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LIST OF ACRONYMS AND ABBREVIATIONS

Acronyms and Definitions

AEWSD	Arvin Edison Water Storage District
AF	Acre foot. The quantity of water required to cover one acre of land to a depth of one foot (325,872 gallons).
Af/y	Acre-feet per year
AID	Alpaugh Irrigation District
AIWD	Atwell Island Water District
Aqueduct	California Aqueduct
Article 5	Relative to the CVP long-term and interim contracts. Exchanges to facilitate the initial delivery of CVP supplies
Article 9	Relative to the CVP long-term and interim contracts. Transfers and exchanges
BVWSD	Buena Vista Water Storage District
CEQA	California Environmental Quality Act
CID	Consolidated Irrigation District
Class 1 Water	Class 1 water is defined as that supply of water stored at Friant Dam which would be available for delivery from the Friant-Kern and Madera Canals as a dependable water supply during each irrigation season.
Class 2 Water	Class 2 water is that supply of non-storable water which becomes available in addition to the supply of Class 1 water and which because of its uncertainty as to availability and time occurrence, would not be dependable in character and would be furnished only if and when available as determined by the United States.
CSWGSA	Conjunctive Surface Water/Groundwater Surface Area
CV Contractors	Cross Valley Contractors
CVC	Cross Valley Canal
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWD	Cawelo Water District
DEID	Delano-Earlimart Irrigation District
DWR	California Department of Water Resources
EA	Environmental Assessment
ESA	Endangered Species Act
Exchanger	The Cross Valley CVP Contractor who is considered to be the first party in the exchange.
Exchangee	A water district that is considered to be the second party and receives the initial supply of water. In turn, the exchangee returns water back to the Cross Valley Contractor.
EID	Exeter Irrigation District
FID	Fresno Irrigation District
GWD	Garfield Water District
FKC	Friant-Kern Canal

FWA	Friant Water Authority
FWS	U.S. Fish and Wildlife Service
HMWD	Henry Miller water District
HVID	Hills Valley Irrigation District
Hwy	Highway
ID	Irrigation District
IID	Ivanhoe Irrigation District
ILSA	In Lieu Service Area
In-Delta Supplies	CVP water made available in the Delta w/o SWP commitment for conveyance
Imbalanced Exchange	For the purposes of this EA, imbalanced exchange arrangements would be limited to a ratio of 2:1. The 2:1 ratio is defined as the entire CV Contractor's supply of up to 128,300 af/y delivered to exchangees and no less than 50% would be delivered to the CV Contractors (exchangers).
IRC	Interim Renewal Contract
JID	James Irrigation District
KBWA	Kern Bank Water Authority
KCWD	Kings County Water District
KDWD	Kaweah Delta Water District
KDWCD	Kaweah Delta Water Conservation District
KR	Kern River
KRWD	Kings River Water District
LCWD	Lewis Creek Water District
LGID	Laguna Irrigation District
LID	Lindmore Irrigation District
Lindsay	City of Lindsay
LIWD	Lakeside Irrigation Water District
LSID	Lindsay-Strathmore Irrigation District
LTRC	Long-Term Renewal Contracts for CVP water
LTRID	Lower Tule River Irrigation District
LWD	Liberty Water District
MAF	Million Acre Feet
MS	Minor Streams
NEPA	National Environmental Policy Act
NOAA	National Oceanic Atmospheric Administration formerly National Marine Fisheries Service
Non-CV Contractor	Potential Exchange Partners with the Cross Valley CVP Contractors
Non-CVP Contractor	Water purveyors that do not have long-term water service repayment contracts
North Kern	North Kern Water Storage District
OCAP	Operations Criteria and Plan
OCID	Orange Cove Irrigation District
PID	Porterville Irrigation District
Purveryors	Collective term for all water districts, irrigation districts and water

	agencies listed in this EA
PXID	Pixley Irrigation District
Reclamation	U.S. Bureau of Reclamation
R-RBWSD	Rosedale-Rio Bravo Water Storage District
RCWD	Raisin City Water District
RID	Riverdale Irrigation District
SCID	Stone Corral Irrigation District
SID	Saucelito Irrigation District
SLC	San Luis Canal
SPUD	Strathmore Public Utility District
SSJMUD	South San Joaquin Municipal Utility District
SWID	Shafter-Wasco Irrigation District
SWP	State Water Project
SWSD	Semitropic Water Storage District
TAF	Thousand Acre Feet
TBID	Terra Bella Irrigation District
TID	Tulare Irrigation District
TLBWSD	Tulare Lake Basin Water Storage District
TPDWD	Tea Pot Dome Water District
TRID	Tranquillity Irrigation District
TVWD	Tri Valley Water District
USCOE	U.S. Army Corps of Engineers
water districts	General term for water and irrigation districts
WD	Water District
WR-MWSD	Wheeler Ridge-Maricopa Water Storage District
WSD	Water Storage District

ENVIRONMENTAL ASSESSMENT

SECTION 1 – PURPOSE OF AND NEED FOR ACTION

1.1 Purpose of the Action

The purpose of the action is to improve water management flexibility, timing, and delivery of water to the Cross Valley Contractors (CV Contractors) within the manner described in Article 5(a) of the Central Valley Project (CVP) water service contract between Reclamation, Department of Water Resources (DWR), and the CV Contractors.

1.2 Need for Action

The CV Contractors need delivery of up to 128,300 acre-feet (af) of their Delta CVP water supply. The CV Contractors cannot take direct deliveries and need to enter into exchanges of water.

1.3 Scope of this Environmental Assessment

Article 5(a) of the water service contract (see Appendix A) provides for exchange arrangements between CV Contractors and water districts to facilitate the delivery of CVP water under different conveyance mechanisms and scenarios for CVP water supplies from the Delta. The CVP Long-term Renewal Contracts (LTRC) and Interim Renewal Contracts (IRC) have the Article 5 provision. Historically, these Article 5(a) exchanges only occurred between the CV Contractors and Arvin Edison Water Storage District (AEWSD). AEWSD would take delivery of the Delta CVP water in exchange for their Friant Division CVP water supplies. The CV Contractors would then take delivery of AEWSD's Friant Division CVP water supplies. In recent years, other exchanges between CV Contractors and CVP contractors or other water districts have undergone environmental reviews and short-term approvals. It is anticipated these other exchanges will occur over the term of the CV Contractor's future water service contracts.

The CV Contractors have requested, from Reclamation, an expedited approval process for exchange arrangements with other water districts. The focus of this Environmental Assessment (EA) is a site specific analysis of the Article 5(a) exchange arrangements with Friant CVP contractors, "other" water districts and "other" sources of water. The other water districts are potential exchange partners besides AEWSD. The other sources of water includes water, streams, creeks, groundwater and SWP water.

The term of this environmental analysis is 25 years beginning in 2005 and ending in Contract Year 2030. Due to the circumstances and variables in timing of water supply deliveries to the CV Contractors this EA will allow for an expedited approval process and improved water management. Each proposed exchange arrangements would be submitted to Reclamation for review and determination that the action is consistent with the criteria established within this NEPA analysis and Endangered Species Act (ESA) consultation,

in addition to all applicable Federal, State, local laws, permits and regulations. This EA will cover the broadest flexibility for exchange arrangements known at this time. Proposed exchange arrangements not covered in this NEPA and ESA review process would require separate and/or tiered environmental review to cover the site specific proposal and analysis of environmental impacts to the human environment.

1.3.1 Background

The CV Contractors are comprised of eight (8) CVP contractors located on the east side of the San Joaquin Valley in Fresno, Kern, Tulare and Kings Counties. Table 1.1 identifies the CV Contractors and summarizes their CVP contract supply.

These water districts are referred to as the CV Contractors because of their use of the Cross Valley Canal (CVC) for conveying their water supply. The CVC was constructed in the mid-1970's through a collaborative effort of several state and federal water districts.

The CVC allows for water to be conveyed between the California Aqueduct (Aqueduct) and the Friant-Kern Canal (FKC). The FKC is owned by Reclamation. However, it is operated and maintained by the Friant Water Authority (FWA) or its assignees. The Aqueduct is a feature of the State Water Project (SWP) and is operated by the California Department of Water Resources (DWR). The segment of the Aqueduct between the San Luis Forebay and the State Highway 41 bridge is a joint-use facility between DWR and Reclamation, and is known also as the San Luis Canal.

Table 1.1 List of CV Contractors and CVP Supply

CV CONTRACTORS	CROSS VALLEY CONTRACT SUPPLY ONLY (AF)
[1]County of Fresno	3,000
[2]County of Tulare	5,308
Hill's Valley Irrigation District	3,346
Kern-Tulare Water District	40,000
[3]Lower Tule River Irrigation District	31,102
Pixley Irrigation District	31,102
Rag Gulch Water District	13,300
Tri-Valley Water District	1,142
TOTALS	128,300

[1]County of Fresno includes subcontractor Fresno County Service Area #34

[2]County of Tulare includes subcontractors Alpaugh ID, Atwell WD, Hills Valley ID, Saucelito ID[3], Smallwood Vineyards, Stone Corral ID[3], City of Lindsay[3], Strathmore Public Utility District, Styrotek, Inc., and City of Visalia

[3]Lower Tule River ID, Saucelito ID, Stone Corral ID and City of Lindsay receive CVP water under more than one contract, either as a Friant and/or Cross Valley Contractors or subcontractor.

The CVC allows for water to flow west to east by pumping or east to west by gravity. Due to this flexibility, the operations on the CVC require coordination among the users. The CVC provides improved management of water supplies in the central and lower San Joaquin Valley. Water supplies originating from the Delta can be conveyed through the CVC for direct deliveries via siphons into the FKC of a restricted amount of water to Kern Tulare and Rag Gulch Water Districts or, more commonly, via an exchange to any of the 8 CV Contractors.

In 1976 the CV Contractors entered into water service contracts with Reclamation for CVP water. The CV Contractor's CVP water is delivered in the Delta by Reclamation and annual supplies are based on South of the Delta allocations.

Typically, the CVP supplies are made available, by Reclamation, in Clifton Court Forebay in the Delta. DWR pumps the water at the Banks Pumping Plant and conveys this water in the Aqueduct to the CVC. The CV Contractors must find a way to get their supplies into their districts on the east side of the San Joaquin Valley. Therefore, the mechanism for exchange arrangements is set forth in Article 5 of the water service contract. This article in part states that "...the parties acknowledge that Project Water furnished to the Contractor...shall be delivered to the Contractor by direct delivery via the Cross Valley Canal and/or by exchange arrangements involving Arvin Edison Water Storage District or others. The parties further acknowledge that such arrangements are not transfers subject to Section 3405(a) of the CVPIA." Project water means all water that is developed, diverted, stored, or delivered by the Secretary in accordance with the statutes authorizing the Project and in accordance with all terms and conditions of water rights acquired pursuant to California law. For purposes of this environmental assessment and analysis the definition is narrowed to mean CVP water pumped and conveyed by DWR through SWP facilities for the Cross Valley Contactors.

The description of the physical mechanism for delivery in facilities follows: This CVP water is made available in the Delta by Reclamation when requested by the CV Contractors. DWR pumps and conveys the CV Contractor's CVP water through the Aqueduct. From there, the CV Contractor's CVP water is delivered through the CVC for direct delivery and/or by exchange arrangements with AEWSD or others pursuant to Article 5(a) of the CVP contracts. DWR only pumps and conveys this CVP water through the Aqueduct when, and if, all other SWP requirements have been met. Historically, AEWSD obtained this water and used it beneficially. In exchange, Friant CVP water that would have flowed to AEWSD in the FKC is diverted by the CV Contractors and used beneficially. This mechanism has occurred historically.
Although the in Delta supplies are made available by Reclamation, DWR has a hierarchy for meeting the SWP water supplies and the CVP water supplies are subordinate to SWP uses. Under certain conditions, DWR does not have an opportunity to pump the annual allocation of water supplies to the CV Contractors and water is not released from upstream storage and is lost (spilled). When DWR has an opportunity to pump CVP water, it may occur at a time that is outside of the growing season and not immediately needed. Therefore, the CV Contractors desire to engage in exchange arrangements with

other water districts to allow an offset in the time of pumping and delivery of this water to the CV Contractors.

Environmental impacts of implementing Article 5(a) exchange arrangements with others, if any, require assessment by the National Environmental Policy Act (NEPA).

Due to varying hydrological conditions and other circumstances imbalanced exchanges could occur. For the purposes of this EA, imbalanced exchange arrangements would be limited to a ratio of 2:1. The 2:1 ratio is defined as the entire CV Contractor's supply of up to 128,300 af/y delivered to exchangees (others) and no less than 50% would be delivered to the CV Contractors (exchangers). Proposed exchange arrangements exceeding this amount are not within the scope of this analysis or approvals. Subsequent environmental reviews would be required. Appendix B contains four scenarios whereby these imbalanced exchanges could occur. In addition, Appendix B describes three examples of how the different sources of water are exchanged in existing facilities. In reviewing the three examples of how these exchanges might occur, it is helpful to review to Figure 3-4 in Appendix G at the end of this document.

1.3.2 Related Actions

Programmatic Environmental Impact Statement for the Central Valley Project Improvement Act.
Reclamation completed the Final Programmatic Environmental Impact Statement for the Central Valley Project Improvement Act in October 1999 that analyzed alternatives and implementation of the Central Valley Project Improvement Act. The Record of Decision was signed in January 9, 2001. The Final Programmatic Environmental Impact Statement and Record of Decision for the Central Valley Project Improvement Act are incorporated by reference.

Biological Assessment for the Operations Criteria and Plan
Reclamation prepared the Biological Assessment for the *Long Term Central Valley Project and State Water Project Operations Criteria and Plan,* dated June 30, 2004. The Biological Assessment analyzed the coordinated criteria plan for CVP and SWP operations. A public information meeting was held on October 7, 2004. This Biological Assessment describes future operations with certain new facilities and operating criteria in place and was prepared to facilitate compliance with State and Federal Endangered Species Acts. The BA identifies many factors influencing the decision-making process and physical and institutional conditions under which the projects currently operate.

Biological Opinion for the Operations Criteria and Plan
FWS issued a non-jeopardy biological opinion with regard to impacts on the threatened delta smelt of the proposed revised operations for the Coordinated Central Valley Project and State Water Project Operations Criteria and Plan (OCAP), dated July 30, 2004.

Biological Opinion for the Operations Criteria and Plan
As of writing this EA, the National Oceanic Atmospheric and Administration is developing the Biological Opinion for the Operations Criteria and Plan. The Biological Opinion is anticipated to be completed in October 2004.

Blanket Approval of Temporary Transfers and Exchanges of Project Water Between Friant Division Contractors During the Interim Period.
A Finding of No Significant Impact and final Environmental Assessment, *Blanket Approval of Temporary Transfers and Exchanges of Project Water Between Friant Division Contractors During the Interim Period*, dated April 1, 1997, (Blanket Approval EA) was prepared to analyze the impacts of temporary transfers and exchanges of up to 150,000 acre-feet of CVP water between CVP contractors within the Friant Division. The actions analyzed included the typical transfers and exchanges for agriculture water that were for short-term, (less than a one year time period), local and between Friant contractors. This Blanket Approval EA is hereby incorporated by reference into this Environmental Assessment

Cross Valley Canal Unit Long Term Contract Renewal Final Environmental Assessment
A Finding of No Significant Impact and final Environmental Assessment, *Cross Valley Unit Long Term Contract Renewal*, dated January 19, 2001 (CV EA) was prepared by Reclamation to analyze the impacts associated with the renewal of a long-term (25 years) water service contract with the CV Contractors. This CV EA is hereby incorporated by reference into this Environmental Assessment.

Friant Division Long Term Contract Renewal Final Environmental Assessment
A final Environmental Assessment, *Friant Division Long Term Contract Renewal*, dated January 19, 2001, (Friant EA) was prepared by Reclamation to analyze the impacts associated with the renewal of a long-term (25 years) water service contract with the Friant Division. This Friant EA is hereby incorporated by reference into this Environmental Assessment.

Biological Opinion on U.S. Bureau of Reclamation Long Term Contract Renewal of Friant Division and Cross Valley Unit Contractors.

The Friant Division requested a formal consultation with the FWS pursuant to section 7 of the Endangered Species Act of 1973, as amended, as part of renewal of 28 long-term water service contracts. Reclamation committed to initiating consultation on other aspects of the Project so that interrelated and interdependent impacts, and cumulative impacts on species outside the San Joaquin Valley could be fully addressed. With that in mind, the FWS issued its' Biological Opinion on October 15, 1991 and Amendment of the Biological Opinion on May 14, 1992. In their Opinion, the FWS stated that renewal of the 28 long-term contracts would not likely jeopardize the continued existence of fifteen threatened and endangered species found within the Friant Division service area, provided Reclamation implement short and long-term endangered species conservation programs to mitigate the adverse impacts of continued Project water delivery to the Friant

Division. This program also committed the FWS to participate by providing technical assistance and developing revised recovery plans for the San Joaquin Valley species needed for the timely resolution of listed species concerns. With contract renewal, the Friant Division Project will continue to fulfill Project purposes, while avoiding adverse impact to threatened and endangered species.

The biological opinion, *U.S. Bureau of Reclamation Long Term Contract Renewal of Friant Division and Cross Valley Unit Contractors*, January 19, 2001, File Number 1-1-01-F-0027 (LTCR Opinion) was prepared by the U. S. Fish and Wildlife Service (FWS) to address the proposed renewal by Reclamation of water service contract with the Friant Division and Cross Valley Units of the CVP in accordance with Section 7 of the Endangered Species Act of 1973, as amended (ESA). The FWS concluded that the renewal for 25 years of the CVP water service contract is not likely to jeopardize 34 listed species. However, transfers and or exchanges involving Friant Division or Cross Valley Unit contractors were not addressed by the biological opinion.

Blanket Approval of Historic Temporary Transfers and Exchanges of Central Valley Project Water Between Friant Water Service Contractors.
A Finding of No Significant Impact and final Environmental Assessment, *Blanket Approval of Historic Temporary Transfers and Exchanges of Central Valley Project Water Between Friant Water Service Contractors*, dated March 2000, (Historic Transfer and Exchange EA) was prepared analyzing annual temporary transfers and exchanges of CVP water between existing water service contractors with access to Friant Division facilities. The context of the EA covered a five year time period. This Historic Transfer and Exchange EA is hereby incorporated by reference into this Environmental Assessment.

Supplemental Environmental Assessment for the Long Term Contract Renewal for the Cross Valley Contractors.
Reclamation has determined new information has become available since the signing of the 2001 EA and FONSI for the Long-Term Contract Renewal for the Cross Valley Contractors. Therefore, the 2004 EA and FONSI are under preparation. Reclamation anticipates circulation for public review in 2005. A final EA and FONSI are expected to be signed on or about February 18, 2006.

Environmental Assessment for the Exchange of Cross Valley Central Valley Project Water between Lower Tule River Irrigation District and Tulare Lake Basin Water Storage District.
A Finding of No Significant Impact and final Environmental Assessment, Exchange of Cross Valley Central Valley Project Water between Lower Tule River Irrigation District and Tulare Lake Basin Water Storage District, dated March 2004 was prepared analyzing the exchange of up to 15,000 af/y of CVP and Tule River water. This Environmental Assessment for the exchange is hereby incorporated by reference.

Environmental Assessment for the Annual Exchanges of 20,000 Acre Feet of Water between Fresno Irrigation District, Kern Tulare Water District and Tulare Lake Basin Water Storage District.
A Finding of No Significant Impact and final Environmental Assessment, *Ten Year Environmental Assessment for the Annual Exchange of 20,000 Acre Feet of Water Between Fresno Irrigation District, Kern Tulare Water District and Tulare Lake Basin Water Storage District***,** dated November 2003 were prepared analyzing the impacts over a ten year period for annual approvals of exchanges of CVP, Kern River, and Kings River water. This ten-year Environmental Assessment for annual exchanges for up to 20,000 af of water is hereby incorporated by reference.

Environmental Assessment for the One-Time Exchange between Kern-Tulare and Rag Gulch Water Districts to Kern County Water Agency
A Finding of No Significant Impact and final Environmental Assessment, *Approval For One-Time Exchange and or Transfer from Kern-Tulare and Rag Gulch Water District to Kern County Water Agency*, dated July 04 was completed. This Environmental Assessment analyzed the one time exchange of CVP and SWP water and is hereby incorporated by reference.

1.3.3 Issues Studied in Detail

Resource issues evaluated in detail in this Environmental Assessment focus on the following:
Biological Resources
Water Quality
Surface Water
Groundwater
Land Use Resources
Environmental Justice
Socio-economic Resources
Indian Trust Resources

1.3.4 Issues Eliminated from Detailed Study

The following resources issues have been dropped from further consideration because the Proposed Action would not result in impacts to the resources:

Recreational Resources
Cultural and Historical Resources
Social Condition
Air Quality
Geology and Soils
Visual Resources.

SECTION 2 – DESCRIPTION OF THE PROPOSED ACTION AND NO ACTION ALTERNATIVE

2.1 Introduction

The Proposed Action and No Action Alternative are identified in this section. All lands affected by the Proposed Action are located within Fresno, Tulare, Kings and Kern Counties. Each proposed exchange would be reviewed for compliance with applicable local, state and federal laws including applicable places and purpose of use of the water prior to approval.

