increase in Water Availability for Urban or Agricultural Expansion

This measure proposes implementing a policy of no net increase in CVP water availability for urban or agricultural expansion. CVP water could not be used to support new urban development or increase the amount of irrigated land in production. This measure would limit CVP water use to existing urban and agricultural uses.

3.23 Pipe Water from Canada and Northern States

This measure would involve the purchase of water from Washington, Oregon, and Canada. A new water source would need to be identified and a purchase contract would need to be implemented that involves crossing state and/or Federal boundaries. Construction of new distribution facilities would be required to deliver purchased water to the Buyer Service Area.

3.24 Fix Owens Valley

The Owens Valley is a main water source for the City of Los Angeles. The city diverts most of the surface water in the valley into the Owens River–Los Angeles Aqueduct system. Additionally, ground water is pumped or flows from wells to supplement the surface-water diversions to the river–aqueduct system. Increased exports caused water levels in the valley to decline and resulted in substantial losses of native vegetation and habitat degradation. The Los Angeles Department of Water and Power is working with local agencies and stakeholders in Inyo County to restore vegetation and improve water management, including conjunctive use of groundwater and surface water supplies. Under this measure, the city would implement identified restoration programs to maintain water supplies from Owens Valley to serve city demands.

3.25 References

CALFED Bay-Delta Program. 2000. Programmatic Record of Decision, Sacramento California: CALFED Bay-Delta Program. Accessed April 21, 2011. Available at <http://www.calwater.ca.gov/content/Documents/ROD.pdf>.

California Department of Water Resources (DWR). 2006. California's Groundwater Bulletin 118: San Joaquin Valley Groundwater Basin,

- Delta-Mendota Subbasin. Accessed on March 28, 2013. Available at http://www.water.ca.gov/pubs/groundwater/bulletin_118/basindescriptions/5-22.07.pdf
- California Department of Water Resources (DWR). 2013a. In-Delta Storage Program website. Accessed March 28, 2013. Available at: <http://www.water.ca.gov/storage/indelta/index.cfm>
- California Department of Water Resources (DWR). 2014. North of Delta Offstream Storage Investigation Highlights. Accessed July 23, 2014. Available at <http://www.water.ca.gov/storage/docs/Highlights/NODOS%20Highlights%20Booklet%2028May14.pdf>
- California Department of Water Resources (DWR) and Bureau of Reclamation. 2013. DRAFT Technical Information for Preparing Water Transfer Proposals. February 2013. Accessed: March 28, 2013. Available at: <http://www.water.ca.gov/watertransfers/docs/TechInfoDoc-WaterTransfers-2013.pdf>
- East Bay Municipal Utility District. 2010a. East Bay Water 2010- A Status Report on Local Water Use and Water Supplies. Accessed April 20, 2011. Available at http://www.ebmud.com/sites/default/files/pdfs/East_Bay_Water_2010.pdf.
- East Bay Municipal Utility District. 2011a. WaterSmart Center. Accessed April 20, 2011. Available at: <http://www.ebmud.com/environment/conservation-and-recycling/watersmart-center>
- East Bay Municipal Utility District. 2011b. Water Supply Management Program 2040. Accessed April 20, 2011. Available at: <http://www.ebmud.com/our-water/water-supply/long-term-planning/water-supply-management-program-2040>
- MWH. 2010. Bay Area Regional Desalination Project - Pilot Testing at Mallard Slough Pilot Plant Engineering Report. Accessed May 10, 2011. Available at <http://www.regionaldesal.com/documents.html>.
- Reclamation. 2006. San Luis Unit Feature Re-evaluation Environmental Impact Statement. Accessed April 26, 2011. Available at http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=61.
- Reclamation. 2008. Presentation-Bureau of Reclamation Groundwater Banking. Accessed April 26, 2011. Available at <https://sunsite.berkeley.edu/WRCA/WRC/pdfs/GW26thSlavin.pdf>.