2.2 Proposed Action

Exchanges would take place with others in addition to AEWSD pursuant to the Article 5(a) exchange arrangements between CV Contractors and other water districts for the full CV Contractor's CVP contract supply: 128,300 af/y over a 25-year time period. The other water districts are identified in Tables 3.1 thru 3.8 in Section 3 of this EA. Under the Proposed Action these imbalanced exchanges would be limited to a 2:1 ratio. The 2:1 ratio is defined as the entire CV Contractor's supply of up to 128,300 af/y delivered to exchangees and no less than 50% would be delivered to the CV Contractors (exchangers).

2.3 No Action

Reclamation recognizes these exchanges are necessary in order for the CV Contractors to obtain their CVP supplies. Therefore, a decision to not approve any proposed Article 5(a) exchanges is unlikely and is not considered a true reflection of the No Action Alternative.

Article 5(a) exchanges would be approved on a case-by-case basis, with environmental analysis and administrative coordination.

2.4 Operational Constraints to the Proposed Action and No Action Alternative

DWR has a priority system for pumping the SWP water supplies and CVP water supplies have a lower priority compared to SWP uses. Under certain conditions, DWR does not have an opportunity to pump and convey the annual allocation of water supplies to the CV Contractors or pumping and conveyance may occur at a time that is outside of the growing season.

CV Contractors have a limited capability to receive Delta water directly from the CVC. Only, Kern-Tulare and Rag-Gulch Water Districts have direct access from the CVC. However the existing facilities provide a limited amount of water to Kern-Tulare and Rag Gulch Water Districts directly. The other CV Contractors rely upon exchanges agreements with other water districts, such as AEWSD, to receive their supply. For example, Fresno County, Pixley Irrigation District and Lower Tule River Irrigation District do not have an exchange agreement with AEWSD. Typically, these three districts transfer their water and use the money to purchase local supplies.

Due to a variety of conditions exchanges between the CV Contractors and other water districts may include compensatory arrangements for water imbalances due to the hydrological conditions, the time of year the water is delivered, and value of such water. These exchange arrangements under Article 5(a) are not water transfers subject to Section 3405(a) of the CVPIA. For the purposes of this EA, imbalanced exchange arrangements are limited to a ratio of 2:1. The 2:1 ratio is defined as the entire CV Contractor's supply of up to 128,300 af/y delivered to exchangees and no less than 50% would be delivered to the CV Contractors (exchangers). Proposed exchange arrangements exceeding this amount are not within the scope of this analysis. Subsequent environmental reviews would be required.

2.5 Past, Present and Reasonably Foreseeable Future Actions not Part of the Proposed Action but Related to Cumulative Effects

Article 55 of the SWP contracts allows for the SWP contractor to wheel non-SWP water in their increment of capacity in the Aqueduct. Under this scenario, a SWP contractor would request DWR to convey a CV Contractor's CVP water, if capacity exists, in the Aqueduct. This option results in elevating the position for the CV Contractor's as a priority for DWR to convey the water. If CVP water is moved under Article 55 of the SWP contracts, the CV Contractor's could request an exchange arrangement under Article 5 of the CVP Contracts. This EA analyzes the impacts of Article 55 conveyance in conjunction with Article 5a exchanges. However, separate approvals would be required by DWR and in accordance with the California Environmental Quality Act.

Kern Tulare Water District and Rag Gulch Water District Groundwater Banking Project in Rosedale-Rio Bravo Water Storage District. Reclamation has completed the EA and FONSI. Kern Tulare and Rag Gulch Water Districts would bank surplus water, when available. This groundwater banking project could be used to bank the Article 5 exchange water. However, the groundwater banking project would be implemented with or without the proposed Article 5 Exchanges.

Kern Tulare Water District and Rag Gulch Water District Groundwater Banking Project with North Kern Water Storage District. Reclamation is developing the draft EA and anticipates completion of a Final EA and FONSI in 2005. Kern Tulare and Rag Gulch Water Districts would bank surplus water, when available. This groundwater banking project could be used to bank the Article 5 exchange water. However, the groundwater banking project would be implemented with or without the proposed Article 5 Exchanges.

Cross Valley Canal Expansion Project. This project would expand the Cross Valley Canal to accommodate surplus water under Article 21 of the SWP contracts. This project includes construction to increase the walls and turnouts to deliver this surplus water to groundwater banking facilities. This surplus water is intermittent and unreliable. This project

SECTION 3 – AFFECTED ENVIRONMENT

3.1 Introduction

The context for this EA is the valley floor of the San Joaquin Valley within Fresno, Tulare, Kings and Kern Counties. Water districts within these counties are characterized as either CVP Contractors including the CV Contractors, or other water districts (Non CVP Contractors) and would participate as exchangees per Article 5(a). This section identifies the affected environment, conditions that currently exist, and the areas of concern that may be affected by the Proposed Action. Refer to Figures 3-2 thru 3-3 in Appendix G at the end of this document for maps showing the location of water districts.

3.2 Cross Valley Contractors

Cross Valley Contractors are CVP contractors that are geographically located within the Friant Division. A complete narrative description of these contractors is found in Appendix C of this EA. In summary there are eight CV Contractors with a total CVP supply of 128,300 af. Two of the CV Contractors have subcontractors which are identified in Table 3.1 and in Appendix C.

Water deliveries to the CV Contractors are made available, by Reclamation, in the Delta and are diverted through the Harvey O. Banks Pumping Plant of the SWP. This CVP water is subordinate in priorities for pumping by DWR.

In 1975 the Cross Valley Canal was completed bringing water from the Aqueduct near Taft, California and through a series of six (6) pump lifts to the east side of the San Joaquin Valley near the city of Bakersfield (Figure 3-1). In summary, water is delivered to the Arvin-Edison Water Storage District (AEWSD) in exchange for a portion of the CV Contractors water supply available through Millerton Lake. Through exchange agreements, water has typically been exchanged between (AEWSD) and the CV Contractors with contracts for CVP water pumped from the Delta.

In addition, Fresno County, Pixley Irrigation District and Lower Tule River Irrigation District have discontinued the exchange with AEWSD and have transferred their CVP Delta water to other CVP water districts and purchased local supplies.

Typically, these exchanges result in imbalanced exchanges. Imbalanced exchanges occur due to the following:

- Differences in hydrological conditions.
- Losses due to evaporation and/or seepage.
- Differences in the value of the water.
- Timing.
- Distance water is conveyed to the exchangee and exchanger.
- Exchanged water is temporarily stored.

For the purposes of this EA the CV Contractors are considered to be the Exchangers.

Table 3.1. CV Contractors and Subcontractors

CVC CONTRACTORS	CVP CONTRACT SUPPLY (AF)	OTHER SURFACE SUPPLY	Ground-water Safe Yield	Groundwater Recharge
County of Fresno County of Fresno Fresno County Service Area 34 (Brighten Crest)	**3,000 Total** 150 Ag 1,242 Ag	Unknown	*	Yes
County of Tulare Alpaugh ID Atwell Island WD Hills Valley Irrigation District Saucelito ID Stone Corral ID City of Lindsay Smallwood Vineyards Strathmore Public Utility District Styrotek, Inc. City of Visalia	**5,308 Total** 100 Ag 50 Ag 2,958 Ag 100 Ag 950 Ag 50 M&I 255 Ag 400 M&I 45 M&I 400 M&I	Groundwater	*	Yes
Hill's Valley Irrigation District	3,346 Ag	Unknown	*	Yes
Kern-Tulare Water District	40,000 Ag	20,000 af/y Kern River exchanged with ID 4 for SWP water	*	Not within service boundary
Lower Tule River Irrigation District	31,102 Ag	70,000 Tule R 61,200 FKC 238,000 FKC	*	Yes
Pixley Irrigation District	31,102 Ag	Groundwater Deer Creek	*	Deer Creek
Rag Gulch Water District	13,300 Ag	0	0	No
Tri-Valley Water District	1,142 Ag	Limited Groundwater	*	No
TOTALS	128,300 Ag	-	-	-

*The safe groundwater yield is difficult to quantify. However, the safe yield of groundwater is generally considered to be 1 af of water for every 1 acre of land.

3.3 Friant CVP Contractors

Friant CVP Contractors are located on the eastern side of the San Joaquin Valley (See Figure 3-2). CVP water for these contractors comes from Millerton Lake via the FKC. CVP water is released from Millerton Lake into the 152 mile long FKC flowing south and the 36-mile long Madera Canal flowing north. Water conveyed to these contractors is categorized as Friant Class 1 and Class 2 water.

A complete narrative description of the Friant CVP Contractors that are potential exchangees is found in Appendix D of this EA. In summary, there are 27 Friant CVP Contractors. However, only 20 that have been identified as potential exchangees for the purposes of this EA. Table 3.2 depicts the CVP and non-CVP supplies for the Friant

Division. Reclamation does not have approval authority of transfers or exchanges involving non-CVP water only.

Table 3.2 Potential Exchangees from the Friant Division CVP Contractors

FRIANT CVP CONTRACTORS	Class 1 Af/y	Class 2 Af/y	Other Surface Supply	Groundwater Safe Yield	Groundwater Recharge
Arvin-Edison Water Storage District	40,000	311,675	Kern River	89,900	Yes
Delano-Earlimart Irrigation District	108,800	574,500	0	*	White River channel
Exeter Irrigation District	11,500	19,000	0	*	Yokohl Creek
Fresno Irrigation District	0	75,000	Kings River 800,000	*	Yes
Garfield Water District	3,500	0	0	*	Unknown
Ivanhoe Irrigation District	7,700	7,900	Wutchumna Water Company Stock 3,950 ST Johns River Cotton Creek	*	ST Johns River and Cotton Creek
Lewis Creek Water District	1,450	0	0	*	Unknown
Lindmore Irrigation District	33,000	22,000	0	21,000	Yes
Lindsay-Strathmore Irrigation District	27,500	0	Wutchmna Water Company Stock 5-45,000	18,000	Unknown
Lower Tule River Irrigation District	61,200	238,000	Tule River 70,000 31,102 CV	*	Unknown
Orange Cove Irrigation District	39,200	0	0	28,000	Only a small amount in certain areas
Porterville Irrigation District	16,000	30,000	Tule River 12,900 Average, Porter Slough	0	No
Saucelito Irrigation District	21,200	32,800	0	*	Deer Creek only when CVP water is diverted from FKC
Shafter-Wasco Irrigation District	50,000	39,600	0	*	0
Southern San Joaquin Municipal Utility District	97,000	50,000	0	0	Poso Creek and other foothill runoff creeks
Stone Corral Irrigation District	10,000	0	950 via exchanges with other CVP Contractors	*	Unknown
Tea Pot Dome Water District	7,500	0	0	0	0
Terra Bella Irrigation District	29,000	0	0	0	Deer Creek

Tulare Irrigation District	30,000	141,000	0	0	0

*The safe groundwater yield is difficult to quantify. However, the safe yield of groundwater is generally considered to be 1 af of water for every 1 acre of land.

3.4 Other CVP and Non CVP Contractors

A complete narrative description of other CVP Contractors and Non CVP Contractors that are potential exchangees is found in Appendix E of this EA and Tables 3.3 to 3.8. In summary, there are 11 other CVP Contractors and 54 Non CVP Contractors. It should be noted that in some cases, the diversions of Non-CVP water from rivers, creeks and ditches, is based on the total runoff in any given hydrological season. The districts receive a percentage of the runoff and no specific limit exists to the total annual supply. The total amount of non-CVP water is difficult to quantify. Therefore, average water supplies are depicted.

Table 3.3 Deer Creek & Tule River Authority

DEER CREEK & TULE RIVER AUTHORITY	Friant	CV	Other Surface Supply	Groundwater Safe Yield	Groundwater Recharge
Lower Tule River Irrigation District	61,200 238,000	31,102	Tule River 70,000	*	Unknown
Pixley Irrigation District		31,102	Deer Creek	*	Via Deer Creek
Porterville Irrigation District	16,000 30,000	0	Tule River 12,900 Average, Porter Slough	0	Yes
Saucelito Irrigation District	21,200 32,800	0 CVC Supply	3,200	*	Deer Creek only when CVP water is diverted from FKC
Stone Corral Irrigation District	10,000	0	950 af/y via exchanges with other CVP Contractors	3,200	Unknown
Terra Bella Irrigation District	29,000	0	0	0	Deer Creek

*The safe groundwater yield is difficult to quantify. However, the safe yield of groundwater is generally considered to be 1 af of water for every 1 acre of land.

Table 3.4 Kaweah Delta Water Conservation District

Kaweah Delta Water Conservation District	Friant	CV	Other Surface Supply	Groundwater Safe Yield	Groundwater Recharge
Lakeside Irrigation Water District	0	0	Kaweah River Cottonwood Creek, Cross Creek, and Kings River	*	Y Cross Creek, Recharge basins
County of Tulare	0	5,308	Kings, Kaweah, Tule Rivers	*	Unknown

Corcoran Irrigation District	0	0	X af/y Kings River	*	Y
Kings County Water District	0	0	Kings and Kaweah Rivers	*	Y
Tulare Irrigation District	30,000 141,000	0	Kaweah River	10% of natural and artificial recharge	Y

*The safe groundwater yield is difficult to quantify. However, the safe yield of groundwater is generally considered to be 1 af of water for every 1 acre of land.

Table 3.5 Kern County Water Agency

Kern County Water Agency	CVP[2]	Other Surface Supply	Ground-water Safe Yield	Ground-water Recharge
Belridge Water Storage District[1]	N	SWP	n/a	None
Berrenda Mesa Water District[1]	N	SWP	n/a	None
Buena Vista Water Storage District	Y	SWP Kern River	.3 ac/ft	Yes
Cawelo Water District	Y	45,000 af/y SWP Wet years only Poso Creek 27,000 Kern River Reclaimed oil field water	.3 ac/ft	Limited Poso Creek, Recharge basins
Henry Miller Water District[1]	Y	SWP Kern River	.3 ac/ft	Limited
Kern County Water Agency Improvement District #4	Y	Kern River SWP	.3 ac/ft	Yes
Kern Delta Water District	Y	Kings River Kaweah River	.3 ac/ft	Yes
Lost Hills Water District[1]	N	SWP	n/a	None
Rosedale-Rio Bravo Water Storage District	Y	SWP Kern River	.3 ac/ft	Yes
Semitropic Water Storage District	Y	SWP Poso Creek Metropolitan Water District	.3 ac/ft	Limited
Tehachapi-Cummings Co. Water District[1]	N	SWP Local streams	*	Yes
Tejon-Castac Water District[1]	N	SWP Local streams	n/a	None
West Kern Water District	N	SWP	n/a	None
Wheeler Ridge-Maricopa Water Storage District	N	SWP Local streams	*	Unknown

[1]Outside the Consolidated CVP Place of Use for Delta water and excluded from this EA and approval process.
[2]Surplus CVP flood water when available.
*The safe groundwater yield is difficult to quantify. However, the safe yield of groundwater is generally considered to be 1 af of water for every 1 acre of land.

Table 3.6 Kern Water Bank Authority

Kern Water Bank Authority	CVP[2]	Other Surface Supply	Ground-water Safe Yield	Ground-water Recharge
Dudley Ridge Water District	N	SWP	*	Yes
Kern County Water Agency	Y	SWP Kern River	*	Yes
Semitropic Water Storage District	Y	SWP Poso Creek	*	Yes
Tejon-Castaic Water District[1]	N	SWP	*	Yes
Westside Mutual Water Company	Y	SWP	*	Yes
Wheeler Ridge-Maricopa Water Storage District	N	SWP Local streams	*	Yes

[1]Outside the CVP Place of Use and excluded from this EA and approval process.
[2]Surplus CVP flood water when available.
*The safe groundwater yield is difficult to quantify. However, the safe yield of groundwater is generally considered to be 1 af of water for every 1 acre of land.

Table 3.7 Kings River Conservation District

Kings River Conservation District	CVP	Other Surface Supply	Ground-water Safe Yield	Ground-water Recharge
Alta Irrigation District	N	Kings River	*	*
Clark's Fork Reclamation District No. 2069	N	Kings River	*	*
Consolidated Irrigation District	215 Water	Kings River	*	Yes
Corcoran Irrigation District	N	Kings River	*	*
Empire West Side Irrigation District	N	Kings River, SWP	*	*
Fresno Irrigation District	[2, 3]	Kings River, CVP	*	*
James Irrigation District	[2, 3]	CVP via exchange for Kings River (See Appendix X)	*	*
Kings County Water District	[2]	SWP, Kings and Kaweah Rivers	*	*

Kings River Water District	[2]	Kings River	*	*
Laguna Irrigation District	800 af/y, [2]	Kings River	*	*
Lakeside Irrigation Water District	[2]	Kings River, St. Johns, Cross Creek	*	Cross Creek, recharge basin
Liberty Water District	[2]	Kings River via Liberty Canal	*	Liberty Canal and recharge basin
Mid-Valley Water District	N	Kings River	*	*
Raisin City Water District	N	Kings River	*	*
Riverdale Irrigation District	N	Kings River	*	*
Salyer Water District	N	0 (See Appendix X)	*	*
Stratford Irrigation District	N	Kings River	*	*
Tranquility Irrigation District	2, 3	CVP via exchange for Kings River (See Appendix X)	*	*
Tulare Lake Reclamation District No. 761	N	Kings River, SWP	*	*
Burrel Ditch Company	N	Kings River via Murphys Slough	*	*
Corcoran Irrigation Company	N	Kings River via Lakelands Canal	*	*
Crescent Canal Company	N	Kings River via Crescent Canal	*	*
John Heinlen Mutual Water Company	N	Kings River	*	*
Last Chance Water Ditch Company	N	Kings River via Last Chance Ditch	*	*
Lemoore Canal and Irrigation Company	N	Kings River via Lemoore Canal	*	*
Liberty Canal Company	N	Kings River via Liberty Canal	*	*
Liberty Mill Race Company	N	Kings River via Murphys Slough	*	*
Lovelace Water Corporation	N	Kings River South Fork Canal and Tulare Lake Canal	*	*
Peoples Ditch Company	N	Kings River via operations of People's Weir	*	*
Reed Ditch Company	N	Kings River via Murphys	*	*

		Slough		
Southeast Lake Water Company	N	Kings River	*	*
Stinson Canal and Irrigation Company	N	Kings River via Stinson Canal	*	*
Tulare Lake Canal Company	N	Kings River via Tulare Lake Canal	*	*
Upper San Jose Water Company	N	Kings River	*	*

[1]Outside the CVP Place of Use and excluded from this EA and approval process.
[2]Surplus CVP flood water when available.
[3]Long-term CVP Contractor
Mill Creek, Sand Creek, and Wahtoke Creek are tributary to the Kings River and provide conveyance and supplies to some districts.
*The safe groundwater yield is difficult to quantify. However, the safe yield of groundwater is generally considered to be 1 af of water for every 1 acre of land.

Table 3.8 Tulare Lake Basin Water Storage District

Tulare Lake Basin WSD	Kings, Tule, Kaweah, Kern Rivers, Deer Creek, SWP
Angiola WD	605 af/y SWP if available 15,000 af/y (5,145 average) Kings River 6,000 af/y (975 average) Tule River/ Deer Creek 60,000 af/y (7,787 average) Tulare Lake Flooding 35,000 groundwater
Melga WD	SWP and Kings, Tule, Kaweah Rivers, Kern River

*The safe groundwater yield is difficult to quantify. However, the safe yield of groundwater is generally considered to be 1 af of water for every 1 acre of land.

3.5 Groundwater

In most cases the water districts do not have authority over the groundwater usage in their districts. Groundwater is pumped from privately owned wells in their districts. The water districts strive to provide surface water, when available, at affordable prices to curb groundwater pumping. The groundwater levels, supplies and safe yield are difficult to quantify. This is due to the variances in soils types, proximity of the districts to the foothills, or districts located upslope from the San Joaquin Valley floor which typically results in groundwater flowing out of certain districts and into others. As a rule of thumb, the groundwater safe yield is approximately 1 af per acre of land. In some years the safe yield is 0 and for certain districts with clay soils or located near the foothills there usually is a limited amount of safe yield. It is not uncommon for two water districts to enter into agreements for exchanges or transfers of surface water to off-set groundwater migration between the two districts.

The CVP was developed as a supplemental supply of surface water and to alleviate groundwater overdraft conditions. The overdraft of groundwater is a region-wide problem throughout the lower San Joaquin Valley.

The usable storage capacity was estimated to be approximately 24 million af for the San Joaquin River Hydrologic Region and 28 million af for the Tulare Lake Hydrologic Region. DWR estimated a level of groundwater extraction that would not lower groundwater levels over the long-term (perennial yield) to be approximately 3.3 million af for the San Joaquin River Hydrologic Region. The perennial yield is 4.6 million af for the Tulare Lake Hydrologic Region. This perennial yield is directly dependent upon the amount of recharge received by the groundwater basin, which may be different in the future than it has been in the past. All of the basins within the San Joaquin River and Tulare Lake Hydrologic Regions experience some overdraft.

Recharge of the semi-confined aquifer in the Regions is primarily derived from seepage from streams and canals, infiltration of applied water, and subsurface inflow. The discussion of each of the Districts located above in this document includes recharge facilities and groundwater resources. Precipitation on the valley floor provides some recharge, but only in abnormally wet years. Seepage from streams and canals is highly variable depending upon annual hydrologic conditions.

Water districts and landowners located within suitable groundwater basins routinely balance irrigation demands with surface and groundwater through conjunctive use. In wet years the groundwater is recharged and in dry years groundwater is extracted. Water districts and landowners located in areas with little to no groundwater sources would seek surface water supplies to purchase if a deficit in water supplies occurs.

The Contractors are located within the San Joaquin River and Tulare Lake Hydrological Regions. These Regions are divided into subbasins. Table 3.9 lists the water purveyors located in the groundwater basins in the project area.

Table 3.9 Groundwater Basins and Subbasins

Madera Basin	**Tule Basin (Deer Creek subbasin)**
None of the water districts in this project are located in the Madera Basin.	Saucelito Irrigation District (Deer Creek) Porterville Irrigation District Kern-Tulare Water District Rag Gulch Water District Lower Tule River Irrigation District Tea Pot Dome Water District (Deer Creek) Pixley Irrigation District (Deer Creek) Terra Bella Irrigation District Delano-Earlimart Irrigation District

The usable storage capacity was estimated to be approximately 24 million af for the San Joaquin River Hydrologic Region and 28 million af for the Tulare Lake Hydrologic Region. DWR estimated a level of groundwater extraction that would not lower groundwater levels over the long-term (perennial yield) to be approximately 3.3 million af for the San Joaquin River Region. The perennial yield is 4.6 million af for the Tulare Lake Region. This perennial yield is directly dependent upon the amount of recharge received by the groundwater basin, which may be different in the future than it has been

in the past. All of the basins within the San Joaquin River and Tulare Lake Hydrologic Regions experience some overdraft.

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Some of the water districts are located near the base of the foothills of the Sierra or Coastal Ranges or in other areas that do not have suitable groundwater basins. Water districts located in areas with little to no groundwater sources would seek surface water supplies to purchase if a deficit in water supplies occurs or may transfer or exchange water for temporary storage of this water in Districts with adequate groundwater basins and facilities.

Water districts and landowners with suitable groundwater basins routinely balance irrigation demands with surface and groundwater through conjunctive use. In wet years the groundwater is recharged and in dry years groundwater is extracted.

3.6 Facilities for Delivery of Water

The following are descriptions of the conveyance facilities within the project area. These include the Friant-Kern Canal, California Aqueduct, Cross Valley Canal, Kern Water Bank canal, Kings, Tule, Kaweah and Kern Rivers in addition to small streams.

The water districts have constructed extensive water conveyance systems to provide water throughout their service areas. Water is conveyed through the extensive networks of canals and aqueducts to provide water where needed.

3.6.1 Friant-Kern Canal

The FKC is operated by the Friant Water Authority to convey water supplies stored in Millerton Lake from the San Joaquin River to water districts in Fresno, Tulare and Kern Counties. The FKC is a prominent feature of the area that provides for the transport of water through the eastern portion of the San Joaquin Valley for delivery of water to CVP Contractors. The FKC extends 152 miles south from Friant Dam in Fresno County to the Kern River in Kern County four miles west of Bakersfield.

In addition to conveying CVP water, the canal is sometimes used to convey floodwaters from the Kings, Kaweah and Tule rivers which are pumped into the FKC in major flood years. If not pumped into the FKC these waters could flood the Tulare Lake bed. Such floodwaters in the FKC are released into the Kern River channel downstream of Bakersfield where the water can flow into the California Aqueduct via the Kern River - California Aqueduct Intertie or be diverted and recharged into the groundwater basin in

Kern County. Alternatively, water from the FKC can be conveyed to the California Aqueduct or recharge areas via the CVC operating in reverse mode (east to west).

3.6.2 California Aqueduct

The State of California constructed the California Aqueduct as part of the SWP. Operations began in 1972. Waters from the aqueduct flow out of the Delta near the City of Tracy to San Bernadino and Riverside into Lake Perris reservoir. Contractors have access to either the Cross Valley Canal and/or direct diversion from the California Aqueduct. Currently, the SWP has delivered a total of about 1.36 million af to the San Joaquin Valley. Contracts executed in the early 1960s established the maximum annual water amount (supply) that each SWP long-term contractor may request from the SWP. These supplies projected annual water needs at the time the contracts were signed. SWP delivers water to agricultural and M&I water contractors based on the criteria established in the 1996 Monterey Agreement, which applies equal deficiency levels to all contractors.

Recovered groundwater that is discharged into the Aqueduct, can be delivered to water districts or exchanged with the DWR. Exchanges with the DWR can be simultaneous, or delayed exchanges. In a simultaneous exchange water delivered from the Aqueduct to an upstream district at the same time the recovered groundwater is transported to the Aqueduct. With a delayed exchange, water might be delivered by the DWR to the receiving district from storage before or after the recovered groundwater is received.

3.6.3 Cross Valley Canal

The Cross Valley Canal (CVC) extends from the Aqueduct near Tupman to Bakersfield. It consists of four reaches which have capacities ranging from 890 cfs through the first two pump plants to 342 cfs in the unlined extension near Bakersfield.

The canal is a joint-use facility operated by the Kern County Water Agency for the Cross Valley participants. Water can be conveyed through the CVC to the Kern Water Bank, the City of Bakersfield 2800 Acres, the Berrenda Mesa Property, the Kern River channel, Pioneer Banking project and the various member units recharge sites.

The CVC is also used to convey banked groundwater after it is recovered. Once in the CVC, recovered water can be delivered to CVC participants in exchange for water in the Aqueduct. During periods when water is not available for exchange, the CVC can be operated in reverse flow. When operated in reverse flow, water flows from the CVC directly into the Aqueduct. In 1991, water levels in the Aqueduct were low enough for the flow to be by gravity. When water levels in the Aqueduct are too high for gravity flow, the water must be pumped into the Aqueduct. In 1992, the DWR constructed a temporary pump station to lift 80 cfs from the CVC into the Aqueduct. A similar station may be constructed in the future if reverse flows into the Aqueduct are needed when levels in the Aqueduct are too high for gravity flow. In addition, raising the lining in the CVC reach adjacent to the Aqueduct would allow reverse flow without a pump station.

3.6.4 Kern River/Alejandro/Outlet Canals

Water from the FKC, the CVC, or from the Kern River can be conveyed in the Kern River channel or in the Kern River Canal to the Pioneer Banking project or other recharge areas. Conveyance of water in the Kern River Canal requires an agreement with the City of Bakersfield. Conveyance of water in the Alejandro Canal requires an agreement with the Buena Vista Water Storage District.

The Kern River Canal can also be used to convey water from the Kern River to the California Aqueduct directly via the Alejandro Canal, the Buena Vista Aquatic Lakes and Outlet Canal and a pumping plant, or indirectly via an exchange.

It should be noted that depending on groundwater pumping operations, water in the Buena Vista Aquatic Lake may contain high concentrations of arsenic. These high concentrations are caused when groundwater from nearby wells is pumped into the Buena Vista Aquatic lakes for agricultural use and to make up evaporation losses.

3.6.5 Kern River

The USACOE operates Isabella Dam on the Kern River. Flows downstream of the dam are monitored and managed by the Kern River Watermaster. Minimum flow requirements and diversions off the Kern River are coordinated with water purveyors and Kern River Watermaster.

3.6.6 Kern Water Bank Canal

The Kern Water Bank Canal is a bi-directional canal constructed by the Kern Water Bank Authority. The canal has a single pumping plant for delivering water for recharge. The forward flow capacity is 950 cfs. Reverse flow capacity is approximately 650 cfs. The canal is used to convey SWP water and other waters from the California Aqueduct to the local banking projects for groundwater recharge. The canal is also used to convey pumped groundwater during a surface water short year, back to the California Aqueduct, either directly or by exchange, to water districts for a supplemental water supply.

3.6.7 Kings River

The USACOE is the operator of Pine Flat Dam and releases water for flood control. During the irrigation season, (normally June through August) water is released from behind Pine Flat Dam and the Kings River is controlled by the Kings River Water Association. In wet years the Kings River may flow to the Tulare Lake Basin. Only in very wet seasons does the Kings River flow north into Fresno Slough and into the San Joaquin River. The average annual runoff for the Kings River is approximately 1.7 million acre-feet. The Kings River is managed similarly to a canal system providing water for irrigation and to meet flow requirements for fish and wildlife purposes.

3.6.8 Kaweah and St. Johns Rivers

The USACOE operates Terminus Dam on the Kaweah River for flood control and water supply. Downstream of Terminus Dam, the St. Johns River and Lower Kaweah River divides from the Kaweah River at McKay Point. The St. Johns River becomes Cross

Creek north of Goshen. A few tributaries such as Dry Creek and Yokohl Creek, flow into the Kaweah and St. Johns Rivers. The Kaweah River ceases to be an identifiable stream south of Highway 245, and the river branches into Mill Creek and other major and minor streams creating a delta. During the irrigation season (June through August) the Kaweah Delta Water Conservation District manages the Kaweah River irrigation flows similarly to a canal facility to meet demands and on behalf of the Watermaster for the Kaweah and St. Johns Rivers Association. The average annual runoff of the Kaweah River is 430,000 af, and does not include various smaller creeks. The St. Johns Rivers was permanently established during the fresher of 1861-62 and branches off the Kaweah River. The Lower Kaweah River, St. Johns River and smaller creeks are used for conveyance of irrigation water to ditch companies and water districts.

3.6.9 Tule River

The Tule River Watershed above Success Dam is a fan shaped area containing 245,000 acres, ranging in elevation of 550 feet at Success Dam to a maximum of 10,000 feet, with less than 10 percent of the watershed above elevation 7,500 feet. The Tule River above Success Reservoir is composed of three channels, the North Fork and the Middle Fork that join just above the community of Springville, and the South Fork that passes through the Tule River Indian Reservation before entering Success Reservoir at State Route 190.

Success Dam, a United States Army Corps of Engineers project, was completed in 1961 and currently has a storage capacity of 82,300 a.f., of which 75,000 a.f. is reserved for flood control and irrigation water storage. The remaining storage, 7,300 a.f., was set aside for a silt and recreation pool.

The Tule River runoff at Success Reservoir is extremely variable subject to precipitation in the watershed. Records of the Tule River runoff for the past 101 years are available from water year 1904 through water year 2004. The average annual runoff of the Tule River is 141,630 a.f. Of the past 101 years, 1977 was the driest year with a runoff of 15,810 a.f., and 1983 was the wettest year with 615,090 a.f.

The Tule River Association, made up of all water rights holders at and below Success Reservoir, administers the water and storage rights at and below Success Dam. The Army Corps of Engineers controls storage in Success Reservoir through a Flood Control Diagram that limits irrigation storage during the period November 15th to May 1st of the following year. Irrigation water storage operations during the remainder of the year are controlled by the Tule River Association Watermaster.

The Tule River gross service area below Success Dam covers about 320,000 acres, of which 140,000 acres are within Tulare County, and 180,000 acres are within the Tulare Lake Basin of Kings County. Of the gross service area, approximately 240,000 acres are developed in irrigated agriculture with the remainder in urban and non-agriculture uses.

The main channel of the Tule River below Success Dam traverses about 50 miles to the pocket of the Tulare Lake Basin where the river joins the terminus of the South Fork of the Kings River. The Tule River bifurcates at Road 192 and a South Fork channel

traverses 12 miles along with a 3rd Middle Fork channel of 3 miles, all northerly of the community of Woodville.

The water districts have constructed an array of extensive conveyance systems including pipelines, canals and ditches.

3.7 Land Use

A more detailed discussion of the land uses in each of the water districts is contained in the incorporated documents and in Appendices C thru E of this document. Generally, the land use is mainly comprised of irrigated agricultural. Cities along the Hwy 99 corridor are expected to expand over the next 25 years. These cities include Fresno, Visalia, Delano and Bakersfield.

3.8 Biological Resources

The documents incorporated by reference contain a more detailed description of biological resources in the District's service areas and boundaries. The CVP Contractors have already undergone consultation with FWS and NOAA and are implementing measures in the applicable Biological Opinions. Kern County Water Agency has an existing Habitat Conservation Plan for portions of the District.

Reclamation will consult with FWS under the Supplemental EA for the Cross Valley Contractors Long-term Contract Renewal on designated critical habitat for vernal pool crustacean and plant species (FR 68(151);46684-46857), and proposed critical habitat for California tiger salamander (FR 69(153):48570-48649). The vernal pool species critical habitat includes four crustaceans and eleven plants.

Threatened, Endangered and Sensitive Species

An unofficial list of endangered, threatened, and sensitive species that may occur within the San Joaquin Valley floor (action area) of Fresno, Tulare and Kern Counties was obtained from the U.S. Fish and Wildlife Service's Endangered Species Lists website at http://sacramento.fws.gov/es/spp_list.htm. Additional data was obtained form the California Department of Fish and Game's California Natural Diversity Database website at http://www.dfg.ca.gov/whdab/html/cnddb.html.

Table 3.10. Federally Listed Threatened and Endangered Species that may Occur within the Action Area

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	CRITICAL HABITAT
Bakersfield cactus	*Opuntia basilaris treleasei*	Endangered	
Bald eagle	*Haliaeetus leucocephalus*	Endangered	
Blunt-nosed leopard lizard	*Gambelia silus*	Endangered	
Buena Vista lake shrew	*Sores ornatus relictus*	Endangered	Yes
California condor	*Gymnogyps californianus*	Endangered	Yes
Calfornia jewelflower	*Caulanthus californicus*	Endangered	
California red-legged frog	*Rana aurora draytonii*	Endangered	

California tiger salamander	*Ambystoma californiense*	Threatened	Proposed
Conservancy fairy shrimp	*Branchinecta conservation*	Endangered	Yes
Delta smelt	*Hypomesus transpacificus*	Threatened	Yes
Fleshy owl's-clover	*Castilleja campestris ssp. Succulenta*	Threatened	
Fresno kangaroo rat	*Dipodomys nitratoides exilis*	Endangered	
Giant garter snake	*Thamnophis gigas*	Threatened	
Giant kangaroo rat	*Dipodomys ingens*	Endangered	
Greene's tuctoria	*Tuctoria greenei*	Endangered	
Hairy Orcutt grass	*Orcuttia pilosa*	Endangered	
Hartweg's golden sunburst	*Psedobahia bahiifolia*	Endangered	
Hoover spurge	Chamaesyce hooveri	Threatened	
Keck's checker-mallow	*Sidalcea keckii*	Endangered	
Kern mallow	*Ermalche kernensis*	Endangered	
Least Bell's vireo	*Vireo belli pusillus*	Endangered	
Longhorn fairy shrimp	*Branchinecta longiantenna*	Endangered	Yes
Mariposa pussy-paws	*Calytridium pulchellum*	Threatened	
Mountain plover	*Charadrius monyanus*	Threatened	
Mountain yellow-legged frog	*Rana muscosa*	Candidate	
Palmate-bracted bird's-beak	*Cordylanthus palmatus*	Endangered	
Riparian brush rabbit	*Sylvilagus bachmani riparia*	Endangered	
Riparian woodrat (San Joaquin Valley woodrat)	*Neotoma fuscipes riparia*	Endangered	
San Benito evening-primrose	*Camissonia benitensis*	Threatened	
San Joaquin adobe sunburst	*Psedobahia peirsonii*	Endangered	
San Joaquin kit fox	*Vulpes macrotis mutica*	Endangered	
San Joaquin Valley Orcutt grass	*Orcuttia inaequalis*	Endangered	Yes
San Joaquin wooly-threads	*Lembertia congdonii*	Endangered	
southwestern willow flycatcher	*Empidonax trailli extimus*	Endangered	
Tipton kangaroo rat	*Dipodomys nitratoides nitratoides*	Endangered	
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	Yes
Valley elderberry beetle	*Desmocerus californincus dimorphus*	Threatened	
Vernal pool tadpole shrimp	*Lepidurus packardi*	Endangered	
western snowy plover	*Charadrius alexandrinus nivosus*	Threatened	
western yellow-billed cuckoo	*Coccyzus americanus*	Candidate	

Appendix F identifies species that are considered as candidate, species of concern or species listed by the State of California which may occur within the action area.

The vernal pool species critical habitat around the County of Fresno WW #34 consists of units designated for the following species: San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*), vernal pool fairy shrimp (*Branchinecta lynchi*), and fleshy (succulent) owl's-clover (*Castilleja campestris* ssp. *succulenta*). Unit #2 of the South San Joaquin Region of proposed CTS critical habitat also overlaps the WW #34 area. 1561 acres of #34 are within the SSJ-2 unit for CTS, and 1294 acres are within the vernal pool units.

The Tri-Valley and Hills Valley water districts also are partially within proposed CTS critical habitat. 243 acres of Tri-Valley, and 792 acres of Hills Valley are overlapped by the proposed boundaries (for a total of 1035 acres). 396 acres of the Stone Corral Irrigation District are overlapped by the vernal pool critical habitat.

The critical habitat consists of undeveloped lands within these areas. Reclamation has determined that no delivery of CVP water to these lands will be allowed unless and until the landowner can demonstrate compliance with the Endangered Species Act, including consultation with the U.S. Fish & Wildlife Service, for the critical habitat.

3.9 Indian Trust Resources

The Tule River Indian Tribe is located along the Tule River upstream from Success Dam. It is possible Indian Trust Resources exist. Clarifications of Indian and other water rights along the Tule River are currently under review.

3.10 Environmental Justice

The employment opportunities for agricultural jobs draw low income and minority populations. The farm workers reside in surrounding communities.

3.11 Socio-economical Resources

The socio-economical conditions in the San Joaquin Valley are described in more detail in the incorporated by reference documents. In summary, the agricultural industry significantly contributes to the economic vitality of the San Joaquin Valley. One in three jobs is related to the agricultural industry.

SECTION 4 – ENVIRONMENTAL CONSEQUENCES

Surface Water Environmental Consequences

Proposed Action

The 128,300 af/y of water involved in the exchanges are supplies already allocated and no additional water supplies would be diverted from rivers or lakes. No new construction or points of diversions would be required. However, changes in timing and locations of when and where water is diverted could occur. The rivers in the project area are managed for flood control and irrigation similar to canals.

Releases from the dams occur in response to high water flows or to meet irrigation demands and minimum flow requirements to benefit fish, wildlife and recreational uses. Typically, minimum flow requirements are maintained while the hydrological conditions dictate the amount of water diverted to meet irrigation demands. Telemetric systems are used to record flows and the Watermasters coordinate with the water districts to open or close their gates for diversions of water on a real-time basis to ensure appropriate flows are maintained throughout the course of the rivers. The timing and locations of diversion vary from year-to-year due to hydrological conditions, fluctuating marketing conditions, transfers and/or exchanges of water with or without the proposed Article 5 exchanges. The proposed exchanges would not result in significant impacts to third parties, water quality, quantity, flows or temperature. The proposed exchanges arrangements would not interfere with deliveries to other water purveyors or meeting minimum flow requirements.

Water diverted from the Delta is typically of lower quality compared to sources on the east side of the San Joaquin Valley. The proposed exchanges would not result in deliveries of additional water supplies from new sources or origins of water. The maximum amount of water exchanged would be up to 128,300 af/y and would be sufficiently diluted in the canals. Deliveries of water supplies in the conveyance facilities occur within the capacities and operations of the canals although the destination and label on the water may differ.

Changes in water flows or temperatures in the canals and Aqueduct would not result in significant impacts to water quality or quantity. The operations and maintenance of the CVP and SWP were addressed in the CVPIA PEIS and the OCAP and included the entire 128,300 af/y of the CV Contractor's water supplies. This water was assumed to be pumped and conveyed in each year for deliveries via exchanges to the CV Contractors. The Proposed Article 5 Exchanges would not result in any impacts to diversion from the Delta or pumping and conveyance of this water beyond those already addressed in the CVPIA PEIS and OCAP.

This EA addresses the conveyance of the CV Contractor's CVP water under Article 55 of the SWP contracts when combined with Article 5(a) of the CVP contracts. The conveyance of CVP water under Article 55 could result in the CV Contractors receiving a higher rank on the SWP hierarchy for pumping. Pumping and conveying water under Article 55 does not result in additional water conveyed. DWR would pump this amount

of water with or without the proposed Article 5 exchanges with others. The proposed exchanges, pumping, conveyance, and approvals are subject to applicable laws including the “no injury” rule whether or not the Article 55 provision in the SWP contracts are exercised. No significant changes in water quantities, diversions, pumping or conveyance practices would occur.

The CV Contractor’s CVP water supply is unreliable in any year due to hydrological conditions and SWP pumping priorities. Therefore, in some years the CV Contractors do not receive any of their CVP water supplies. The CV Contractors seek other sources of water or management practices, including purchases of surface water, extracting groundwater, growing less water intensive crops, or fallowing lands.

Historically, the untimely delivery of CV Contractor water has resulted in this AEWSD receiving the water when its value is low. This same amount of water is of much higher value at such time this water is exchanged back to the CV Contractors due to timing and demands. The value and timing of the water is considered in exchange agreements between the parties. Therefore, the CV Contractors are seeking to enter into exchange arrangements that will benefit AEWSD and/or others in order to obtain water at a reasonable price for the CV Contractors landowners to compete with other agricultural growers. In lieu of paying a higher price for the water when it is exchanged to the CV Contractors, the exchange arrangements commonly allow for short-term or permanent imbalanced exchanges of water to compensate for the value of the water when it is delivered. Similar exchange arrangements are anticipated for the “other” exchange partners.