- Reclamation. 2010a. Accelerated Water Transfers and Exchanges, Central Valley Water Project, South of Delta Contractors 2011-2015. Accessed April 26, 2011. Available at http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=7000.
- Reclamation. 2010b. Accelerated Water Transfer Program for Friant Division and Cross Valley Central Valley Project Contractors, 2011-2015. Accessed April 26, 2011. Available at http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=6997.
- Reclamation. 2012. Shasta Enlargement Update Briefing. Accessed March 28, 2013. Available at http://www.usbr.gov/mp/slwri/docs/Shasta_Enlargement_Update_Briefing_03-05-2012%20.pdf
- Reclamation. 2014. Upper San Joaquin River Basin Storage Investigation website. Accessed July 23, 2014. Available at <http://www.usbr.gov/mp/sccao/storage/>
- Santa Clara Valley Water District. 2008. Water Use Efficiency Strategic Plan-Phase I Urban Conservation Programs for Long-Term Conservation and Shortage Management. Accessed April 20, 2011. Available at <http://www.scvwd.dst.ca.us/programs/waterconservation.aspx>.
- Santa Clara Valley Water District. 2011. Recycled Water. Accessed April 20, 2011. Available at <http://www.valleywater.org/Services/RecycledWater.aspx>
- Santa Clara Valley Water District. 2012. Groundwater Management Plan. Accessed March 28, 2013. Available at <http://www.valleywater.org/Services/Groundwater.aspx>
- Westlands Water District. 1996. Groundwater Management Plan. Accessed May 11, 2011. Available at [http://www.westlandswater.org/long/200207/gwmp2.pdf?title=Groundwater%20Management%20Plan%20\(AB3030\)&cwide=1440](http://www.westlandswater.org/long/200207/gwmp2.pdf?title=Groundwater%20Management%20Plan%20(AB3030)&cwide=1440).
- Westlands Water District. 2012. Deep Groundwater Conditions Report-December 2011. Accessed March 28, 2013. Available at [http://www.westlandswater.org/long/201203/525r2011.pdf?title=Deep%20Groundwater%20Conditions%20Report%20\(Dec%202011\)&cwide=1280](http://www.westlandswater.org/long/201203/525r2011.pdf?title=Deep%20Groundwater%20Conditions%20Report%20(Dec%202011)&cwide=1280)

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Chapter 4

Measures Screening Evaluation

4.1 Screening Evaluation

The screening process described in Chapter 2 was applied to all measures. As described in Section 2.3, the Lead Agencies developed three criteria to address the purpose and need statement and basic project objectives:

- **Immediate:** the term proposed for this EIS/EIR is 2015 through 2024. This period is relatively short, and measures need to be able to provide some measurable benefit within this time period.
- **Flexible:** project participants need water in some years, but not in others. They need measures that have the flexibility to be used only when needed.
- **Provide Substantial Water:** project participants need measures that have the capability of providing additional water to regions that are experiencing shortages.

If a measure did not meet a criterion, it was considered a fatal flaw and screened out from further consideration. Measures that met all purpose and need criteria move forward to the alternatives formulation phase. The following sections present the evaluation of each measure relative to the above screening criteria. Chapter 3 defines each measure.

4.1.1 Agricultural Water Use Efficiency (Buyer Service Area)

Immediate: no Flexible: yes Provide Substantial Water: no
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As described in Section 3.2, CVP contractors currently implement WUE BMPs, as required by CVPIA Section 3405(e). Reclamation also supports WUE through the WaterSMART program. This measure proposes additional WUE to existing and proposed plans. As part of the existing plans, CVP contractors have already implemented (or are currently implementing) WUE measures. Additional measures would generally require substantial infrastructure and investment and would not be immediately implementable. Flexibility depends on how the measures are implemented; WUE could be flexible, but the flexibility decreases when the measures are implemented for permanent crops.

The purpose and need for water transfers is to provide additional water to reduce shortages. Buyers are taking actions to address shortages, such as WUE

measures, within the No Action/No Project, and these measures would help users accommodate shortages but would not provide any additional supply. Implementing agricultural WUE in the Buyer Service Area would not provide water to users with existing demands affected by CVP shortages.

4.1.2 Agricultural Water Use Efficiency (Upstream from Delta)

Immediate: yes Flexible: yes Provide Substantial Water: yes
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This measure would be both immediate and flexible upstream from the Delta for measures such as weed control. Agricultural WUE practices can be implemented relatively quickly. Sellers would need to prove that water saved is irrecoverable and reduces a

beneficial use. Water could then be sold to buyers. Buyers could call on the transfer annually as needed. Transfer water would provide water to existing demands in the Buyer Service Area to reduce potential shortages.