The exchange arrangements are developed between willing buyers and sellers with mutually agreeable terms. Compensation for the imbalances may occur with money or water. The money would be used to purchase other supplies, pump groundwater or offset costs for not growing crops. The short-term imbalanced exchanges involve the repayment in water supplies and are not limited to a certain time period and could occur the following year or subsequent years to balance the exchange. In certain circumstances the imbalanced exchanges are permanent. A portion of the water (up to 50%) would be retained by the exchangee and 50% would be delivered to the exchanger (CV Contractor) when it is needed.

Under the exchange arrangements, the water management practices for the CV Contractors would not change significantly. The CV Contractors would receive 50% of their CVP supply when it is needed. The CV Contractors would receive the benefit of having lower priced water with an improved timing for deliveries to allow for advanced planning and growing of crops on existing agricultural lands in order to compete with neighboring farmers. However, the availability of this water is contingent upon DWR having a window of opportunity to pump the water.

Under the Proposed Action and imbalanced exchanges, the exchangees could receive an increase of no more than 64,150 af/y of water. This water could be used to grow higher value crops, groundwater recharge, banking for later use in dry years, subsequent

transfers within the Place of Use including selling to the Environmental Water Account and/or municipal and industrial uses. The increase of 64,150 is small compared to the overall water supplies for the water purveyors and would not lead to significant impacts to surface water quality or quantity. The same amount of water would continue to be utilized within the lower San Joaquin Valley for beneficial uses. This increased supply is considered CVP water until its final end use. This water would not be used for conversion of lands without subsequent environmental review and approvals from the Contracting Officer. Subsequent transfers, recipients of the banked water, changes in the places or purpose of the use of the water would require environmental review, and compliance with the RRA, water rights permits and applicable federal, state and local laws prior to approval. Reclamation does not have jurisdiction over non-CVP supplies.

Under the Proposed Action, certain conditions could result in the CVP water losing its CVP characteristic and the non-CVP water could assume the characteristics of CVP water as it relates to the Reclamation Reform Act. This is called swapping characteristics. However, CVP water is tracked from its origin to its final disposition (end use) and does not lose its characteristics under the water rights permits. The purpose and place of use of the CVP water would be used in compliance with the applicable water rights permits. This swapping of characteristics allows for maximum flexibility to apply water to irrigated lands. This water would not be applied to native lands. Lands that have been fallowed for three or more years would undergo biological surveys and environmental review under NEPA, Endangered Species Act prior to approval. Each proposed exchange arrangement would be reviewed for applicable water rights permits, local, state, and federal laws prior to approvals including out of basin transfers, points of diversions and Places of Use. The CV Contractors are responsible for compliance with the California Environmental Quality Act (CEQA), if applicable.

It is recognized the exchangee(s) could take deliveries of their other water supplies in addition to receiving the 64,150 af/y of CVP water. The use of CVP water within the exchangee's service areas could result in other sources of water freed up, of which, Reclamation does not have approval authority. The freed up water supplies could be sold providing a financial benefit to the exchangee(s). The Cumulative Effects section below discusses the other sources of water in addition to the CVP water including transfers and other water service actions.

No Action Alternative

The impacts under the No Action Alternative are similar to the Proposed Action. The same amounts of water would be involved and no additional water supplies would be diverted from reservoirs or rivers. Under the No Action Alternative, Reclamation could deny Article 5 exchange requests. This could result in SWP Contractors to be less receptive in exercising the Article 55 provision to pump and convey the CV Contractors' water. The CVP water may not be released from upstream reservoirs if DWR does not have a pumping opportunity. The CVPIA PEIS and OCAP assumed the 128,300 af/y of water would be diverted, pumped and conveyed every year. Therefore the impacts to environmental resources have already been assessed for the operations and maintenance activities of the CVP and SWP and are part of the No Action Alternative.

Reclamation would prepare separate environmental documents each instance an Article 5 exchange is proposed to examine the impacts to environmental resources beyond the diversions, pumping and conveying of this water in CVP and SWP facilities. The timing for preparation of environmental and administrative review could exceed the window of opportunity for the exchange resulting in reduced flexibility in the management of the CV Contractor's CVP water in order to compete with neighboring farmers. The No Action Alternative would likely result in increases of water transfers and higher prices for the CV Contractors. The exchangees (others) may not receive the benefit of the additional water supplies for beneficial uses including growing higher value crops, groundwater recharge, groundwater banking or transfers. Less water may be available in the San Joaquin Valley if the exchange requests are not approved and CVP water is not conveyed under Article 55. However, the CV Contractors could continue to exchange water with AEWSD or transfer the water to other water districts south of the Delta. Therefore, the No Action Alternative and Action Alternative are similar and do not result in significant impacts to water resources.

Cumulative Effects

The Proposed Action would not contribute to, or inhibit, the renewal of CVP long-term contract renewals for other CVP contractors.

The reservoirs, rivers and creeks in the lower San Joaquin Valley associated with the Proposed Action are managed for flood control and agricultural supplies. Diversions of water occur based on the hydrological and environmental conditions. During wet seasons and high water flows, surplus water supplies are released and, if possible, marketed to quickly disperse this water to avoid flooding and damage downstream in the rivers. The Proposed Action would not interfere with deliveries, operations or cause significant adverse changes to the rivers, creeks or conveyance facilities.

The conveyance facilities and river systems in the lower San Joaquin Valley are interconnected and allow for a myriad of transfers, exchanges, contract assignments, and conveyances of water via Warren Act Contracts, Operational Contracts or Article 55 of the SWP. The conveyance of water under these water service options are subject to available capacity, meeting primary requirements, and environmental reviews.

The CVPIA envisioned improved water management options and expanded the opportunities for transfers to occur to encourage efficient water management and conservation. Transfers of CVP water require approval by Reclamation's Contracting Officer. Transfers of CVP water undergo a rigorous checklist to determine whether there are any immitigable third party impacts, as well as a public review period under NEPA and Section 3405(a) of the CVPIA. CVP water transfers outside the respective places of use or changes in points of diversions require prior approval by the State Water Resources Control Board. Reclamation does not have approval authority over transfers of non-CVP water. Under State law, transfers are prohibited if they would result in unmitigated third party impacts regardless of the type of water rights held by the seller. SWP contractors are restricted under Table A and the Monterey Agreement to transfer

SWP water. DWR manages a 'Turn Back Pool" for SWP contractors who do not need to deliver all of their SWP water supplies and DWR redistributes this water. Riparian water rights are restricted to use of the water that can be reasonably used on those lands appurtenant to stream courses and transfers are prohibited. Transfers out of the Kaweah Basin are not permitted without proper consent with the Kaweah Basin water interests. All "out of basin" transfers are reviewed for applicable laws prior to approvals.

Over the 25 year term of this EA, if DWR had a window of opportunity to pump and convey this water in each of those 25 years, the exchangee(s) could receive an increase of up to 1,603,750 af of water. The Proposed Action alone or with Article 55, could result in additional water supplies for the exchangee(s) to manage, use and market. This benefit is small and insignificant when compared to the overall water supplies over a 25 year period. The Kings River and SWP deliver over 2 million af/y, on average, to the San Joaquin Valley, not including CVP and other sources of water.

Under the Proposed Action, the exchanger(s) could receive less water than their full contract supply and allocation. However, receiving a reduced amount of water versus supplies outside of the growing season would provide better use and management of this water. This reduction would not result in significant impacts for the exchanger(s) since their water supplies are intermittent and unreliable.

The US Army Corps of Engineers has increased the capacity of Lake Kaweah, which is created by Terminus Dam on the Kaweah River. The dam enlargement project would raise the gross pool by 21 feet and add 42,600 acre-feet of flood storage space in Lake Kaweah. The plan would increase the levels of flood protection to the 70-year event for downstream communities and the 3.2-year event for the Tulare lakebed. An additional average annual irrigation water supply of 8,400 acre-feet could be stored in the reservoir. (*Kaweah River Basin Investigation and Draft Environmental Impact Statement, US Army Corps of Engineers).* The Proposed Action is unrelated to the project modifications and would not contribute to or hinder decisions to the enlargement project. The spillway modification project increases water supplies for agricultural or marketing purposes. Transfers of Kaweah River water supplies outside of the Kaweah Basin are currently prohibited with the exception of high flood flows. The Proposed Action, when added to the modification to the lake enlargement project, would not increases or decreases water allocations and would not contribute to cumulative effects to rivers or reservoirs.

The Proposed Action would not contribute to or interfere with flood control management and operations. The Proposed Action and imbalanced exchanges would not increase or decrease the availability of flood water nor inhibit or contribute to decisions to accept or reject this source of water.

The KCWA and CV Contractors have prepared an Environmental Impact Report under CEQA for the expansion of the CVC. The objective of the CVC expansion project is to capture high water flows (surplus water) of the SWP. This water is marketed under Article 21 of the SWP contracts and is available on a short-term and unreliable basis. The CVC expansion project would allow this water to be conveyed in the CVC and delivered

to groundwater banks for later use in dry seasons. The CVC enlargement project includes additional pumps and turnouts for deliveries of this water to groundwater banks. The North Kern Water District is also constructing a pipeline to its groundwater facilities to accommodate the surplus water, when available. The turnout facilities could result in improved capabilities for the Article 5 exchanges water to be conveyed to the existing groundwater bank facilities. The turnouts may reduce the need to pump the exchange water over longer distances providing a financial benefit to the water districts and benefit to power users. The CV Contractor's water has historically been conveyed across the length of the CVC to AEWSD and would not contribute to adverse cumulative impacts. North Kern Water District is not included in this EA. Therefore, Article 5 exchange requests involving North Kern Water District would require additional environmental review prior to approval including cumulative impact analysis. The CVC expansion project would occur with or without the proposed Article 5 exchanges.

Kern-Tulare and Rag Gulch Water Districts are in the process of approvals for two separate groundwater banking projects with Rosedale-Rio Bravo Water Storage District and North Kern Water Storage District. The main source of water for the banking projects is surplus CVP water, when available. Kern-Tulare and Rag Gulch Water Districts do not have adequate groundwater storage capacity. It is possible the Article 5 exchange water would be banked in these facilities until such time Kern-Tulare and Rag Gulch Water Districts need this water. The Article 5 exchanges, when added to the groundwater banking projects would not contribute to significant cumulative impacts to water resources since this water is contingent upon the opportunity for DWR to pump and convey this water.

Groundwater Environmental Effects

Proposed Action

The San Joaquin Valley is in overdraft conditions. A portion of the water applied on irrigated lands seeps into the groundwater. However, groundwater seepage is slow and would not lower the expense of pumping groundwater. The water districts strive to provide surface water at affordable prices to discourage groundwater pumping. The Proposed Action could provide short-term relief to groundwater quality and quantity.

The Proposed Article 5 exchanges do not result in significant reductions of water supplies in the CV Contractor's service areas since this water has been delivered on an intermittent basis in the past. Kern Tulare Water District, Rag Gulch Water District, Alpaugh Irrigation District and Atwell Water District are located in areas with inadequate groundwater supplies and unsuitable for groundwater recharge or banking.

Due to the availability of groundwater storage facilities in Kern County, it is likely that water districts located in the Kern County Basin would become exchange partners with the CV Contractors. Therefore it is likely groundwater quality and quantity would improve temporarily in Kern County. The groundwater is typically stored and extracted when surface water supplies are unavailable and distributed to the "owners" of the storage space in the groundwater banking facilities. As stated earlier, the existing conveyance facilities allow for water to be conveyed to the exchangers or exchangees

throughout the lower San Joaquin Valley. The Proposed Action would provide an increase of water to areas suitable for groundwater recharge providing an improvement of managing available water supplies and overall benefit to the region-wide overdraft conditions until the water is extracted in dry years. Therefore the Proposed Action would not result in long-term or significant impacts to groundwater quality or quantity.

No Action Alternative

The No Action Alternative is a continuation of exchanges between the CV Contractors and AEWSD, as in the past. AEWSD is located in Kern County and exchange arrangements could result in temporary increases to the local groundwater as in the past. Reclamation could still approve exchange arrangements between the CV Contractors and other exchangees but only after completing environmental and administrative review. The separate environmental reviews could exceed time frames for approvals for the exchanges since DWR has a short window of opportunity to pump and convey this water. Therefore, the exchangees may not have the benefit of using this water for groundwater recharge or banking this water for later use during dry seasons to benefit the overdraft conditions in the San Joaquin Valley. The No Action Alternative could result in the CV Contractors to pump groundwater or extract groundwater from banking facilities if adequate surface water supplies are not available for purchase.

Cumulative Effects

Most of the water districts have adopted or have developed groundwater management plans in response to AB3030. These plans typically limit the amount of groundwater that landowners can transfer out of the water districts. Due to the overdraft conditions in the San Joaquin Valley, costs for pumping and the groundwater management plans, it is unlikely groundwater would be transferred outside the San Joaquin Valley. Although the constraints for water transfers exist, there may be occasions when freed-up water supplies are transferred. This amount of water would be up to 64, 150 af/y and is minor when compared to the overall water supplies of over 2 million af/y of surface water delivered and applied mainly to agricultural lands providing recharge to the groundwater supply until extracted when surface water supplies are inadequate.

The availability of the CVP water to exchange is contingent upon hydrological conditions and an opportunity by DWR to pump this water. Therefore, this water is unreliable and would not lead to significant or long-term changes in groundwater quality and quantity in the San Joaquin Valley.

Land Use Environment Effects

Proposed Action

Land use would not change under the exchange arrangements. The CVP water is a supplemental supply. The CV Contractors have managed their water supplies to meet demands in the past when DWR has not had the opportunity to pump the water. Receiving a reduced supply of water when DWR has the opportunity would not result in significant changes in cropland production since an increment of this water would be provided by the exchangee to the CV Contractor during the irrigation season.

Although it is possible the exchangee would receive an increase of 64,150 af/y of water, this would occur only in years when DWR has a window of opportunity to pump this water or when Article 55 conveyance arrangements are utilized. The conveyance of water under Article 55 is subject to capacity in the Aqueduct and meeting all SWP requirements. Due to the unreliability and unavailability of this water, the Proposed Action would not lead to long-term land use changes. The water supplies are variable and do not provide a reliable or consistent amount for landowners to make long-term land use changes. No native grasslands or shrub land would be tilled or cultivated. Water would be delivered to established croplands and used for irrigation purposes on lands irrigated within the last three years or for existing M&I uses. Exchange arrangements that result in short-term imbalanced exchanges could result in short-term fallowing of lands until such time the water is delivered. Imbalanced exchanges may involve monetary compensation to allow purchases of other supplies. Some lands may be fallowed if surface water supplies are not available for purchase and groundwater resources are inadequate. Crop patterns could change. However, no increases in agricultural lands would occur without environmental reviews.

The exchanges would occur within existing facilities. Exchanges requiring additional construction to convey this water are not within the scope of this EA and would undergo separate environmental review.

No Action Alternative

The No Action Alternative is similar to the Proposed Action. Available water supplies would be applied to existing agricultural lands. Decisions to fallow lands would be based on available water supplies, hydrological conditions, constraints of water deliveries, and fluctuating agricultural marketing strategies.

Cumulative Effects

The home prices in the lower San Joaquin Valley and project area are lower compared to other regions in California. This and other economical forces are driving factors for land use changes from agricultural to urban uses. These changes are long-term and require approvals from the Local Area Formation Committee, changes in City or County General Plans and undergo environmental reviews. Changes in the CVP Contractor's boundaries and service areas undergo environmental review under NEPA and approval by Reclamation. Boundary change requests from the CVP Contractors for Reclamation's approval are often misconstrued. Reclamation does not have land use change approval authority. However, Reclamation must determination whether boundary change requests would result in inconsistency with the Reclamation Reform Act, water rights permits or other laws and regulations. During this determination and approval process, Reclamation evaluates any proposals for boundary changes as it relates to the use of the water and prepares environmental documents in accordance with NEPA prior to Reclamation's approval.

As stated earlier, a myriad of water service transactions routinely occur within the project area. The temporary fallowing of lands could occur especially during dry and drought seasons. The various water service transactions are for the efficient management of water

resources and do not contribute to long-term or reliable water supplies that would result in land use changes.

The exchange water could be diverted through the facilities for the proposed groundwater banking projects for Kern Tulare Rag Gulch Water Districts with Rosedale Rio-Bravo Water Storage District and North Kern Water Storage District. The CVC expansion project includes turnouts that could be used to divert the exchange water under the Proposed Action with the exception of North Kern Water District. The exchange water is unreliable and in some years is not pumped and conveyed. Therefore, the Proposed Action would not lead to decisions to construct additional groundwater facilities or contribute to significant cumulative impacts to land uses.

Biological Resources Environmental Effects

Proposed Action

The operations of the CVP and SWP, including the diverting, pumping and conveying CV Contractors CVP water supplies were included in the CVPIA PEIS and OCAP. The Proposed Exchanges would not result in changes to operations and maintenance activities beyond those already addressed in the CVPIA PEIS and OCAP.

Portions along the Kern River have been proposed for designated habitat for the Buena Vista Lake Shrew. Elderberry trees exist along the Kaweah River. In certain cases, the imbalanced exchanges could provide water supplies to the exchangees resulting in less water diverted from the Kings, Kaweah, Tule and/or Kern Rivers providing a slight benefit to fish and wildlife. It is unlikely less water would be diverted since the water districts have deficits in water supplies and need additional supplies to meet demands. No additional water supplies would be diverted from rivers as a result of the Proposed Action. The proposed exchanges do not interrupt or prevent proposals to transfer water to refuges or for fish and wildlife purposes. The Proposed Action could free up water supplies to be sold to the Environmental Water Account providing a benefit to fish. The Proposed Action would not prevent transfers to refuges or the Environmental Water Account. Currently, CVP water stored behind Friant Dam is not authorized for fish and wildlife uses. The water involved in the proposed exchanges would be applied to existing agricultural lands or to M&I users and would not reduce supplies for wetlands.

Under certain conditions, the water supplies would be imbalanced long-term. Water districts may have increases or decreases supplies resulting in land fallowing or resuming irrigation on lands that were fallowed. The Proposed Action does not lead to large scale or long-term land fallowing that would have provided shelter and foraging opportunities for wildlife species. It is possible the exchange arrangements would provide additional water supplies within the exchangees service areas to grow higher value crops. These crops could provide improved shelter and foraging opportunities for wildlife. The exchanged water would be applied to existing crop lands or lands fallowed within the past three years. Subsequent environmental review and consultations would be required for application of any of the water involved in the proposed exchange arrangements to lands that have been fallowed for more than three years.

Although Reclamation does not have jurisdiction over non-CVP water, by virtue of the exchange with CVP water, the management and application (end use) of the non-CVP water is part of the approval and has a Federal nexus. Reclamation is committed to the protection of fish and wildlife species. Therefore, the use of any source of water related to the exchange with the CVP water is subject to the criterion of this environmental review and consultations with the FWS and NOAA. In addition, Reclamation would review each proposed exchange with consistency with this EA and the approvals would be contingent upon written agreements with all parties that no water within the control of the exchangers or exchangees would be applied to native lands or lands fallowed within the past three years. Moreover, lands fallowed for three or more years would undergo appropriate biological surveys and consultation in accordance with the ESA prior to application of any source of water in control of the water districts within the water district's service areas. Reclamation has prepared a Biological Assessment for the Proposed Article 5 Exchanges. A copy of this EA and Biological Assessment will be sent to FWS and NOAA for review and informal consultation. The exchangers and exchangees would be subject to the restrictions and limitations in the EA and Biological Assessment and Biological Opinions, if issued by FWS or NOAA.

For clarification purposes, groundwater is typically managed in conjunction with surface water supplies. The groundwater is recharged and later extracted when surface water supplies are inadequate. It is recognized the exchangers, exchangees, or Reclamation do not have control over the landowners use of private wells and groundwater sources. The water districts strive to provide affordable surface water supplies to discourage groundwater pumping. The pumping of groundwater is expensive due to the overdraft conditions and depth of groundwater supplies in the San Joaquin Valley. The Proposed Action would provide surface water at an affordable rate resulting in less reliance on groundwater resources which are generally unregulated by Reclamation or the water districts.

Federally Listed Threatened and Endangered Species

The proposed exchanges would not likely adversely affect federally listed threatened and endangered species or their designated habitats. This determination is based on the following:

- The diversion of the CV Contractor's CVP water, pumping and conveying in SWP facilities were addressed in the CVPIA PEIS, OCAP and Long-term Contract Renewal consultations with FWS and NOAA. When, and if, DWR has a window of opportunity to pump and convey this water, Reclamation releases it from upstream reservoirs and makes it available in Clifton Court Forebay. DWR pumps and conveys this water through SWP facilities. No additional impacts to biological resources would occur as a result of the Proposed Action beyond those already addressed in the previous consultations.

- Pumping and conveying the CV Contractor's CVP water under Article 55 of the SWP contracts could increase the frequency of diversion of this water from the

Delta. DWR pumps the maximum amount of water allowed. Therefore the same amount of water is diverted from the Delta although the destination and label on the water may differ. DWR would only pump the CV Contractor's CVP water when all SWP uses have been met and no third party impacts would occur. The window of opportunity to pump this water is intermittent. This water is unreliable and would not lead to long-term land use changes. The OCAP consultations addressed the coordinated operations of the CVP and SWP including the pumping and conveyance of the CV Contractor's CVP water supplies with the assumption this water would be conveyed each year. Therefore the Proposed Action when added to Article 55 conveyance agreements would not result in additional impacts to biological resources beyond those already addressed in the consultations.

- The CVP water may be diverted at Reach 12 of the California Aqueduct into the CVC or to other existing diversion points for delivery to exchangees. No additional diversion points would be required.

- The EA and BA examine other sources of water that could be used in the Proposed Article 5 Exchanges. Operations on the Kings, Kaweah, Tule and Kern Rivers are conducted for flood control and irrigation purposes similar to operations of canals. Hydrological conditions dictate the amount of water diverted each year while the Watermasters maintain minimum flow requirements each year to benefit all downstream users including fish and wildlife resources. Telemetric systems gage flows on a real-time basis. The Watermasters coordinate with the water districts to close and open their diversion gates to maintain minimum flows downstream. The hydrological conditions typically do not produce adequate surface water supplies to meet demands. It is unlikely the permanent imbalanced exchanges would result in decisions by water districts to not divert their annual allocation of water supplies. Therefore, the diversions from reservoirs, rivers, streams and creeks would not change from past conditions as a result of the Proposed Action.

- The Proposed Action could result in additional water supplies for the exchangees. It is possible the exchangees could switch to higher value crops providing improved shelter and foraging opportunities and a benefit for wildlife.
The exchange arrangements would be reviewed for consistency with this EA and BA including a Biological Opinion, if one is issued, prior to approval. The approvals would be conditioned that no water within the control of the water districts would be applied to native lands. In addition, lands that have been fallowed for three or more years would require appropriate biological surveys prior to irrigation. Consultations in accordance with the ESA may be required prior to application of water to the fallowed lands. It should be noted neither Reclamation or the water districts have control over privately owned wells and pumping of groundwater by landowners. The San Joaquin Valley is in overdraft conditions. Groundwater seepage is slow and would not lower the expense of pumping groundwater. The water districts strive to provide surface water supplies at the least cost to discourage groundwater pumping. Therefore, the Proposed

Action would not contribute to conversions of lands. Reclamation has determined the Proposed Action would not adversely affect federally listed threatened and endangered species or their designated habitats.

The associated water would be conveyed in existing facilities and no ground disturbing activities would be required for moving or temporary storing this water. Reclamation will informally consult with FWS and NOAA.

No Action Alternative
The No Action Alternative is similar to the Proposed Action Alternative. The same amounts of water would be diverted from rivers and reservoirs based on hydrological conditions. Deliveries would occur in existing facilities. The operations of the CVP and SWP would continue as in the past within constraints and limitations. Croplands would remain the same. Decisions to fallow or not fallow lands would be based on hydrological and agricultural marketing conditions. Reclamation could prepare separate environmental assessment reviews for each proposed exchange request. However, the timing for administrative and environmental reviews could exceed beyond the time constraints to implement an exchange arrangement.

Cumulative Effects
The reservoirs and natural waterways in the lower San Joaquin Valley associated with the Proposed Action are managed for flood control and agricultural supplies. Releases from the dams occur accordingly.

The conveyance facilities and river systems in the lower San Joaquin Valley are interconnected and allow for a myriad of water service transactions as described in the water resources section in this EA. Each of these transactions requires separate environmental review and approvals.

During high water flows, water is diverted off streams into the canals when capacity exists. This water is marketed and delivered to the water districts. The availability of this water is intermittent and short-term.

The Proposed Action, when added to other water service transactions does not result in cumulative impacts to fish or wildlife species. No increases of water diversions from natural water ways would occur. No changes in points of diversions would occur. The river systems are coordinated and managed in a similar manner to the canals and have minimum flow requirements that must be maintained. The Proposed Action when added to other water service transactions could result in long-term increases to surface and groundwater supplies that would contribute to additional effects for fish and wildlife resources on a localized basis. Groundwater could migrate beyond the service areas and district boundaries to benefit other water districts or neighboring refuges and wetlands. However, the migration and seepage of groundwater is slow and the benefits to fish and wildlife would be small and short-term.

The CVC expansion project is unrelated to the proposed exchanges. The CVC expansion project, if approved, would occur with or without the exchanges. The turnouts could be used to divert the water involved with the proposed exchanges. This exchange water would have been conveyed in the CVC and delivered to the groundwater banking facilities with or without the expansion project with the exception of North Kern Water District. Separate environmental assessments would be required for exchange requests with North Kern Water District. Therefore the Proposed Action would not contribute to cumulative impacts to resources.

Reclamation would examine each proposed exchange arrangement in context of this EA and the conditions occurring within the service areas of the prospective exchange partners. This EA provides the conditions as they exist in 2005 and provides a basis for comparison of conditions at the time exchange arrangements are considered for approval. Subsequent environmental review would be required to examine changes that are inevitable over the next 25 years. These changes are likely to include development of homes and businesses that would undergo separate environmental reviews and approvals that may or may not be within Reclamation's approval authority.

Cultural Resources

Proposed Action Alternative

The Proposed Action does not include any new ground disturbing activities and would not result in significant impacts to cultural resources.

No Action Alternative

The No Action Alternative is similar to the Proposed Action.

Cumulative Effects

The Proposed Action when added to other water service actions would not contribute to new ground disturbing activities or cumulative effects to cultural resources.

Indian Trust Resources Environmental Consequences

Proposed Action Alternative

The Proposed Action involves water that is already allocated and would not interfere with water deliveries, ceremonial activities, or conclusion of water rights reviews for Indian Tribes. Therefore, the Proposed Action would have no significant impacts to Indian Trust Resources.

No Action Alternative

The No Action Alternative is similar to the Proposed Action. Historical diversions and water deliveries would continue as in the past. Therefore no changes or significant impacts to Indian Trust Resources would occur.

Cumulative Effects

The Proposed Action would not interfere with ongoing water rights settlements for Indian Tribes. The Proposed Action does not result in additional water supplies for the exchangers or exchangees. No additional water supplies would be diverted from

reservoirs or rivers. Therefore, the Proposed Action would not contribute to cumulative effects on Indian Trust Resources.

Environmental Justice Environmental Effects

Proposed Action

The proposed exchanges would not result in harm to minority or disadvantaged populations within the exchangee's or exchanger's service areas. The same amount of water is available for crop lands within the San Joaquin Valley. Managing existing water supplies would continue as in the past including decisions to purchase other supplies, pumping groundwater, planting or growing less water intensive types of crops or fallowing lands. No lands would be permanently taken out of agricultural production. No increase of cultivated lands would occur as a result of the Proposed Action.

No Action Alternative

The No Action Alternative is similar to the Proposed Action.

Cumulative Effects

The Proposed Action does not contribute to cumulative effects to low or disadvantaged populations. The Proposed Action, when added to other water service actions improve water management to grow crops that sustain job agricultural job opportunities providing a benefit for minority or disadvantaged populations. No lands would be taken out of long-term agricultural production. No increase of cultivated lands would occur as a result of conveying and deliveries of this water.

Socio Economical Environmental Effects

Proposed Action

The Proposed Action involves similar amounts of water delivered and applied to lands in the San Joaquin Valley as in the past. The Proposed Action would allow for improved water deliveries to the CV Contractors when it is needed during the growing season and maintain the stability of the agricultural market and economical vitality for the San Joaquin Valley.

It is likely the exchangers and exchangees would seek the least costly exchanges by conveying water shorter distances resulting in less power usage. The amount of power needed to convey 128,300 af/y of water is small when compared to the overall water supplies and power used each year to move water where it is needed. CVP power is currently not used for exchanges occurring under Article 55 of the SWP. The CV Contractor would enter into mutually agreeable exchange arrangements that include terms, conditions, and responsible party(s) for the payment of power.

The Proposed Action and imbalanced exchanges would not result in significant impacts to crop production, associated job opportunities or socio-economics.

The Proposed Action would result in improved water management and could reduce purchases of water supplies by the CV Contractors. The Proposed Action could maintain

costs for water through the imbalanced exchange scenario. The amount of water is small and would not contribute to significant changes in water prices.

No Action Alternative
Under the No Action Alternative, Reclamation may not have a streamlined approval and review process resulting in redundancy and inefficiency and increased administrative costs. Exchange requests may not be approved in a timely manner and implemented when water is available. Water prices may increase slightly for the local area.

Cumulative Effects
The Proposed Action when added to other actions does not contribute to significant increases or decreases in socio-economical conditions. The multiple water service actions have occurred historically and are not precedent setting. The Proposed Action does not increase or decrease long-term water supplies that would result in decisions by landowners to permanently change existing land uses.

Water districts strive to provide affordable surface water to the farmers to curtail groundwater overdraft and to maintain the economic stability and agricultural related jobs and economic base within their communities and service areas. In addition, water service actions are sought to convey water over shortest distances to lower pumping costs and energy usage. The saved money is used to hire staff, pay overhead costs, maintain and improve facilities. These water districts are non-profit and maintain financial records that are accessible to the public.

Providing affordable surface water to farmers could curtail urban sprawl. The population in California is expected to grow over the next couple decades. Land values are anticipated to increase as housing becomes scarce. These trends are expected to continue and could entice farmers to sell their lands. These conditions are likely to occur with or without the proposed exchanges.

DWR and Reclamation have existing agreements for paying power costs associated with CVP water conveyed in SWP facilities. Reclamation provides CVP power to convey this water to the CV Contractors. DWR and Reclamation may swap power to facilitate the exchanges. Currently, the CV Contractors are responsible for paying for the power used to convey water under Article 55.

The exchangee(s) could sell this water back to DWR or Reclamation to meet refuge water supplies or for the Environmental Water Account. Article 5(a) states these imbalanced exchanges are not transfers. Therefore, Reclamation does not charge the full cost rate and the non-CVP contractor would get this water at the same cost of the CV Contractors.

5.0 Environmental Commitments

There are no specific activities and measures that would result from the proposed alternative to improve or enhance the environment. Reclamation is committed to the protection of fish and wildlife resources. The approvals for proposed exchange arrangements would include the condition that the use of any source of water within the

control of the water districts would not be applied to native lands and lands fallowed for three or more years would undergo appropriate biological surveys prior to the application of any water. If appropriate, consultations in accordance with the Endangered Species Act may be required if the presence of federally listed species are present prior to applying any water.

6.0 References

(Reclamation, October 1999) *Final Programmatic Environmental Impact Statement for the Implementation of the Central Valley Project Improvement Act*

(Reclamation, June 30, 2004) *Biological Assessment for the Long Term Central Valley Project and State Water Project Operations Criteria and Plan,* dated June 30, 2004

(USFWS, July 30, 2004) *Biological Opinion for the Coordinated Central Valley Project and State Water Project Operations Criteria and Plan* (OCAP)

(NOAA, October 2004) *Biological Opinion for the Operations Criteria and Plan*

(Reclamation, April 1, 1997) *Blanket Approval of Temporary Transfers and Exchanges of Project Water Between Friant Division Contractors During the Interim Period*

(Reclamation, January 19, 2001) *A Finding of No Significant Impact and final Environmental Assessment, Cross Valley Unit Long Term Contract Renewal*

(Reclamation, January 19, 2001) A final Environmental Assessment, *Friant Division Long Term Contract Renewal*

(USFWS, October 15, 1991, May 14, 1992 and January 19, 2001*) Biological Opinion on U.S. Bureau of Reclamation Long Term Contract Renewal of Friant Division and Cross Valley Unit Contractors.*

(Reclamation, March 2000*) A Finding of No Significant Impact and final Environmental Assessment, Blanket Approval of Historic Temporary Transfers and Exchanges of Central Valley Project Water Between Friant Water Service Contractors*

(Reclamation,) *Supplemental Environmental Assessment for the Long Term Contract Renewal for the Cross Valley Contractor.* A final EA and FONSI are expected to be signed on or about February 18, 2006.

(Reclamation, March 2004) *A Finding of No Significant Impact and final Environmental Assessment, Exchange of Cross Valley Central Valley Project Water between Lower Tule River Irrigation District and Tulare Lake Basin Water Storage District*

(Reclamation, November 2003) *A Finding of No Significant Impact and Final Ten Year Environmental Assessment for the Annual Exchange of 20,000 Acre Feet of Water*

Between Fresno Irrigation District, Kern Tulare Water District and Tulare Lake Basin Water Storage District

(Reclamation, July 2004) *A Finding of No Significant Impact and final Environmental Assessment, Approval For Exchange and or Transfer from Kern-Tulare and Rag Gulch Water District to Kern County Water Agency*

(US Army Corps of Engineers) *Kaweah River Basin Investigation and Draft Environmental Impact Statement*

(Reclamation, January 2004) *Environmental Assessment and Finding of No Significant Impacts for the Kern Tulare Water District and Rag Gulch Water District Groundwater Banking Project Rosedale-Rio Bravo Water Storage District*

(Shafter-Wasco Irrigation District, October 1993) *Initial Study of Environmental Aspects of the Shafter-Wasco/Semitropic Interconnection and Water Banking Program*

(Rosedale-Rio Bravo Water Storage District, July 2001) *Final Master Environmental Impact Report Groundwater Storage, Banking, Exchange, Extraction & Conjunctive Use Program*

(Kern County Water Agency, 2000) *Annual Report*

7.0 Consultation and Coordination

During the preparation of the Draft Environmental Assessment, Reclamation coordinated with the proponents of the Proposed Action. While no impacts to endangered species or to historic/cultural resources have been indicated by the Proposed Action, consultation and coordination was conducted with the agencies and mandates considered below.

FISH AND WILDLIFE COORDINATION ACT (16 USC sec. 651 et seq.)

The Fish and Wildlife Coordination Act requires that Reclamation consult with fish and wildlife agencies (federal and state) on all water development projects that could affect biological resources. No significant, immitigable impacts to wildlife will occur under the Proposed Action and no further coordination/consultation will be needed with the FWS, National Oceanic and Atmospheric Administration or the California Department of Fish and Game.

ENDANGERED SPECIES ACT (16 USC Sec. 1521 et seq.)

Section 7 of the Endangered Species Act requires federal agencies, in consultation with the Secretary of the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species. Reclamation has prepared a Biological Assessment and has determined the Proposed Action would not likely adversely affect federally listed threatened and endangered species or their designated

habitats. This determination is based on the conclusions in the Biological Resources discussion in Section 4 of this document.

The associated water would be conveyed in existing facilities and no ground disturbing activities would be required for moving or temporary storing this water. Reclamation will informally consult with FWS and NOAA on the other sources of water and other potential exchange partners.

NATIONAL HISTORIC PRESERVATION ACT (16 USC Sec. 470 et seq.)

Section 106 of the National Historic Preservation Act requires federal agencies to evaluate the effects of federal undertakings on historical, archeological and cultural resources. No features or resources have been identified that could be impacted by the Proposed Action.

EXECUTIVE ORDER 11988 - FLOODPLAIN MANAGEMENT AND EXECUTIVE ORDER 11990-PROTECTION OF WETLANDS

Executive Order 11988 requires federal agencies to prepare floodplain assessments for actions located within or affecting flood plains, and similarly, Executive Order 11990 places similar requirements for actions in wetlands. The Proposed Action will not affect either concern.

8.0 List of Agencies and Persons Consulted

Lynne Silva, Environmental Protection Specialist, Reclamation - Preparer
David Young, Environmental Specialist, Reclamation - Preparer
Kathy Wood, Chief, Resources Management Division, Reclamation
Judi Tapia, Contract Repayment Specialist, Reclamation
Gale Heffler, CVPIA Water Transfer Program Manager, Reclamation
Frank Perniciaro, Native American Affairs Program Manager, Reclamation
John Renning, Water Rights Specialist, Reclamation
Jeff Sandberg, Central Valley Operations, Reclamation
Tule River Indian Tribe
Patrick Welch, Archeologist, Reclamation
Susan Jones, Chief San Joaquin Valley Branch, US Fish and Wildlife Service
Mr. Michael Aceituno, Sacramento Office, National Oceanic Atmospheric Administration
Steven C. Dalke, General Manager, Kern-Tulare Water District
Gary Serrato, General Manager, Fresno Irrigation District
Lyn Garver, Kings River Conservation District
Steve Haugen, Watermaster, Kings River Water Association
Dennis Keller, Engineer, County of Tulare
Richard Schafer, Engineer

APPENDIX A
ARTICLE 5(A)

POINT OF DIVERSION AND RESPONSIBILITY FOR DISTRIBUTION OF WATER
5. (a) Project Water scheduled pursuant to subdivision (b) of Article 4 of this Contract shall be delivered to the Contractor at a point or points of delivery either on Project and/or State facilities or another location or locations mutually agreed to in writing by the Contracting Officer, DWR, and the Contractor. The parties acknowledge that Project Water to be furnished to the Contractor pursuant to this Contract shall be conveyed by DWR and delivered to the Contractor by direct delivery via the Cross Valley Canal and/or by exchange arrangements involving Arvin-Edison Water Storage District or others. The parties further acknowledge that such exchange arrangements are not transfers subject to Section 3405(a) of CVPIA. Notwithstanding Article 9 of this Contract, such exchange arrangements, other than the previously approved exchange arrangements with Arvin-Edison Water Storage District, shall be submitted to the Contracting Officer for approval in accordance with principles historically applied by the Contracting Officer in approving Cross Valley exchange arrangements. DWR shall have no obligation to make such exchange arrangements or be responsible for water transported in facilities that are not a part of the SWP.

(b) Omitted.

(b2) When Project Water is made available by the Contracting Officer at Clifton Court Forebay, DWR shall provide to the Contractor, subject to the availability of capacity as determined by DWR, conveyance from the Delta and storage in DWR’s share of storage at San Luis Reservoir, if necessary, of such Project Water consistent with subdivision (k) of Article 3, the following provisions, and the Operations Manual;
(1) The Contracting Officer shall deliver or cause to be delivered into the DWR's Clifton Court Forebay, or at other points mutually agreed to by the parties in accordance with Article 5, Project Water in such quantities and of such quality as shall be sufficient to perform the Contracting Officer's and DWR's obligation to furnish water to the Contractor as set forth in this contract. Such deliveries into Clifton Court Forebay shall be made at such times and rates of flow as the Contracting Officer and DWR shall agree.
(2) DWR, in accordance with an approved Project Water delivery schedule, shall convey the amount of water delivered into DWR's Clifton Court Forebay by the Contracting Officer directly: (i) to turnouts from the California Aqueduct from Reaches 3 through 16A or to other points of diversion mutually agreed to in writing by DWR and the Contractor, or (ii) to DWR or Federal share of storage in San Luis Reservoir for later release and delivery to the Contractor or (iii) to replace water delivered to the Contractor from DWR's share of San Luis Reservoir prior to DWR receiving Project Water from the Contracting Officer, to the extent DWR determines under subdivision (k) of Article 3 that capacity (and water in the event of an exchange) is available for such conveyance, storage, or exchange (if any). Such deliveries of Project Water shall be required to be made pursuant to subdivision (k) of Article 3 and in a manner which will not increase the cost of or adversely affect SWP operations and the quantity or quality of water deliveries

to SWP Contractors. (3) If DWR delivers water to the Contractor from DWR's share of storage in San Luis Reservoir prior to the Contracting Officer providing Project Water at DWR's Clifton Court Forebay, the United States shall return a like amount of water to DWR pursuant to the procedures set forth in the Operations Manual. (4) The total amount of Project Water delivered at Clifton Court Forebay to DWR by the Contracting Officer shall include water to compensate DWR for water conveyance and storage losses incurred in the delivery of Project Water to the Contractor. The amount of such conveyance and storage losses will be determined pursuant to procedures set forth in the Operations Manual. (5) Project Water received by DWR at Clifton Court Forebay for conveyance and/or storage for delivery to the Contractor will be commingled with waters of DWR which are pumped through facilities of the California Aqueduct and with other waters of both the United States and DWR in the joint use facilities of the San Luis Unit. (6) Priorities for use of DWR's share of storage at San Luis Reservoir for storage of Project Water shall be subject to subdivision (k) of Article 3 and all DWR obligations to the SWP operations and SWP Contractors and to the criteria specified in the Operations Manual. (7) Subject to the necessary arrangements, the Contracting Officer shall 477 transmit or cause to be transmitted, by exchange or otherwise, such quantities of power as shall be required by DWR to pump through its Delta Pumping Plant and its share of Dos Amigos Pumping Plant, the quantities of Project Water transported into Clifton Court Forebay pursuant to (1) of this subdivision. (8) DWR shall furnish the Contracting Officer with such information as the Contracting Officer and DWR agree is needed regarding the timing and quantities of power required by DWR to pump Project Water. Such information shall be exchanged between the Contracting Officer and DWR in accordance with provisions set forth in the Operations Manual. (9) The Contracting Officer and DWR may, under terms and conditions satisfactory to both, and in accordance with applicable law, exchange water and/or power necessary for delivery of Project Water to the Contractor under terms of this Contract. Such exchange shall be in accordance with the provisions set forth in the Operations Manual. (b3) To the extent that Friant Division Project Water exceeds Friant Division Contract demand and other Project purposes, as determined by the Contracting Officer, and if the Contractor so requests, the Contracting Officer, subject to subdivision (d) of Article 3 of this Contract, shall make Project Water provided for in subdivision (a) of Article 3 of this Contract available from such Friant Division supplies. (b4) Project Water may be provided by the Contracting Officer to the Contractor, at the Contractor's request and subject to the terms and conditions of this Contract, through Federal Delta diversion and conveyance facilities and/or stored in the Federal share of storage at San Luis Reservoir for reregulation for later delivery to the Contractor to the extent such diversion, conveyance and/or storage does not diminish the ability of the Project to deliver Project Water to users in the Delta Division, San Luis Unit and San Felipe Division service areas pursuant to existing contracts and assignments or any renewals thereof, to meet current Reclamation commitments to Pajaro Valley Water Management Agency, or to meet other legal obligations of the Project including, but not limited to agreements related to the joint operation of the state and Federal projects. (c) The Contractor shall deliver Irrigation Water in accordance with any applicable land classification provisions of Federal Reclamation law and the associated regulations. The Contractor shall not deliver Project Water to land outside the Contractor's Service Area unless approved in advance by the

Contracting Officer. (d) All Water Delivered to the Contractor pursuant to this Contract shall be measured and recorded with equipment furnished, installed, operated, and maintained by the United States, DWR or the Operating Non-Federal Entity/Entities at the point or points of delivery established pursuant to subdivision (a) of this Article. Upon the request of either party to this Contract, the Contracting Officer or DWR shall investigate, or cause to be investigated by the appropriate Operating Non-Federal Entity, the accuracy of such measurements and shall take any necessary steps to adjust any errors appearing therein. For any period of time when accurate measurements have not been made, the Contracting Officer shall consult with the Contractor and the appropriate Operating Non-Federal Entity prior to making a final determination of the quantity delivered for that period of time. (e) Neither the Contracting Officer, nor DWR, nor any Operating Non-Federal Entity/Entities shall be responsible for the control, carriage, handling, use, disposal, or distribution of Water Delivered to the Contractor pursuant to this Contract beyond the delivery points specified in subdivision (a) of this Article. The Contractor shall indemnify the United States, DWR, and their officers, employees, agents, and assigns on account of damage or claim of damage of any nature whatsoever for which there is legal responsibility, including property damage, personal injury, or death arising out of or connected with the control, carriage, handling, use, disposal, or distribution of such Water Delivered beyond such delivery points, except for any damage or claim arising out of: (i) acts or omissions of the Contracting Officer, DWR, or any of their officers, employees, agents, or assigns, including the Operating Non-Federal Entity/Entities, with the intent of creating the situation resulting in any damage or claim; (ii) willful misconduct of the Contracting Officer, DWR, or any of their officers, employees, agents, or assigns, including the Operating Non-Federal Entity/Entities; (iii) negligence of the Contracting Officer or any of his officers, employees, agents, or assigns including the Operating Non-Federal Entity/Entities; or (iv) damage or claims resulting from a malfunction of facilities owned and/or operated by the United States, DWR, or the Operating Non-Federal Entity/Entities; Provided, That the Contractor is not the Operating Non-Federal Entity that owned or operated the malfunctioning facility(ies) from which the damage claim arose. In the event any such claim or liability, referenced in this Article or otherwise arising from this Contract, is made against DWR, its officers or its employees, the Contractor agrees to defend, indemnify and hold each of them harmless from such claim to the extent such claim does not arise from an error or omission of DWR related to the carriage and control of Project Water made available to the Contractor by the Contracting Officer.