4.1.3 Conservation – M&I

Immediate: yes Flexible: yes Provide Substantial Water: no

Buyers serving urban demands currently implement M&I conservation measures and have incorporated additional measures in long-range plans to meet conservation goals. Measures could generally be implemented within the project timeframe.

Conservation could occur year round and implemented in any year. Similar to agricultural WUE, implementing additional M&I conservation in the Buyer Service Area would not provide water to meet existing demands affected by CVP shortages. Additionally, implementing conservation measures in addition to existing planned measures would be challenging because M&I conservation goals are very high under existing conditions.

4.1.4 Desalination – Brackish

Immediate: no Flexible: yes Provide Substantial Water: yes

This measure would not be immediate to provide water to reduce shortages from 2015 to 2024. Planning, pilot testing, design, permitting, and construction of a brackish water desalination plant and distribution system take many years. Brackish water

desalination would be flexible if the basin is influenced by seawater and water is available year-round for extraction and treatment. This measure could provide enough water to reduce CVP shortages.

4.1.5 Desalination - Seawater

Immediate: no Flexible: yes Provide Substantial Water: yes

Planning, pilot testing, design, permitting, and construction of an ocean water desalination plant and distribution system takes many years. The BARDP is still in the planning process. Therefore, operation of ocean water desalination plant would not occur in time

to provide substantial benefits during the 2015 to 2024 timeframe. Ocean water desalination would be flexible as water is available year round and could provide enough water to reduce CVP shortages.

4.1.6 Reclamation - Nonpotable Reuse

Immediate: no
Flexible: yes
Provide Substantial Water: yes

Non-potable reuse requires identifying a wastewater source, planning, design, and construction of a wastewater treatment plant, and conveyance to agricultural distribution systems. This measure would not be implemented to provide benefits during the entire 2015 to 2024 timeframe. This measure would be flexible because recycled water would be available year round. Assuming an adequate wastewater source can be identified, this measure would provide water to reduce shortages.

4.1.7 Reclamation - Indirect Potable Reuse

Immediate: no
Flexible: yes
Provide Substantial Water: yes

An IPR project would provide a new potable water source. IPR projects require feasibility studies, pilot studies, design, construction and often a lengthy public education and outreach program. An IPR project would not be implemented in time to provide benefits during the entire 2015 to 2024 timeframe. Water provided by an IPR project would be flexible because it would be pumped from the groundwater basin as needed. Assuming an adequate wastewater source can be identified, this measure would provide water to reduce shortages.

4.1.8 Cropland Idling Transfers - Rice, Field, Grain Crops

Immediate: yes
Flexible: yes
Provide Substantial Water: yes

Cropland idling transfers can occur immediately in that farmers can choose to idle land generally up to the time of planting. Water would be transferred the starting in July of the same year. Cropland idling transfers are also flexible because buyers can use rainfall in the winter months to help predict CVP water needs for the irrigation season. If the transfer water is no longer needed or export capacity appears to be restrictive, buyers could opt out of the transfer without a very large investment. Multi-year contracts would likely include an option fee, but it would not be as large as if infrastructure were developed and no longer needed. Cropland idling can also provide a substantial amount of water for transfer. The Sacramento Valley has extensive irrigated crop acreage and past transfers actions have shown that farmers are willing to idle land and sell irrigation water.

4.1.9 Cropland Idling Transfers - Pasture and Alfalfa

Immediate: yes
Flexible: yes
Provide Substantial Water: yes

Similar to cropland idling for rice, field, and grain crops, pasture and alfalfa idling would also be immediate, flexible and provide water to reduce CVP shortages. Some areas of alfalfa, including the Delta Region and the Sacramento River area south of the American River confluence, would not be allowed for idling because groundwater levels in these regions are relatively high and fields intended for idling may consume groundwater. In these instances, alfalfa idling would not

result in a reduction of consumptive use. Because of water accounting issues, Reclamation must evaluate alfalfa idling transfers on an individual basis.

Pasture idling would have less certainty than alfalfa, and would be difficult to verify that consumptive use has been reduced to make water available for transfer. For this reason, pasture transfers are screened out.

4.1.10 Land Retirement in the San Joaquin Valley

Immediate: no Flexible: no Provide Substantial Water: no

Under the San Luis Drainage Feature Re-evaluation, Reclamation is working to retire 194,000 acres of drainage impaired farmland. Irrigation water for retired lands will be distributed to other lands in the San Luis Unit. This measure proposes to retire additional land above the 194,000 acres. Identifying and negotiating land retirement agreements with willing landowners would take several years to implement. This measure is not flexible because land would go out of irrigated agricultural production permanently. Further, land retirement does not provide additional water to address basin-wide CVP shortages, but rather provides a way for users to address shortages in the No Action/No Project Alternative.

4.1.11 Groundwater Substitution

Immediate: yes Flexible: yes Provide Substantial Water: yes
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Under this measure, sellers in the Upstream from Delta Region would use groundwater in lieu of surface water supplies. Surface water would be transferred to the Buyer Service Area. Groundwater substitution transfers would be both immediate and flexible. Farmers can turn on and off groundwater pumps and switch between surface and groundwater supplies at any time. Similar to cropland idling transfers, buyers can negotiate groundwater substitution transfers in the year of the transfer and have flexibility to opt out of the transfer if water is not needed. Groundwater basins in the Upstream from Delta Region can provide substantial amounts of water for local irrigators and allow for CVP water to be transferred to the Buyer Service Area to reduce potential shortages.

4.1.12 New Surface Storage

Immediate: no Flexible: yes Provide Substantial Water: yes

Reclamation is investigating new storage opportunities that could increase CVP deliveries. The studies are in the planning phases and projects would not likely be implemented to provide benefits from 2015 through 2024. Once implemented, storage projects would provide water and be flexible.

4.1.13 Groundwater Storage

Immediate: yes
Flexible: yes
Provide Substantial Water: no

This measure would be implemented in the Buyer Service Area. Developing new groundwater storage would require construction of recharge, extraction, and conveyance facilities and could not occur immediately. Participation in existing banks, however, could move forward immediately with existing facilities. Once fully implemented, the measure could be flexible because farmers can pump groundwater for irrigation when needed. The success of groundwater storage, however, depends on having an available source of water to recharge and withdraw later during shortages. Agencies in the Buyer Service Area face water shortages in most years and would not have additional water available for recharge. Without an adequate source of recharge water, this measure would not provide sufficient water to reduce CVP shortages.

4.1.14 Water Rights Purchase

Immediate: no
Flexible: yes
Provide Substantial Water: no

This measure would require identifying and negotiating water right purchases with interested sellers. Few water rights sales have occurred in past years. It may take several years to identify sellers and provide enough water to provide benefits to CVP contractors and undertake the legal process to purchase the water right. Therefore, this measure would not be immediate or provide water.

4.1.15 Delta Conveyance

Immediate: no
Flexible: yes
Provide Substantial Water: yes

Reclamation is studying Delta conveyance measures through the BDCP process. The BDCP is in the early stages of the planning process. It is not likely that a measure would provide be implemented during the 2015 through 2024 timeframe. New Delta conveyance would be flexible and provide water to south of Delta contractors because it would not have the same pumping restrictions that currently exist at Jones and Banks pumping plants.

4.1.16 Crop Shifting in Seller Service Area

Immediate: yes
Flexible: yes
Provide Substantial Water: yes

Similar to cropland idling, crop shifting would also be immediate and flexible. Crop shifting would generally provide less water than a crop idling transfer on a per acre basis; however, because of the extensive irrigated acreage and crop variability in the Sacramento Valley, crop shifting transfer could potentially provide a substantial amount of water to reduce CVP shortages.

4.1.17 Rice Decomposition Water

Immediate: yes Flexible: yes Provide Substantial Water: no

Rice water decomposition transfers would be immediate and flexible. Buyers can negotiate with sellers on an annual basis prior to fall flooding. The transfers would be flexible because buyers could opt out if transfer water is not needed. The Sacramento

Valley has extensive rice acreage that is flooded during the fall. The schedule of when this water is available, however, means that it cannot provide substantial water when it is needed. Water would be available in the fall after the irrigation season in which it is needed.

4.1.18 Reservoir Release

Immediate: yes Flexible: yes Provide Substantial Water: yes
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Some agencies in the Upstream from Delta Region have local (non-CVP) reservoirs that could provide water for transfer. Under this measure, sellers would release water stored in local reservoirs for transfer through the Delta to the Buyer Service Area. Water

eligible for transfer would not have otherwise been released downstream. Reservoir release transfers are both immediate and flexible. Water would be released from an existing reservoir and conveyed using existing infrastructure. Buyers would have the option of calling on transfers annually prior to the irrigation season and can opt out if needed. This measure could provide water to reduce potential CVP shortages.