APPENDIX B
SCENARIOS WHEREBY IMBALANCES COULD OCCUR

Scenario 1 – Evaporation and Conveyance Losses

In some cases the exchange parties are miles apart or the exchange water is temporarily stored resulting in losses of water due to evaporation and/or seepage. Consequently, one (or more) recipient does not receive the entire amount of water. The parties would enter into mutually agreeable terms to compensate for such losses.

Scenario 2 – Differing Hydrological Conditions

The hydrological conditions in the State of California are sporadic. Northern California could receive higher precipitation and snow-pack to fill reservoirs compared to Southern California. Annual allocations are based on snowmelt and runoff for the Friant and Delta CVP contractors. These varying conditions could result in less water available to complete the exchanges. The exchange arrangements between the parties typically include mutually agreeable terms for compensation if such conditions occur.

Scenario 3 – Timing of Water Deliveries

As stated in the Background Section above, the CV's CVP water is delivered to SWP facilities when an opportunity exists for DWR to convey this water. This opportunity is often outside of the growing season when the water is not needed for crops in the CV's districts. In these cases, the CVs could enter into agreements with an exchangee that is able to take this water at the time it is available. Later during the growing season, an amount of water would be returned to the CV. The amount returned to the CV would be less than the amount delivered to the exchangee to compensate the exchangee for the service of providing this water to the CVC at a time it is needed.

Scenario 4 – Differing Values of Water During the Year

Scenario 4 is similar to Scenario 3. However the imbalanced exchange is due to other timing issues other than restrictions by DWR to convey the CV Contractor's water. The value of water is typically much higher between June and September. Exchange agreements could include an imbalanced exchange of water based on unpredictable timing constraints to offset the difference in the value of the water when it is delivered. See chapter 3 for additional information of the imbalanced exchanges.

Example Exchanges

In reviewing the following examples, refer to Figure 3-4 in Appendix G at the end of this document**.**

Typical Article 5 Exchange Between Cross Valley Contractors and Arvin Edison Water Storage District

1.) The CV Contractor's CVP Delta water is conveyed by DWR down the California Aqueduct to the CVC and delivered to AEWSD.

2.) AEWSD's Friant CVP water is delivered down the FKC and is delivered to the CV Contractors instead of AEWSD.

Exchange Between Cross Valley Contractor(s) and Kern County Water Agency

1.) The CV Contractor's CVP Delta water is conveyed down the California Aqueduct either directly, or via the CVC to KCWA and its subcontractors.

2.) KCWA's SWP water is conveyed down the California Aqueduct into the CVC and either directly delivered to Kern Tulare WD or Rag Gulch Water Districts. Kern Tulare and Rag Gulch Water Districts share common facilities and have an existing siphon from the CVC to their distribution system. Additionally, water entering FKC from the CVC may be "backed up" a short distance (up to Lake Woollomes, a FKC feature, near Delano) for delivery to water districts having access to the FKC.

Three-way Exchanges between Cross Valley Contractor(s) and Exchangees

1.) The CV Contractor's CVP Delta water is delivered down the California Aqueduct and is delivered to TLBWSD.

2.) TLBWSD's Kings River water is delivered to FID.

3.) FID's CVP Friant water is delivered to CV Contractors along the FKC.

Exchanges involving non-CVP and non-SWP water are likely to only occur in very wet years. It is recognized similar exchanges involving Tule River, Deer Creek, Kaweah River (St Johns River, Cross Creek) could occur. However, Kaweah River water is limited to use in the Kaweah Basin except under high water flows and no third party impacts would occur. Additional coordination and approvals may be required by local water users in the Kaweah Basin.

APPENDIX C
CROSS VALLEY CONTRACTORS (EXCHANGERS)

CV Contractors.

There are eight (8) CV Contractors as previous stated (See Table 1.1). However, some CV Contractors have subcontractors. Altogether, there area sixteen (16) water districts within the group known as the CV Contractors. The following description characterizes each water district.

County of Fresno

Pursuant to the County of Fresno's water service contract CVP water is delivered to Fresno County Service Area #34 that receives approximately 420 af/y.

County of Tulare

Tulare County has ten subcontractors. In certain years, only a portion or none of the CV water is pumped and conveyed, therefore, the subcontractors purchase water on the open market to make up the deficits. The ten subcontractors are described below:

Alpaugh Irrigation District

Alpaugh Irrigation District (AID) was formed in 1915 and is located in Tulare County approximately 15 miles south of Corcoran and 15 miles northwesterly of Delano, California. AID is comprised of approximately 10,500 acres, of which 5,400 are irrigated. Groundwater provides the primary water supply to AID. AID also operates 18 wells. Two of the deep wells, provide approximately 300 af/y of potable water supply to the Community of Alpaugh. The population in Alpaugh is approximately 1,150. AID maintains 60 miles of domestic water pipelines.

In 1975, AID entered into a contract with the County of Tulare as a subcontractor for CVP water. Historically, AID has entered into exchange arrangements with AEWSD under Article 5 of the water service contract. AID receives 100 af/y of CVP water through its contract with County of Tulare. Through the exchange arrangements, AEWSD takes delivery of this water and AID takes delivery of the CVP water that would have been delivered to AEWSD from the Friant facilities.

AID receives its CVP water supplies via Deer Creek. Water from the FKC is diverted into Deer Creek and flows approximately 12 miles to the Deer Creek check structure located on the westerly side of Highway 43 at the northeasterly corner. AID has approximately 45 miles of unlined canals and approximately 25 miles of pipeline. AID has three regulating reservoirs. Reservoir No.1 is the primary regulatory reservoir is used year round to provide timing and flexibility in water deliveries. Reservoirs 2 and 3 are used to provide additional storage to meet the peak demand flows during the summer months. Collectively, the reservoirs cover approximately 800 acres and have a maximum capacity of 4,000 af.

AID does not have any other contracts or water rights to surface water supplies. However, during wet years AID has been able to utilize excess waters available in the Homeland Canal located on the westerly side, which if not used, would flow into the historic Tulare Lake. The main crops grown in AID are cotton, alfalfa, barley, and wheat.

Atwell Island Water District

Atwell Island Water District (AIWD) was established in 1977 and is located in Kings and Tulare Counties approximately 1 ½ miles south of the Community of Alpaugh. AIWD is comprised of 7,136 acres, of which, 4,645 are irrigated. In 1978, AIWD entered into a long-term contract with Reclamation for 1,055 af/y of CVP water to be transported by DWR through SWP facilities to the CV and delivered to AEWSD. The CVP water from the Friant facilities that would have flowed to AEWSD are diverted at MP 102.67R via Deer Creek through Alpaugh Irrigation District's facilities to Atwell Island Water District. The contract for 1,055 af/y was terminated.

In 1993, AIWD and Hills Valley Irrigation District entered into a contract for CV Contractors CVP water with the County of Tulare. Both AIWD and Hills Valley Irrigation District receive 954 af/y of CVP water. In recent years, Hills Valley Irrigation District has obtained 904 af/y of AIWD's supply under this agreement resulting in a reduction to 50 af/y for AIWD.

AIWD also is a participant in the Mid-Valley Water Authority. This Authority was organized to develop the Mid-Valley Canal.

The distribution of AIWD's water is performed by Alpaugh Irrigation District through a wheeling agreement. Alpaugh Irrigation District owns and operates the approximately 36 miles of unlined canals and laterals. AIWD does not operate or maintain groundwater recharge or extraction facilities. Landowners must provide privately owned wells to sustain irrigation during periods when the AIWD does not have surface water available. AIWD serves only agricultural users. The main crops are cotton, alfalfa, barley, and wheat.

AIWD provides an in lieu conjunctive use program. In wet years, AIWD purchases supplies for use in lieu of pumping groundwater. AIWD uses primarily surface water supplies when it is available and relies on groundwater only when surface water is unavailable.

Hills Valley Irrigation District

Hills Valley Irrigation District (HVID) is located in Fresno County about 20 miles east of Fresno and 5 miles north of Orange Cove. A small portion of the HVID is located in Tulare County. HVID does not maintain a central office or full time staff. The operations and maintenance of the facilities are conducted through a contractual agreement with a private contractor.

In 1976 HVID entered into a long-term contract with Reclamation for 2,146 af/y of water as a separate subcontractor. In 1995, the contract amount was amended to 3,346 af/y. HVID entered into a contract for Cross Valley CVP water through County of Tulare for 954 af/y and an additional 1,100 af/y. Subsequently HVID acquired 904 af/y from AIWD's subcontract with County of Tulare. The total amount of CVP water is 6,304 af/y.

Four intermittent streams flow into HVID. Wahtoke and Wooten Creeks flow through HVID. Hills Valley and Navelencia Creeks are both natural channels which have been destroyed by land leveling operations. An artificial channel has been constructed through the area that is adequate to prevent flooding from Hills Valley Creek, while no channel appears to be necessary to control any flooding from Navelencia Creek waters.

HVID is comprised of approximately 4,319 acres, of which, 3,602 are irrigated acres. HVID is divided into three areas. Improvement Districts Nos. 1 and 2 and the non-improved district. Improvement District No. 1 covers 1,276 acres, Improvement District No. 2 is 1,990 acres and the remaining 795 acres are outside any improvement district but are within HVID's boundaries. HVID's distribution system is comprised of approximately 11 miles of pipeline. HVID does not have any groundwater extraction facilities, therefore, landowners must provide their own wells to sustain irrigation during periods when surface water supplies are inadequate. HVID constructed a 15 af regulating reservoir within Improvement District No. 1 and two regulating reservoirs in Improvement District No. 2.

The low yielding wells within HVID are useful as a supplemental irrigation supply and in controlling the buildup of a perched water table in some areas. Therefore, HVID has limited conjunctive use capability. HVID is located near the foothills of the Sierra Nevada Mountains and has relatively low aquifer storage capacity, shallow depth of sediments prevail and in some locations restricted lateral drainage out of HVID occurs. Landowners located in isolated areas do not have wells. For those landowners who do have wells maintain a balance between recharge and withdrawal to prevent insufficient water supplies from occurring while avoiding waterlogging other areas. Typically, the landowners with wells extract groundwater in the spring when the groundwater levels are at their highest. The main crops are oranges, prunes/plums and grapes.

Saucelito Irrigation District

See description elsewhere in this document. SID receives up to 100 af/y of CVP water under its contract with County of Tulare.

Smallwood Vineyards

Smallwood Vineyards receives up to 255 af/y of CVP water under its contract with County of Tulare.

Stone Corral Irrigation District

See description earlier in this document. SCID receives up to 950 af/y of CVP water under its contract with County of Tulare.

City of Lindsay

Lindsay is located on the east side of the San Joaquin Valley in Tulare County near the base of the Sierra foothills and has falling grade from east to west. Lindsay is traversed by State Highway 65 running north and south along the west side of the City. Lindsay is located approximately 12 miles east of Tulare and State Highway 99, approximately 11 miles north of Porterville and 15 miles southeast of Visalia. The first census of Lindsay in 1910 indicated 1,814 residents. The latest population estimates in January 1999 showed 9,015 residents. During the 1990's, yearly population growth was at or less than 1% per year. This rate of growth is slower than the rate of Tulare County. The 2000 census indicates the population in Lindsay at 10,297. Lindsay is an agricultural service center. The agricultural industry is built around citrus (oranges), and twelve orange packing houses, providing the major component of the economic base.

The City of Lindsay entered into a long-term water service contract with Reclamation for 2,500 acre feet per year (af/y) of Class 1 Friant water under contract number 5-07-20-W0428. The City of Lindsay receives up to 50 af/y of CVP water under its contract with County of Tulare.

Lindsay obtains their CVP water from the Friant-Kern Canal at the Honolulu Street turnout. The water treatment plant is at the same location and provides filtration, chemical additions and chlorination.

Strathmore Public Utility District

SPUD provides wastewater treatment for a population of approximately 1,900 in the city of Strathmore. SPUD receives up to 400 af/y of CVP water through its contract with the County of Tulare. The CVP water is diverted from SPUD's turnout on the FKC and injected into a well to be used for blending with the wastewater before it reaches the headworks of the wastewater treatment plant. SPUD coordinates its diversions in a manner to minimize impacts to agricultural users along the FKC. The CVP water is typically diverted by SPUD during times of wet seasons and high flows when water turbidity is increased allowing for less chemicals used to coagulate and treat the wastewater. The treated water is temporarily stored in an onsite storage facility and is distributed to M&I customers.

Styrotek, Inc.

Styrotek, Inc. is located near the city of Delano and manufactures shipping containers. The company receives up to 45 af/y of CVP water under its contract with the County of Tulare. The CVP water is used in the cooling process after the container molds are heated and formed. A portion of the water evaporates or is reclaimed for use in boilers.

City of Visalia

The city of Visalia is located in Tulare County and is approximately 28.58 square miles with a population of approximately 102,000. Visalia receives up to 400 af/y of CVP water under its contract with County of Tulare.

Visalia exchanges up to 400 af/y of CV Project water with HVID's Wutchumna Water rights from the Kaweah River. HVID takes physical possession of the CVP water. However, this water is considered non-Project water and is applied to *ineligible* lands. Visalia takes physical possession of the Kaweah (Wutchumna) River water which is characterized as Project water. This water is conveyed through the Persian Ditch Company facilities and is applied to golf courses.

Kern-Tulare and Rag Gulch Water Districts

The Kern-Tulare Water District and Rag Gulch Water District (KTRG) provide irrigation water to over 19,000 acres of high-value permanent crops in Kern and Tulare counties. The annual irrigation demand is approximately 54,000 acre-feet, of which (KTRG) currently provide approximately 40,000 acre-feet of imported water. The remaining 14,000 acre-feet per year are from groundwater pumped by water users.

LOCATION

KTRG are located on the eastern side of the San Joaquin Valley in Kern and Tulare counties, approximately 8 miles east of Delano and 27 miles north of Bakersfield. KTRG are approximately 4 miles in width generally located west of State Highway 65, and extend approximately 14 miles in length from Sherwood Avenue to Avenue 48.

LAND USE

The summer climate is hot and dry while winters are cooler with somewhat more rainfall than adjacent valley areas. KTRG are located within a thermal zone with favorable air movement where citrus, deciduous trees, and other frost sensitive crops are successfully grown. The average length of the growing season in the area is from 250 to 300 days per year. Soils in both water districts are of excellent quality for irrigation.

KTRG currently comprise a gross area of approximately 24,000 acres, of which almost 19,000 acres are developed in irrigated agriculture. There are very few residences located within KTRG. At the present time, 99 percent of irrigated lands are permanent plantings. A summary of land use in 2000 is presented in the matrix below.

	Kern-Tulare	Rag Gulch	Total
Alfalfa	0	276	276
Almonds	480	100	580
Pistachios	1,111	0	1,111
Other Deciduous	355	15	370
Citrus	6,945	1,097	8,042
Subtropical	201	0	201
Grapes	4,301	3,815	8,116
Total Irrigated	13,393	5,303	18,696
Non-irrigated	4,792	650	5,442
Total	18,185	5,953	24,138

It is estimated that 1 percent of the cropped land in the Kern-Tulare Water District is irrigated by the sprinkler method, 8 percent is irrigated by the furrow method, and 91 percent is irrigated using the drip or micro-sprinkler irrigation method. This high percentage of low volume irrigation practices results in a very high irrigation efficiency.

WATER RESOURCES

Kern-Tulare Water District has a contract with the Bureau of Reclamation for 40,000 acre-feet of entitlement from the Central Valley Project (CVP) and Rag Gulch Water District has a CVP contract for 13,300 acre-feet. The California Department of Water Resources conveys water under this contract through the California Aqueduct to Tupman. Water is then conveyed through the Cross Valley Canal from Tupman to the Friant-Kern Canal, where it is either delivered directly to the KTRG or exchanged with Arvin-Edison for water available in the Friant-Kern Canal.

Kern-Tulare Water District has a contract with the City of Bakersfield for an average of 20,000 acre-feet per year of Kern River water and Rag Gulch Water District has a similar contract for an average of 3,000 acre-feet per year. Water under these contracts is delivered to Kern County Water Agency Improvement District No. 4 in exchange for State Water Project Water. The State Water Project water is conveyed through the Cross Valley Canal to the Friant-Kern Canal, where it is either delivered directly to the KTRG or exchanged with Arvin-Edison for water available in the Friant-Kern Canal.

DISTRIBUTION FACILITIES

KTRG share common distribution systems and staff. The distribution system of KTRG delivers water from the Friant-Kern Canal to lands within KTRG. The distribution system consists of 4 pumping plants located along the Friant-Kern Canal, 4 regulating reservoirs, 7 re-lift pumping plants, and approximately 70 miles of buried pipelines. In addition, KTRG operate 2 pumping plants located in Delano Earlimart Irrigation District (DEID) reservoirs and 1 pumping plant located in a Southern San Joaquin Municipal Water District (SSJMUD) reservoir.

GROUNDWATER RESOURCES

The depth to groundwater varies from about 200 feet to over 600 feet throughout KTRG and averages approximately 450 feet. There are static groundwater levels taken in the spring and do not include the temporary drawdown of 50 to 100 feet caused by pumping.

Wells drilled on the west side of KTRG tap into an unconfined aquifer that is classified as suitable for irrigation. Groundwater in this area contains between 250 and 400 parts per million (ppm) total dissolved solids and is of a calcium bicarbonate or sodium bicarbonate chemical type.

Wells drilled on the east side of KTRG tap into confined aquifers that also contain useable groundwater. This groundwater is characterized as sodium chloride with total

dissolved solids concentrations between 300 and 500 ppm and is classed as having medium to high salinity hazard and high to very high sodium hazard.

Lower Tule River Irrigation District

LTRID was formed in 1950. LTRID is currently comprised of 93,502 of agricultural lands, 7,671 of native or natural lands and approximately 1,917 acres of urban land uses. LTRID is located in Tulare County on the east side of the San Joaquin Valley. State Highway 99 bisects LTRID in a north-south direction, and the Tule River flows westerly through the entire length of the LTRID. The FKC is located five miles to the east of LTRID's northeast boundary and adjoins the southeast portion of LTRID between Avenues 136 and 128. The towns of Woodville, Popular and Tipton lie within LTRID's boundaries but are not serviced by LTRID. LTRID's entire distribution system is unlined earth canals. Collectively, LTRID owns or controls approximately 163 miles of canals and approximately 47 miles of river channel. LTRID maintains and operates 12 recharge and regulating basins, covering approximately 3,000 acres. In wetter years, LTRID uses these facilities to recharge the groundwater reservoir. LTRID does not own or control groundwater extraction facilities. Therefore, each landowner must provide privately owned wells to sustain irrigation during periods when LTRID does not have surface water available. The main crops in LTRID are alfalfa, grain/hay and cotton.

Currently, the water supplies in LTRID are groundwater, water rights on the Tule River, and CVP water under two separate contracts. The Tule River water supply is approximately 70,000 af/y. Tule River flows approximately 22 miles through the central part of the LTIRD. Porter Slough follows a parallel course north of the Tule River. In 1951, LTRID entered into a long-term contract with Reclamation for 61,200 af/y of Class 1 and 238,000 af/y of Class 2 Friant water. In 1975, LTRID entered into a three-way contract with Reclamation and the California Department of Water Resources (DWR) to provide an additional 31,102 af/y of CVP water supply. Under this three-way contract, the CVP water is diverted from the Delta, conveyed through State Water Project (SWP) facilities via the California Aqueduct to the Cross Valley Canal to AEWSD. Through the Cross Valley Canal Exchange Program, AEWSD and LTRID 'swap' CVP water supplies from the Delta and Friant facilities. Recently, the exchange agreement between AEWSD and LTRID has been terminated. LTRID may enter into similar exchange arrangements with other water districts to obtain their CVP water supplies from the Delta. Currently, LTRID sells their CVP contract supplies from the Delta and uses the money to purchase other supplies.

Pixley Irrigation District

PXID is located in Tulare County and bisected by State Highway 99. The City of Pixley is located within the PXID's boundaries. However, PXID does not serve the City of Pixley. PXID was formed in 1958 and currently comprises 69,550 acres, of which 48,302 are irrigated. Deer Creek flows westerly through the entire length of PXID. The FKC is located between one to five miles east of PXID's boundary.

PXID's water supply is derived from the use of groundwater, diversions from Deer Creek and CVP water. PXID entered into a long-term contract with Reclamation in 1975 for 31,102 af/y.

PXID operates a conjunctive use program by supplying a portion of the irrigated lands and a portion for direct groundwater recharge through Deer Creek, the existing canal system and sinking basins owned or leased by PXID. PXID obtains their CVP supplies through four turnouts on the FKC into Deer Creek to PXID diversions or Deer Creek. PXID has 45 miles of unlined canals that convey water and provide groundwater recharge. An estimated 30% of the CVP supplies are "lost" through the unlined canals. However, the recharge to the groundwater is considered a beneficial use of this water. PXID maintains and operated nine recharge and regulating basins covering approximately 330 acres.

PXID owns or has access to approximately 330 acres of sinking/re-regulating basins. These basins, along with the Deer Creek channel and the PXID's canals, are used for direct groundwater recharge when surface water supplies are available. It is estimated that a third of the water imported by PXID has been directly recharged into the underground reservoir by PXID operations since PXID's inception.

PXID does not own or operate and groundwater extraction facilities. However, groundwater is the primary water supply available to lands within PXID. Privately owned wells currently provide water to all irrigated lands within the PXID. Approximately 31,957 acres of lands rely totally on groundwater pumping for irrigation.

In addition, PXID may enter into an agreement with the Pixley Wildlife Refuge to recharge the groundwater. The refuge is approximately 960 acres.

Rag Gulch Water District
(See description above under Kern Tulare and Rag Gulch Water District.)

Tri-Valley Water District
TVWD is comprised of 4,481 acres, of which, 1,812 are irrigable acres. The nearest town is Orange Cove. TVWD only serves agricultural water to seven growers and approximately 880 acres. TVWD does not provide groundwater. However all landowners have wells. Due to the proximity of TVWD to the Sierra foothills, groundwater supplies are typically inadequate. Wells tend to produce groundwater early in the growing season but produce very little in mid and late summer. The water distribution system is comprised of approximately seven miles of pipeline which is shared with Orange Cove Irrigation District landowners and operated by Orange Cove Irrigation District personnel. TVWD does not own or operate any canals, recharge basins, or regulating reservoirs. The main crops are oranges, lemons and tangerines.

APPENDIX D
FRIANT CVP CONTRACTORS (EXCHANGEES)

Arvin-Edison Water Storage District
(AEWSD) is located in Kern County in the southeasterly portion of the San Joaquin Valley. AEWSD was formed in 1942 and its original size was 129,988 acres. Currently, AEWSD comprises 132,000 acres, of which, 109,230 acres are irrigated. Urbanization has changed approximately 2,500 acres of agricultural lands to M&I. AEWSD entered into its first long-term contract with Reclamation in 1986 for 40,000 af of Class 1 and 311,675 af of Class 2 water. The main crops in AEWSD are grapes, potatoes, oranges and cotton.

The CVP water supplies for AEWSD are variable and regulates this water by use of the groundwater reservoir underlying AEWSD. In addition, AEWSD engages in Article 5 exchanges of CVP water with the CV Contractors. Up to 128,300 af/y of CV Contractor's CVP water is delivered to AEWSD. This water is diverted from the Delta through the Aqueduct and to the CVC. In exchange, the Friant CVP water that would have flowed down the FKC to AEWSD is diverted by the CV Contractors in the FKC. Due to the variances in allocations of Friant CVP water, these exchanges may not even out each year. However, over the long-term the amounts of water would be equal. Two of the CV Contractors have terminated their exchange arrangements with AEWSD resulting in approximately 70,984 af/y maximum delivered to the remaining six CV Contractors and approximately 66,096 af/y of water returned to AEWSD.

AEWSD takes Friant CVP water from a turnout located at the terminus of the FKC. AEWSD has 45 miles of lined canals and 170 miles of pipeline. AEWSD maintains three spreading basins to percolate water into the aquifer for storage. Gravity and pressure fed ponds are filled from surface water supplies in "wet" years, while groundwater wells are used to extract stored water in "dry" years. The safe yield of the groundwater supply is 89,900 af.

In 1997, AEWSD entered into a 25-year agreement with the Metropolitan Water District of Southern California (MWD), in which AEWSD agreed to bank approximately 250,000 af/y of MWD State Water Project Supply for later extraction in drought years. AEWSD has completed construction of an Intertie pipeline connecting the terminus of its canal to the California Aqueduct to enhance the water banking and exchange program. The Intertie pipeline does not create new or additional contractual supplies.

AEWSD has historically delivered an average of less than 2,000 af/y of non-CVP to two urban customers, East Niles Community Service District and Sycamore Canyon Golf Course.

Delano-Earlimart Irrigation District
(DEID) is located in Tulare and Kern Counties on the eastern side of the San Joaquin Valley, approximately 10 miles from the Sierra foothills. DEID is comprised of 56,474 acres, of which 46,581 are irrigated. DEID serves agricultural water supplies only. In

DEID entered into a long-term contact with Reclamation for 108,800 af/y of Class 1 and 574,500 af/y of Class 2 water. The main crops in DEID are grapes, almonds, deciduous and subtropical orchards. DEID obtains its CVP water from its turnout on the FKC and delivers the water to its customers through 172 miles of pipeline.

DEID recharges the groundwater during surplus "wet" years through operations with the White River channel, as well as, a small 5 acre recharge basin. In 1993, the DEID purchased and developed an 80 acre parcel specifically for development into a groundwater recharge basin. This basin has five separate cells and dual methods for introducing water to each cell from either DEID's distribution system or from direct diversions out of White River. The FKC flows north-south through DEID and Lake Woollomes is located adjacent to DEID. Lake Woollomes is a feature of the FKC and CVP facilities. DEID does not obtain supplies or recreational opportunities from Lake Woollomes.

Exeter Irrigation District
(EID) is located in Tulare County on the east side of the San Joaquin Valley, nine miles east of the City of Visalia. EID was formed in 1937 and in 1950 entered into a long-term contract with Reclamation for 10,000 af/y of Class 1 and 19,000 af/y of Class 2 water. In 1953, the Class 1 water supply was increased to 11,500 by an amendment to the contract. EID is comprised of approximately 15,184 acres and 12,700 are irrigated. The City of Exeter is located within EID. However, EID serves only agricultural water. EID obtains it CVP water from seven turnouts on the FKC located between MP 74.6 and MP 81.4. EID's distribution system is comprised of approximately 60 miles of pipeline. EID maintains two small balancing or regulating reservoirs with a capacity of less than one af each. Yokohl Creek is an intermittent stream which traverses through the northern portion of EID in a northwesterly direction for approximately 2 miles. The main crops grown in EID are citrus, grapes, plums and olives.

Fresno Irrigation District
(FID) was formed in 1920 under the California Irrigation Districts Act, as the successor to the privately owned Fresno Canal and Land Company. FID purchased all of the rights and property of the company for the sum of $1,750,000. The assets of the company consisted of over 600 miles of canals and distribution works which were constructed between the years 1850 and 1880, as well as the extensive water rights on Kings River.

FID, which now comprises some 245,000 acres, lies entirely within Fresno County and includes the rapidly growing Fresno-Clovis metropolitan area. FID now operates approximately 800 miles of canals and pipelines. Total irrigated area exceeds 150,000 acres, although this number has been decreasing in recent years as a result of urban expansion. The main crops in FID are grapes, citrus, and cotton.

A significant improvement in the control and management of the waters of Kings River occurred with the completion of the Pine Flat Dam project by the U. S. Army Corps of Engineers in 1954. Although built primarily as a flood control project, Pine Flat Dam provides significant water conservation stemming from the storage and regulation of

irrigation water to the 28 water right entities on Kings River including FID. FID is contracted for 11.9% of the 1,000,000 af capacity of Pine Flat Reservoir. While FID is entitled to approximately 26% of the average runoff of Kings River, much of its entitlement occurs at times when it can be used directly for irrigation of crops without the need for regulation at Pine Flat.

In a normal year, FID diverts approximately 500,000 af of water and delivers most of that to agricultural users, although an increasing share of FID's water supply is used for groundwater recharge in the urban area. Depending upon hydrological conditions and Kings River flows, FID diverts water and allocates a proportional share of the water to its customers including the City of Fresno and Clovis. In addition to its entitlement from Kings River, FID and the City of Fresno have signed contracts to purchase up to 135,000 af annually from the Friant Division of the CVP.

Historically, excess water applied by the farmers has percolated beyond the root zone and recharged the extensive aquifer underlying FID. Between 85% and 90% of the groundwater supply can be attributed to water imported and distributed by FID.

However, the conversion of agricultural lands to high-density urban uses in the expanding Fresno-Clovis metropolitan area has reduced the capacity to utilize surface water because all municipal and industrial water is obtained by pumping groundwater. A local overdraft has developed in and around the urban area, and this situation has been exacerbated by the drought of the late 1980s and early 1990s.

FID has combined forces with the City of Fresno, the City of Clovis, the County of Fresno, and the Fresno Metropolitan Flood Control District in a cooperative effort to develop and implement a comprehensive surface and groundwater management program. The main goal of the program involves using flood control basins for recharge during the summer when the basins are not needed to control urban storm runoff. This program also contains elements designed to protect the quality of groundwater in the area.

Garfield Water District
(GWD) is located in Fresno County on the east side of the San Joaquin Valley near the foothills of the Sierra Mountains. GWD is comprised of 1,750 acres, of which, 1,300 are irrigated acres. The main crops are grapes, almonds, olives, stone fruit, citrus and pasture. The distribution system is approximately 8 miles of pipeline. GWD is a CVP contractor with 3,500 af/y of Class 1 Friant water. GWD has no other sources of surface water. GWD is near the foothills and groundwater supply is limited.

Ivanhoe Irrigation District
(IID) is located in Tulare County on the east side of the San Joaquin Valley approximately 50 miles southeast of Fresno and 8 miles northeast of Visalia. IID is generally located between the St. Johns River on the south and Cottonwood Creek on the north. As early as 1915 the lands began to be developed for agricultural uses. Irrigation was from groundwater pumping, precipitation and surface diversions from runoff on the Kaweah River. IID was formed in 1948 and has acquired private surface water rights

through the Wutchumna Water Company. IID's owns 7.9 shares of Wutchumna Water stock equaling approximately 3,950 af of water. In 1949, IID entered into a long-term contact with Reclamation for 7,700 af/y of Class 1 and 7,900 af/y of Class 2 water. The non-CVP water supplies are diverted from the Kaweah River through the Wutchumna Ditch to IID's diversion facility and is co-mingled with the CVP supply. IID obtains its CVP water supplies through two turnouts on the FKC. IID's distribution system comprises approximately 48 miles of pipeline and three groundwater recharge areas. The three groundwater recharge areas cover approximately 15 acres and are used when surplus water is available. Approximately three miles of a portion of Cottonwood Creek is also used for recharge purposes. IID does not own or operate groundwater extraction facilities. Therefore, landowners must provide their own wells to sustain irrigation during periods when IID does not have surface water supplies available. IID comprises of 11,202 acres, of which 10,648 are irrigated. The main crops in IID are grapes, citrus, deciduous fruits, and olives.

Lewis Creek Water District
(LCWD) is located on the east side of the San Joaquin Valley in Tulare County near the base of the Sierra foothills and has falling grade from east to west. LCWD is traversed by State Highway 65 running north and south along the west side of the City. LCWD is located approximately 12 miles east of Tulare and State Highway 99, approximately 11 miles north of Porterville and 15 miles southeast of Visalia. The first census of LCWD in 1910 indicated 1,814 residents. The latest population estimates in January 1999 showed 9,015 residents. During the 1990's, yearly population growth was at or less than 1% per year. This rate of growth is slower than the rate of Tulare County. The 2000 census indicates the population in LCWD at 10,297. LCWD is an agricultural service center. The agricultural industry is built around citrus (oranges), and twelve orange packing houses, providing the major component of the economic base.

In 1958, LCWD entered into a long-term water service contract with Reclamation for 2,500 acre feet per year (af/y) of Class 1 Friant water under contract number 5-07-20-W0428.

LCWD obtains their CVP water from the Friant-Kern Canal at the Honolulu Street turnout. The water treatment plant is at the same location and provides filtration, chemical additions and chlorination.

Lindmore Irrigation District
(LID) is located in Tulare County at the base of the Sierra foothills. LID's northern boundary extends approximately 2 miles from Lindsay and extends approximately 1 ½ miles south of Strathmore. LID is approximately 9 miles long and 10 miles wide and comprises 27,255 acres, of which 25,700 are irrigated. LID was formed in 1937 and in 1948 entered into a long-term contract with Reclamation for 33,000 af/y of Class 1 and 22,000 af/y of Class 2 water. LID lies over the Kaweah Basin. The safe groundwater yield for LID was calculated in 1987 to be 21,000 af/y. LID operates a conjunctive use program to manage surface and groundwater supplies. LID uses groundwater at the beginning of the growing season to warm the CVP water while filling LID's pipeline

system. This reduces maintenance costs and leaks in the concrete irrigation pipes due to contraction of cold water. The main crops grown in LID are oranges, olives, cotton, and alfalfa. LID obtains their CVP supplies from four turnouts on the FKC between MP 88.4 and 93.2. LID's conveyance system comprises of 123 miles of pipeline and five reservoirs. The Noel reservoir is 3 af, earthen-clay lined reservoir used for balancing (overflow). The Montgomery reservoir is 4.5 af, earthen-clay lined and is used for balancing (overflow). The Brewer reservoir is 6.5 af, earthen-clay lined and is used for balancing (overflow). The 93.2E N. reservoir is 5.5 af, concrete lined and is used for balancing (equalizing). The 93.2-0.1S S. reservoir is 2.5 af, concrete lined and is used for balancing (equalizing).

Lindsay-Strathmore Irrigation District
(LSID) was formed in 1915 and is located in Tulare County on the east side of the San Joaquin Valley. LSID comprises 15,700 acres, of which 12,700 acres are irrigated to permanent crops. LSID's original imported water supply was from the Kaweah River through LSID's ownership of Wutchumna Water Company stock and 39 deep wells. The supplies from the Wutchumna Water Company range from 5,000 to 14,000 af/y. LSID enters into Warren Act Contracts with Reclamation to transport this water within LSID using CVP facilities. The groundwater supply is limited to 18,000 af/y. In 1948, LSID entered into a long-term contract with Reclamation for 3,900 af/y of Class 1 water. In 1985, the contract amount was amended to 27,500 af/y. The main crops in LSID are oranges and olives. LSID serves only agricultural water.

LSID obtains their CVP water supplies from its turnout at MP 85.56 of the FKC. LSID's distribution system is approximately 115 miles of pipeline and three balancing reservoirs. The Main reservoir is 80 af and concrete lined. The High-Level reservoir is 5 af and concrete lined and the El Mirado reservoir is a 200,000 gallon steel tank. LSID operates 5 groundwater wells with a normal production of 1,750 GPM. These wells are not utilized if surface water is available due to the high cost of pumping. No usable groundwater basin underlies LSID. LISD lies too far east against the foothills to be influenced by either the Kaweah or Tule Rivers. LSID does not operate recharge areas or a conjunctive use program. LSID contractually uses the conjunctive use capacity of the Tulare Irrigation District, a common stockholder in the Wutchumna Water Company, by delivering LSID's Kaweah River water through the Wutchumna Ditch to the Tulare Irrigation District turnout. Tulare Irrigation District either uses this water for irrigation (in lieu recharge) or direct sinking in their groundwater recharge basins. During "dry" years, Tulare Irrigation District's farmers utilize the groundwater delivered by LSID. Tulare Irrigation District returns surface water to LSID through either the FKC or through the Kaweah River system. LSID regularly transfers water to Lindmore Irrigation District, which borders LSID on the west. Approximately 2,500 af/y is transferred to Lindmore during normal water supply years.

Lower Tule River Irrigation District
See description under Cross Valley Contractors.

Orange Cove Irrigation District
(OCID) is located in Fresno and Tulare Counties and was formed in 1937. OCID is about 30 miles southeast of Fresno and 20 miles north of Visalia. OCID is 14 miles long and 3 miles wide and has 28,000 acres, of which approximately 26,788 are irrigated. In 1949, OCID entered into a long-term contract with Reclamation for 31,800 af and in 1989, the contract amount was amended to 39,200 af/y of Class 1 water. OCID obtains their CVP water supplies from fifteen diversion points on the FKC between MP 35.87 to 53.32. OCID's distribution system is 105 miles of pipeline and one regulating reservoir with a capacity of 8 af. OCID does not supply any M&I water. A groundwater basin is almost non-existing under OCID. The area immediately east of Smith Mountain and the area in the vicinity of Navelencia contain basin water. The majority of wells are located in this area. The safe yield does not exceed 28,000 af/y. OCID does not operate any groundwater wells or recharge facilities due to the existing groundwater conditions. OCID provides approximately 1.4 af per acre. Therefore, the balance of crop needs are made up from precipitation and groundwater pumping. The landowners in OCID manage the groundwater supplies through conjunctive use practices. OCID transfers unused water supplies out to other districts for storage and banking. OCID is pursuing partners for a long-term transfer program or groundwater banking program to balance water in wet and dry years. The main crops in OCID are citrus, grapes, deciduous and subtropical orchards, olives, and nuts.

Porterville Irrigation District
(PID) is located in Tulare County and is comprised of 17,400 acres, of which 13,061 are irrigated. PID was formed in 1949. PID entered into a long-term contract with Reclamation for 16,000 af/y of Class 1 and 30,000 af/y of Class 2 water. PID has an average annual entitlement of 12,900 af/y of water supply from the Tule River.

The FKC enters PID at the northeast corner and exists in the south central portion. The Tule River passes through PID in a northwesterly direction. PID owns the facilities of two improvement districts. Improvement District No. 1 consists of approximately four miles of pipeline and serves 854 acres. Improvement District No. 2 consists of 3.3 miles of open ditch and serves 1,266 acres.

PID obtains their CVP supplies from six diversion points on the FKC. In addition to its owned facilities, PID has entered into agreements with Lower Tule River Irrigation District and other entities to utilize non-District owned facilities to convey PID's Water.

Through an agreement between PID and Lower Tule River Irrigation District, CVP water deliveries are conveyed through facilities owned or operated by Lower Tule River Irrigation District within PID. These facilities consist of 13 miles of unlined canals.

PID also conveys both CVP supplies and Tule River water through facilities owned by the Porter Slough Ditch Company, the Hubbs-Miner Ditch Company, the Rhodes-Fine Ditch Company and the Gilliam-McGee Ditch Company. These facilities consist of approximately 13 miles of unlined ditch within PID. The facilities belonging to these companies are operated by PID under long-term agreements with the entities.

PID operates two percolation basins. PID owns no storage facilities. It does, however, own a portion of the water conservation storage space within Success Reservoir. This storage space is used to store water rights water owned by ditch companies with which PID has operating agreements.

PID serves agricultural water only. The main crops in PID are walnuts, cotton, grapes, alfalfa, prunes, corn and citrus.

Saucelito Irrigation District
SID was formed in 1941 and is located in Tulare County, approximately ten miles southwest of Porterville, two miles south of Poplar, eight miles east of Tipton and five miles west of Terra Bella. Deer Creek crosses SID, for about 5 miles , near its southerly boundary and runs during wet years. SID takes no diversions off Deer Creek. The FKC is located on the eastern boundary of SID.