4.1.19 Transfers within Buyer Service Area

Immediate: yes Flexible: yes Provide Substantial Water: no

Buyers currently transfer water within the basin to help reduce the effects of CVP delivery reductions. Additional transfers could be immediate and flexible to assist water users in selecting where limited water will be applied but would not provide substantial

water to reduce CVP shortages. Even after in-basin transfers occur, CVP contractors continue to face shortages.

4.1.20 Groundwater Development

Immediate: no Flexible: yes Provide Substantial Water: no
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This measure would be implemented in the Buyer Service Area. Groundwater development would require planning, locating, and installing new wells and conveyance to on-farm systems. Planning and construction of the new system would not likely be developed prior to 2015. Once installed, groundwater use is flexible because farmers can turn pumps on or off as needed. New groundwater development in the Buyer Service Area would not provide a substantial supply to water users to reduce CVP shortages. In response to the previous dry years and reduced CVP water supplies, users have pumped additional groundwater for irrigation. As a result, groundwater levels have reduced and typically do not recover without additional recharge. Therefore, new groundwater development would not provide enough water annually to reduce CVP shortages.

4.1.21 Modify CVP Contracts

Immediate: no Flexible: no Provide Substantial Water: no

Reclamation has long-term contracts with CVP contractors and cannot modify contracts to reduce contract water supplies. This measure would not provide any water or flexibility to CVP contractors to meet a potential shortage.

4.1.22 Change Cropping Patterns in San Joaquin Valley

Immediate: yes Flexible: yes Provide Substantial Water: no

Changing cropping patterns would not reduce potential CVP shortages. Farmers commonly change cropping patterns as normal farm practices and to respond to reduced water supplies or market prices. In the San Joaquin Valley, many farmers have planted lower water use crops to reduce irrigation needs during a particular year. At the same time, in order to support their investments in WUE equipment and higher priced supplemental supplies, many farmers have now planted permanent crops that create the same demand in all years. This measure would not provide enough benefits to farmers experiencing shortages.

4.1.23 Limit Dairies in San Joaquin Valley

Immediate: no Flexible: yes Provide Substantial Water: no
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This measure would limit new dairies in the Buyer Service Area. There are not many existing dairies in the Buyer Service Area. In addition, Reclamation would need to work with counties or cities to enforce relocation or a policy to restrict new farms. Furthermore, to the extent such farms have an allocation of irrigation water, removing those uses would not necessarily change the need for water to irrigate the same acres. This measure would not provide much, if any, water to alleviate shortages.

4.1.24 Enforce Seniority System to Manage Deliveries

Immediate: no
Flexible: no
Provide Substantial Water: no

Modifying deliveries would need to occur after long-term contracts have expired. Under current contracts, CVP contractors do receive water based on seniority. Settlement and exchange contractors receive water before other CVP contractors. Regardless of seniority, modifying contracts would not provide any additional water. CVP contractors in the Buyer Service Area would continue to face shortage in dry years and due to regulatory restrictions.

4.1.25 Implement Policy of No Net Increase in Water Availability for Agricultural and Urban Expansion

Immediate: no
Flexible: no
Provide Substantial Water: no

This measure would not be immediate or flexible. Agricultural land in the San Joaquin Valley is considered to be fully developed; therefore, a no net increase policy would not be effective for agricultural water supplies. Buyers have also stated they plan to use water for existing demands and transfers would not be used to meet new demands. This measure would also not provide any water to CVP contractors to meet existing demands during a shortage.

4.1.26 Pipe Water from Canada and Northern States

Immediate: no
Flexible: yes
Provide Substantial Water: yes

This measure requires purchasing a water source from Canada or northern states, including Oregon, Washington, or Idaho, and transporting the water to the Buyer Service Area. Infrastructure would be required to move water. This measure would take years to negotiate and implement and would not provide benefits during the 2015 to 2024 timeframe. This measure would be flexible if the water can be called on when needed. This measure would provide water to reduce CVP shortages in the Buyer Service Area.

4.1.27 Fix Owens Valley

Immediate: no
Flexible: no
Provide Substantial Water: no

CVP contractors do not receive water from Owens Valley; therefore, this measure would not be flexible or provide water to reduce CVP shortages.

4.2 Screening Results

Table 4-1 summarizes the screening evaluation results. An “x” indicates that the measure met the criterion. A “-” indicates the criterion was not met and the measure was screened out for further analysis.

Table 4-1. Screening Evaluation Results

Transfer Measures	Purpose and Need Criteria		
	Immediate	Flexible	Provides water
Agricultural water use efficiency (Buyer Service Area)	-	X	-
Agricultural water use efficiency (Upstream from Delta)	X	X	X
Conservation – municipal & industrial	X	X	-
Desalination - brackish	-	X	X
Desalination - seawater	-	X	X
Reclamation - nonpotable reuse	-	X	X
Reclamation - indirect potable reuse	-	X	X
Cropland idling transfers- rice, field crops, grains	X	X	X
Cropland idling transfers-pasture and alfalfa	X	X	X
Land retirement in San Joaquin Valley	-	-	-
Groundwater substitution	X	X	X
New surface storage	-	X	X
Groundwater storage	X	X	-
Water rights purchase	-	X	-
Delta conveyance	-	X	X
Crop shifting in Seller Service Area	X	X	X
Rice decomposition water	X	X	-
Reservoir release	X	X	X
Transfers within the Buyer Service Area	X	X	-
Groundwater development	-	X	-
Modify CVP contracts	-	-	-
Change cropping patterns in San Joaquin Valley	X	X	-
Limit dairies in San Joaquin Valley	-	X	-
Enforce seniority system to manage deliveries	-	-	-
Implement policy of no net increase in water availability for urban or agricultural expansion	-	-	-
Pipe water from Canada and northern states	-	X	X
Fix Owens Valley	-	-	-

4.3 Measures Carried Forward to Alternatives Formulation

The following measures met all purpose and need criteria and will be combined into alternatives to be analyzed in the EIS/EIR:

- Agricultural WUE (Upstream from Delta)
- Cropland Idling Transfers - rice, field crops, grains
- Cropland Idling Transfers - alfalfa
- Groundwater Substitution
- Crop Shifting
- Reservoir Release

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Chapter 5 Alternatives

This chapter presents alternatives developed based on the evaluation described in Chapter 4. Alternatives for the EIS/EIR include different combinations of potential measures and a No Action/No Project Alternative. Transfers would only be implemented through agreements between willing sellers and buyers. The alternatives propose a menu of measures that buyers and sellers can select from to implement a transfer. Some measures in an alternative may not be implemented if there are no willing sellers or buyers interested in that particular measure. The next steps in alternative development will identify willing sellers, proposed transfer measures, and potential quantities for transfer. The Lead Agencies have identified preliminary sellers and transfer quantities for each alternative.

Reclamation's role would be to facilitate transfers that comply with Federal and state law and would not include negotiating transfer measures among buyers and sellers. SLDMWA, on behalf of its member agencies, and other interested buyers would negotiate transfers with willing sellers, including agreeing upon transfer measures and quantities included in the proposed alternatives.

5.1 Alternative 1 – No Action/No Project

CEQA requires an EIR to include a No Project Alternative. CEQA Guidelines Section 15126.6(e)(2) states that “the "no project" analysis shall discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, as well as what 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.” NEPA requires an EIS to “include the alternative of no action” (40 CFR Part 1502.14(d)).

The No Action/No Project Alternative represents the state of the environment without the Proposed Action or any of the alternatives. Under the No Action/No Project Alternative, some agricultural and urban water users may face potential shortages in the absence of water transfers. To the extent transfer water is not available; there will be demand will go unmet by surface water. Demand may be met by increasing groundwater pumping, idling cropland, reducing landscape irrigation, or rationing water.

5.2 Alternative 2 – Full Range of Transfers

This alternative combines all potential transfer measures that met the purpose and need and were carried forward through the screening process, as identified in Chapter 4. Measures in the Full Range of Transfers Alternative include:

- Agricultural WUE (Upstream from Delta Region)
- Cropland idling transfers – rice, field, grains
- Cropland idling transfers – alfalfa
- Groundwater substitution
- Crop shifting
- Reservoir release

Table 5-1 identifies preliminary sellers and transfers under this alternative. The quantities represent the upper limit for transfer. Because of the uncertainty of hydrologic and operating conditions in the future, it is likely that only a portion of the potential transfers identified in Table 5-1 would occur. Additionally, many agencies are uncertain about whether they would participate through groundwater substitution or cropland idling/crop shifting transfers. They have included their potential upper limit for both types of transfers, but they would not sell the maximum amount of both types in the same year. Entities requiring Reclamation approval that are not listed in this table may decide that they are interested in selling water, but those transfers may require supplemental NEPA and Endangered Species Act analysis to allow Reclamation to complete the evaluation of the transfers. This alternative would be the least restrictive for buyers and sellers and provides the most potential water by offering the whole range of transfer measures. No sellers for rice water decomposition transfers have been identified at this time, but could potentially occur in the future under this alternative.

Table 5-1. Alternative 2 Potential Sellers (Upper Limits)

Water Agency	April – June				July - September			
	Groundwater Substitution	Cropland Idling/ Crop Shifting	Stored Reservoir Release	Conservation	Groundwater Substitution	Cropland Idling/Crop Shifting	Stored Reservoir Release	Conservation
Sacramento River Area of Analysis								
Anderson-Cottonwood Irrigation District	2,613				2,613			
Conaway Preservation Group	21,550	7,899			13,450	13,450		
Cordua Irrigation District					12,000			
Cranmore Farms	5,140	925			2,860	1,575		
Eastside Mutual Water Company	1,067				1,163			
Glenn-Colusa Irrigation District	12,500	24,420			12,500	41,580		
Natomas Central Mutual Water Company	15,000				15,000			
Pelger Mutual Water Company	2,151	939			1,599	1,599		
Pleasant Grove-Verona Mutual Water Company	8,000	3,330			10,000	5,670		
Reclamation District 108	7,500	7,400			7,500	12,600		
Reclamation District 1004		3,700			7,175	6,300		
River Garden Farms	4,000				5,000			
Sycamore Mutual Water Company	7,500	3,700			7,500	6,300		
Te Velde Revocable Family Trust	2,700	2,581			4,394	4,394		
American River Area of Analysis								
City of Sacramento					5,000			
Placer County Water Agency							47,000	
Sacramento County Water Agency					15,000			

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Water Agency	April – June				July - September			
	Groundwater Substitution	Cropland Idling/ Crop Shifting	Stored Reservoir Release	Conservation	Groundwater Substitution	Cropland Idling/Crop Shifting	Stored Reservoir Release	Conservation
Sacramento Suburban Water District	15,000				15,000			
Yuba River Area of Analysis								
Browns Valley Irrigation District							5,000	3,100
Feather River Area of Analysis								
Butte Water District					5,500	11,500		
Garden Highway Mutual Water Company	6,500				7,500			
Gilsizer Slough Ranch	1,500				2,400			
Goose Club Farms and Teichert Aggregates	4,000	3,700			6,000	6,300		
South Sutter Water District							15,000	
Tule Basin Farms	3,800				3,520			
Merced River Area of Analysis								
Merced Irrigation District							30,000	
Delta Region Area of Analysis								
Reclamation District 2068	2,250	2,775			2,250	4,725		
Pope Ranch	1,400				1,400			
Total ¹	124,171	61,369	0	0	166,324	115,993	97,000	3,100

Note:

¹ These totals cannot be added together. Agencies could make water available through groundwater substitution, cropland idling, or a combination of the two; however, they will not make the full quantity available through both methods. Table 5-1 reflects the total upper limit for each agency.

5.3 Alternative 3 – No Cropland Modifications

The No Cropland Modifications Alternative includes the following measures:

- Agricultural WUE (Upstream from Delta Region)
- Reservoir release
- Groundwater substitution

The Lead Agencies developed this alternative because buyers are not certain they are interested in cropland idling and crop shifting transfers due to operational restrictions. Buyers would need to purchase the entire ETAW for a cropland idling or shifting transfer; however, they may only receive the portion of ETAW during the July through September transfer period.

Table 5-2 identifies preliminary sellers and transfers under Alternative 3. Similar to Table 5-1, the quantities in Table 5-2 are maximum amounts and would not likely be transferred each year. Alternative 3 includes less water to be transferred than Alternative 2.

Table 5-2. Alternative 3 Potential Sellers (Upper Limits)

Water Agency	April – June			July - September		
	Groundwater Substitution	Stored Reservoir Release	Conservation	Groundwater Substitution	Stored Reservoir Release	Conservation
Sacramento River Area of Analysis						
Anderson-Cottonwood Irrigation District	2,613			2,613		
Conaway Preservation Group	21,550			13,450		
Cordua Irrigation District				12,000		
Cranmore Farms	5,140			2,860		
Eastside Mutual Water Company	1,067			1,163		
Glenn-Colusa Irrigation District	12,500			12,500		
Natomas Central Mutual Water Company	15,000			15,000		
Pelger Mutual Water Company	2,151			1,599		
Pleasant Grove-Verona Mutual Water Company	8,000			10,000		
Reclamation District 108	7,500			7,500		
Reclamation District 1004				7,175		
River Garden Farms	4,000			5,000		
Sycamore Mutual Water Company	7,500			7,500		
Te Velde Revocable Family Trust	2,700			4,394		
American River Area of Analysis						
City of Sacramento				5,000		
Placer County Water Agency					47,000	
Sacramento County Water Agency				15,000		
Sacramento Suburban Water District	15,000			15,000		
Yuba River Area of Analysis						
Browns Valley Irrigation District					5,000	3,100
Feather River Area of Analysis						
Butte Water District				5,500		
Garden Highway Mutual Water Company	6,500			7,500		
Gilsizer Slough Ranch	1,500			2,400		
Goose Club Farms and Teichert Aggregates	4,000			6,000		

Water Agency	April – June			July - September		
	Groundwater Substitution	Stored Reservoir Release	Conservation	Groundwater Substitution	Stored Reservoir Release	Conservation
South Sutter Water District					15,000	
Tule Basin Farms	3,800			3,520		
Merced River Area of Analysis						
Merced Irrigation District					30,000	
Delta Region Area of Analysis						
Reclamation District 2068	2,250			2,250		
Pope Ranch	1,400			1,400		
Total	124,171	0	0	166,324	97,000	3,100

5.4 Alternative 4 – No Groundwater Substitution

The No Groundwater Substitution Alternative includes the following measures:

- Agricultural WUE (Upstream from Delta Region)
- Cropland idling transfers– rice, field and grains
- Cropland idling transfers– alfalfa
- Crop shifting
- Reservoir release

Public comment received during the scoping period included many concerns regarding groundwater impacts associated with groundwater substitution transfers. The Lead Agencies have developed this alternative to address these comments and create an alternative that could reduce potential environmental effects of the Proposed Action. Table 5-3 identifies preliminary sellers and transfers under Alternative 3. The quantities in Table 5-3 are maximum amounts and would not likely be transferred each year. This alternative has the smallest quantity of water transferred.

Table 5-3. Alternative 4 Potential Sellers (Upper Limits)

Water Agency	April – June			July - September		
	Cropland Idling/Crop Shifting	Stored Reservoir Release	Conservation	Cropland Idling/Crop Shifting	Stored Reservoir Release	Conservation
Sacramento River Area of Analysis						
Anderson-Cottonwood Irrigation District						
Conaway Preservation Group	7,899			13,450		
Cordua Irrigation District						
Cranmore Farms	925			1,575		
Eastside Mutual Water Company						
Glenn-Colusa Irrigation District	24,420			41,580		
Natomas Central Mutual Water Company						
Pelger Mutual Water Company	939			1,599		
Pleasant Grove-Verona Mutual Water Company	3,330			5,670		
Reclamation District 108	7,400			12,600		
Reclamation District 1004	3,700			6,300		
River Garden Farms						
Sycamore Mutual Water Company	3,700			6,300		
Te Velde Revocable Family Trust	2,581			4,394		
American River Area of Analysis						
City of Sacramento						
Placer County Water Agency					47,000	
Sacramento County Water Agency						
Sacramento Suburban Water District						
Yuba River Area of Analysis						
Browns Valley Irrigation District					5,000	3,100
Feather River Area of Analysis						
Butte Water District				11,500		
Garden Highway Mutual Water Company						
Gilsizer Slough Ranch						
Goose Club Farms and Teichert Aggregates	3,700			6,300		

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Water Agency	April – June			July - September		
	Cropland Idling/Crop Shifting	Stored Reservoir Release	Conservation	Cropland Idling/Crop Shifting	Stored Reservoir Release	Conservation
South Sutter Water District					15,000	
Tule Basin Farms						
Merced River Area of Analysis						
Merced Irrigation District					30,000	
Delta Region Area of Analysis						
Reclamation District 2068	2,775			4,725		
Pope Ranch						
Total	61,369	0	0	115,993	97,000	3,100