SID entered into a long-term contract with Reclamation in 1959 for the construction of facilities. Water deliveries began in 1961for 21,200 af/y Class 1 and 32,800 af/y of Class 2 water. Currently, SID comprises of 19,453 acres, of which 19,057 are irrigated. SID has five individual water users that are Riparian Water rights holders totaling 9.5 shares at 55 acre feet per share from Mole Ditch. SID engages in exchanges with the Cross Valley Contractors.

SID obtains its CVP water supplies from 4 diversion points on the FKC between MP 11.64 and 107.35 and Deer Creek diversion at MP 102.69. SID's distribution system is 55 miles of pipeline with one recharge pond that covers approximately ½ acre. Deer Creek also provides groundwater recharge in wet years. The main crops in SID are milo, wheat, cotton, grapes and almonds.

Shafter-Wasco Irrigation District
(SWID) was formed in 1937 and is located in Kern County about 20 miles northwest of Bakersfield. Currently, SWID is comprised of 38,766 acres, of which 32,000 are irrigated. Included within its boundaries are the cities of Shafter and Wasco covering approximately 2,400 acres.

SWID entered into a long-term contract with Reclamation in 1955 for 50,000 af/y of Class 1 and 39,600 af/y of Class 2 water. SWID does not have any other long-term surface water supplies. SWID provides water for agricultural use only.

SWID obtains its CVP water supplies from two turnouts on the FKC at MP 134.4 and 137.2. The distribution system is .3 miles of lined canals and 117 miles of pipeline. SWID does not own or operate any water storage facilities or groundwater extraction facilities. Landowners must provide wells to meet irrigation demands when SWID does not have adequate surface water supplies available. The main crops in SWID are almonds, cotton, alfalfa, nursery stock, grains, grapes, blackeye peas and carrots. SWID has a history of transferring small amounts of water to neighboring districts.

Southern San Joaquin Municipal Utility District
(SSJMUD) was formed in 1935 and is located in Kern County, approximately 75 miles southeast of Fresno and 30 miles northwest of Bakersfield. The Delano and McFarland are within its boundaries but are not serviced by SSJMUD. Currently, SSJMUD is comprised of approximately 61,000 acres, of which 47,000 are irrigated. SSJMUD entered into a long-term contract with Reclamation in 1945 for 97,000 af/y of Class 1 and 50,000 af/y of Class 2 water and does not have other long-term surface water supplies.

SSJMUD obtains its CVP water supplies from nine diversion points on the FKC between MP 119.6 and 130.4. The distribution system is 158 miles of pipeline. SSJMUD operates eleven regulating reservoirs that provide groundwater recharge. Poso Creek and other smaller foothill drainages provide recharge to the groundwater. SSJMUD does not own and operate groundwater production facilities. Landowners must provide well to irrigate during times when SSJMUD does not have surface water supplies available to meet irrigation demands. The main crops in SSJMUD are alfalfa, citrus, grapes, cotton, nuts and barley. SSJMUD does not typically transfer water in or out.

Stone Corral Irrigation District
(SCID) was formed in 1948. SCID is located in Tulare County, approximately 30 miles southeast of Fresno and 10 miles north-northeast of Visalia. SCID's longest portion, north to south, is 3 ¼ miles and its greatest width, east to west, is 3 miles. SCID is comprised of 6,488 acres, of which 5,470 acres are irrigated. SCID entered into a long-term contract with Reclamation for 7,700 af/y of Class 1 water in 1950. In 1991, the contract was amended to 10,000 af/y of Class 1 water. SCID receives a small amount of water through exchange arrangements with CVC Contractors. This amount is 950 af/y of CVP water. The safe yield for the groundwater supply in SCID is approximately 3,200 af.

The FKC runs approximately along the north and east boundaries. SCID obtains the CVP water from the FKC at MP 57.90, 59.33, 60.90 and 62.68. The conveyance system is 27 miles of pipeline. SCID serves only agricultural water. The main crops are citrus, cotton, deciduous and subtropical fruit.

Tea Pot Dome Water District
(TPDWD) was formed in 1954 and is located in southeastern Tulare County, approximately three miles south of Porterville. TPWD is comprised of 3,282 acres, and all are irrigated. TPDWD relies mostly on their CVP contract water supplies.

In 1958, TPDWD entered into a long-term contract with Reclamation for 7,500 af/y of Class 1 water. TPDWD does not have any other long-term surface water supplies. TPDWD does not own or operate groundwater recharge or extraction facilities. Landowners pump small amounts of groundwater.

TPDWD receives its CVP water supplies from its turnout on the FKC. The distribution system is 20 miles of pipeline. The main crops are citrus and olives.

Terra Bella Irrigation District
(TBID) was formed in 1915 and is located in Tulare County about 75 miles southeast of Fresno and about eight miles south of Porterville. Deer Creek flows westerly and passes through the northern portion. Fountain Spring Gulch flows in a northwest direction, traversing a portion of TBID. TBID is comprised of 13,962 acres, of which, 11,165 are irrigated. The town of Terra Bella is located within TBID's boundaries with an estimated population of 3,870. TBID provides CVP and groundwater CVP for domestic purposes and to the town of Terra Bella. Approximately 850 af/y of CVP water is delivered for domestic, municipal and industrial uses within TBID.

TBID entered into a long-term contract with Reclamation in 1950 for 29,000 af/y of Class 1 water. TBID receives its CVP water supplies from the FKC at MP 103.64, MP 102.69 and Deer Creek to a percolation pond. The distribution system is 152 miles of pipeline. TBID does not have any other long-term surface water supplies.

TBID's deep well system is barely adequate to support small winter demands. Historically, there were a total of 83 wells drilled over the years in TBID. Currently, TBID owns and operates 10 wells. Recently, TBID has lost the use of three wells due to chemical contamination. TBID is losing its groundwater supply. There are no significant grower or landowner wells. TBID uses three regulating reservoirs during the irrigation season and are also used for storage in the winter. Station 1 has a capacity of 0.185 million gallons, Station 2 has 0.212 million gallons and Station 3 has a 1.880 million gallon capacity.

TBID has developed groundwater banking arrangements with other districts. Groundwater banking arrangements have enabled TBID, a groundwater deficient district, to produce crops during drought years. In years when surplus amounts of water are available, TBID transfers water to other districts for direct use, resale, or percolation through recharge basins. TBID and Lower Tule River Irrigation District have a long history of water exchanges. TBID transfers water to Lower Tule River Irrigation District and, in turn, transfers water to TBID in dry years.

TBID provides agricultural water, in addition to, municipal and industrial water for domestic use. The main crops are nuts, deciduous fruit orchards, and citrus.

Tulare Irrigation District
(TID) was formed in 1889 and is located in western Tulare County on the eastside of the San Joaquin Valley. TID currently comprises of 70,000 acres, of which, approximately 62,000 are irrigated. The city of Tulare lies on the eastern portion at the intersection of the Southern Pacific and Santa Fe Railroads and on U.S. Highway 99. TID provides only agricultural water supplies and does not service the city of Tulare. Water for Tulare is extracted from the ground and furnished through City owned facilities.

TID entered into a long-term contract with Reclamation in 1952 for 30,000 af/y of Class 1 and 141,000 af/y of Class 2 water. TID has pre-1914 water rights on the Kaweah River for approximately 50,000 af/y of water. TID's owned Kaweah River water rights are 1)

Crocker Cut on the Lower Kaweah Branch, 2) St. Johns Canal (TID) on the St. Johns Branch and 3) Crossmore cut Packwood Creek) on the St. Johns Branch. Water is also made available through share holdings in the following Kaweah River agencies: 1)n Tulare Irrigation Company on both the Lower Kaweah Branch and the St. Johns Branch, 2) Evans Ditch Company on both the Lower Kaweah Branch and the St. Johns Branch, 3) Wutchumna Water Company on the Kawaeah River, 4) Persian Ditch Company, and 5) Consolidated Peoples Ditch Company. Groundwater recharge occurs from percolation in the canals and natural channels, recharge basins, and treated municipal and industrial effluent. TID has 12 groundwater recharge areas covering a total of 1,110 acres. TID does not operate extraction wells.

TID obtains their CVP water supplies from its turnout which is located approximately 14 miles northeast of the District Service Area. The water is conveyed in TID's Main Canal. Diversions into this Main Canal include water from the Kaweah and St. Johns River Branch. The Packwood Creek diversion system begins at the terminus of the Lower Kaweah River approximately 10 miles northeast of TID. The distribution system includes 300 miles of unlined canals, ¼ mile of lined canal and 30 miles of pipeline. The main crops in TID are alfalfa, field corn, wheat and cotton.

APPENDIX E
OTHER CVP CONTRACTORS AND NON CVP CONTRACTORS (EXCHANGEES)

Buena Vista Water Storage District

Buena Vista Water Storage District (BVWSD) lies in the trough of the southern San Joaquin Valley in Kern County. The District lands are within a portion of the lower Kern River watershed, where historic runoff created the heavy clay soils from former swamp and overflow lands north of Buena Vista Lake. The area lies on the west side of the valley floor, about 16 miles west of the city of Bakersfield. The unincorporated town site of Buttonwillow (population 1,500) is situated in the geographical center, however BVWSD does not supply any M&I water. The water service area contains 48,443 acres of agricultural land. Approximately 45,500 acres have been built-out, and about 40,000 acres almost entirely field and row crops.

BVWSD service area is agricultural, with cotton, grain, sugar beets, and alfalfa as the principal crops. Cotton is the dominant crop, comprising about 85% of the annual cropping pattern. Total crop consumptive use peaked in the 1970s, averaging about 113,000 acre-feet. In the past 10 years consumptive use has declined to about 105,000 acre-feet.

In addition to Kern River water supplies BVWSD contracted with DWR via the Kern County Water Agency for an additional surface water supply in 1973. This contract provided for an annual firm supply of 21,300 af and surplus supply of 3,750 af. BVWSD has also been a historic user of surplus FKC flows to serve irrigation demands and for groundwater recharge programs.

BVWSD receives CVP water from the FKC out of the Kern River east of Coffee Road. The water is diverted into the City of Bakersfield's Kern River Canal, a lined canal, proceeding west to BVWSD's Alejandro Canal, a lined canal, which proceeds south into the Buena Vista Aquatic Lakes. BVWSD diverts water from the lakes into Outlet Canal which proceeds to the intake facilities and canals that serve BVWSD’s landowners.

BVWSD can also receive Friant-Kern water directly into Kern River which proceeds west and can either be diverted from Kern River into the City of Bakersfield's 2800 acre Recharge Facilities or be diverted from Kern River into the Kern County Water Agency Pioneer Project, or proceed west to be diverted either into the Alejandro canal for delivery as noted above or proceed west to be diverted into the West Kern Water District/Buena Vista Water Storage District Project and recharge facilities just west of Interstate 5 Highway.

BVWSD can also receive FKC water for banking in the Rosedale-Rio Bravo Water Storage District. This is done by flowing southerly to the terminus of the FKC. At this point, the water can flow in the Kern River Channel and then flow southwesterly for two (2) miles to Rosedale-Rio Bravo Water Storage District Kern River headworks. The other

option is for the water to enter the Arvin Edison bypass into the CVC and then flow southwesterly to the Rosedale-Rio Bravo Water Storage District's CVC turnout No. 2.

BVWSD can also receive CVP water from the California Aqueduct via five turnouts to either the Aquatic Lakes for diversion to landowners via a turnout into the Outlet Canal or via three turnouts directly into BVWSD canals.

BVWSD is geographically located adjacent to the California Aqueduct and low in elevation on the Kern River Fan. BVWSD's Kern River supply is thus delivered by gravity from its origin in the Sierra-Nevada Mountains north east of Lake Isabella. BVWSD is a member unit under KCWA. Other members of KCWA in the Bakersfield area also have contracted for SWP water but must pump their supplies to their service areas upslope and to the east of the San Joaquin Valley via the CVC. These circumstances lend themselves to an exchange of BVWSD Kern River water for east side member units SWP water, thus avoiding or reducing energy use and resultant pumping costs. This process also frees up CVC capacity that would otherwise be necessary for transportation of east side member units of SWP water. In order to allow maximum benefit from these exchanges, BVWSD has increased its SWP capacity by construction of a three pipe siphon Aqueduct Turnout (BV-7) having a capacity of 300 cfs. BVWSD Aqueduct capacity can now provide approximately 85-90% of peak system demand with a total flow capacity from the California Aqueduct of approximately 800 cfs. Although the exchange programs have provided benefits to BVWSD, salt loading is an issue since SWP water supplies carry more salinity than Kern River water. This would influence the degree of exchange volume in particular years when salinity levels are greater.

BVWSD engages in water banking programs. These banking programs generally fall under two categories. The first category would be a program designed to return water to BVWSD during a dry year when supplies are restricted. The second category would be a program where BVWSD is providing a banking and extraction service for monetary payment or similar benefits. BVWSD wet year supplies have afforded it the ability to enter into both categories of banking programs which in turn allow BVWSD to stretch its wet year supplies into dry year payback deliveries and thus help to balance required groundwater pumping. These programs also allow BVWSD to make more efficient use of its Kern River water supplies over the long term which in turn minimizes the loss of water from the critically overdrafted groundwater basin.

BVWSD also engages in direct groundwater recharge programs. BVWSD Kern River supply is dependent on the hydrologic cycles as they occur regardless of crops demands. During dry years, landowners must provide the difference between crop demands and BVWSD allocated surface deliveries via groundwater pumping from individual wells. During wet years BVWSD is able to satisfy maximum crop demands that eliminates the use of landowner wells. Excess wet years are stored to maximize surface carryover use and followed by direct recharge, to the maximum extent possible to replenish the groundwater supply. The efficiency of managing this difference between crop demands and available water supplies ensures that BVWSD, as a whole, is in positive balance with the groundwater basin. The main recharge areas used by BVWSD below the Enos Lane

are the Kern River Bypass Area, the Kern River channel, the Main Canal, the Outlet Canal, the Tule Elk Reserve area near Tupman, and the upper reach of the Kern River Flood Channel. Recharge capacity has nearly doubled in the Kern River Bypass Area due to improvements in the West Kern/Buena Vista banking program, and in the Tule Elk Reserve area via additional distribution facilities in sloughs and other low lying areas. In addition, BVWSD is a recharge participant in the KCWA Pioneer Project and shares a first priority access to the total recharge capacity for overdraft correction.

Historically, BVWSD stored its spring runoff flows within Buena Vista Lake until the lake bottom lands were freed from the storage right in exchange for conservation storage space in Lake Isabella. This storage space was purchased by the Kern River Interests upon construction of Isabella Dam by the US Army Corps of Engineers. BVWSD owns 31.6% of the conservation storage space within the reservoir with flood control being the only overriding purpose. This affords a maximum storage increment of 172,000 af of regulation space with a maximum winter carryover capability of 68,800 af. BVWSD also retained storage rights within the cells Buena Vista Lake with a yield, after losses, of approximately 25,000 af. Pursuant to the Kern River Storage and Use of Water Agreement, BVWSD is afforded use of this facility for wet year storage of excess Kern River supplies. In addition, BVWSD, via agreement with Kern County maintains regulation storage use of 1,800 af of space within Buena Vista Aquatic Recreation Area Lakes. Therefore, BVWSD has approximately 96,000 af of surface storage space for regulation of its surface water supplies from one year to the next.

These surface storage rights are very important to the efficient management of BVWSD’s Kern River water rights since the April-July runoff period does not coincide with the crop irrigation requirement which occur in the January through March pre-irrigation and the June through September summer irrigation periods. The carryover capability with Isabella reservoir and BVWSD’s SWP supply allow BVWSD to provide a surface water supply for the early pre-irrigation period even though BVWSD’s Kern River supply normally does not begin until the Mar-August supply period. The reservoir also provides peaking capability and facilities other management practices such as the previously mentioned exchange, banking, and recharge activities

The Buena Vista Aquatic Recreational Area lakes provide the BVWSD with a very useful tool in the operational storage for regulation of both Kern River and SWP flows to the BVWSD as well as some valuable surface storage. This facility receives the BVWSD's Kern River flow via the Alejandro Canal and SWP flow via turnout BV-3 while directing flows in the BVWSD's Outlet canal for use in the Buttonwillow service area. The lakes are also used to serve the Maples area and Henry Miller Water District per agreement with Kern County and upon arrangement with BVWSD.

During wet years the BVWSD authorizes the sale of surplus water to reduce or avoid groundwater pumping and generate revenue to offset BVWSD operating costs. Generally, surplus water is offered to landowners within the BVWSD (for use above surface allocation), to landowners adjacent to the BVWSD who rely primarily on groundwater

supplies, and other non-adjacent parties. Such deliveries are beneficial since they correct overdraft, raise pumping levels, and generate revenues.

Most of the BVWSDs 125 miles of canals and tailwater drains are unlined. System delivery losses are approximately 30-35% for the short pre-irrigation run and approximately 28% of total flow, for an average summer run. These estimated losses do not include Outlet Canal seepage. Seepage losses through the unlined canals recharge the primarily unconfined aquifer below. In areas experiencing lateral flow problems from canal seepage, affected landowners occasionally will install interceptor ditches or drain lines to minimize any localized crop damage.

BVWSD maintains inflow capability from the Kern River, the KFC and the California Aqueduct. Kern River and FKC flows are delivered via the Kern River channel, the City's Kern River Canal, and BVWSD's Main, Outlet, and Alejandro Canals. California Aqueduct inflow points include BV-1B, BV-2 BV-3, BV-6, and BV-7 which provide adequate capacity to operate at near peak demand. This flexibility allows access to large amounts of surplus water from various sources. BVWSD is also able to make isolated deliveries to the northern portion of the service area via California Aqueduct turnout BV-1B that allows for better water management. BVWSD also engages in reclamation, drainage control and irrigation conservation programs.

Historically there have been threatened and endangered species present within the bounds of BVWSD. The giant kangaroo rat (Dipodomys ingens) was known to exist in the southernmost portion of BVWSD, but has not been sighted in recent times. The giant garter snake (Thamnophis gigas) was located in BVWSD in a 1999 survey. The western yellow billed cuckoo (coccyzus americanus occidentalis) was last reported in BVWSD in 1973. Two accounts of the buena vista lake shrew (Sorex ornatus relictus) were made in BVWSD in 1991. The blunt-nosed leopard lizard (Gambelia sila) was last observed in BVWSD in 1987. The western snowy-plover (Charadrius alexandrinus nivosus) was last seen in BVWSD in 1978.

Cawelo Water District

Cawelo Water District (CWD) is located in the North-Central portion of Kern County and encompasses an area of nearly 45,000 acres. The CWD lies between State Highway 99 on the west and State Highway 65 on the east, the community of McFarland on the north and Oildale on the south. The city of Bakersfield is approximately six miles southeast of CWD.

As of 2000, the total area of CWD was 45,079 acres including a service area of 33,320 acres. Land use in 2000 in the service area consisted of 29,657 acres of irrigated agriculture, 3313 acres of fallow and 350 acres devoted to other uses including waterways, residential, commercial and agriculture-related businesses.

Approximately 85% of the irrigated lands served by CWD are planted to trees and vines (principally grapes, citrus, deciduous fruit, and nuts).

CWD surface water supply is obtained primarily under two long-term contracts: a contract with the Kern County Water Agency for SWP water and a contract with the city of Bakersfield for Kern River water. Water from these two sources has accounted for 90% of CWD's surface water supplies. CWD also purchases water from many other sources under short-term agreements as available. The imported surface water serves as a supplemental supply for irrigation within CWD. Approximately 65% of the irrigation demands within CWD have been satisfied with imported surface water deliveries. CWD does not serve M&I water. Individual landowner wells have contributed to the remainder of the water required to irrigate crops.

CWD obtains surface water from other sources including diversions from Poso Creek when available, oil-field produced water, and CVP water through one-year temporary water service contracts when available.

CWD obtains its SWP water from the California Aqueduct via the Cross Valley Canal (operated by Kern County Water Agency) near Tupman to the Beardsley/Lerdo Canal and into CWD's distribution system.

CWD receives CVP surplus water from the FKC by way of the Cross Valley Canal (CVC) and its extension, of which CWD is a 27% owner. The CVP water is pumped from the CVC extension through CWD's pump station and conduit "A" and is discharged into the Beardsley/Lerdo Canal and conveyed to pump station "B", for delivery through CWD's distribution system where it serves approximately 33,320 watered acres.

Within the bounds of CWD, the only threatened or endangered species that has been sighted in recent times is the San Joaquin kit fox (*vulpes macrotis mutica*). This species was last observed in CWD in 1986.

Kaweah Delta Water Conservation District

The Kaweah Delta Water Conservation District (KDWCD) was formed in 1927, under the provisions of California state law known as the Water Conservation District Act of 1927, for the purpose of conserving and storing waters of the Kaweah River and for conserving and protecting the underground waters of the Kaweah Delta. Later the Water Conservation District Act, as well as the purpose of KDWCD, was expanded to include power generation.

KDWCD is located in the south central portion of the San Joaquin Valley and lies in both Tulare and Kings Counties. It fully encompasses the growing cities of Visalia, Farmersville and Tulare. The population of the KDWCD is currently estimated to be in excess of 150,000 people. The total area of KDWCD is about 337,000 acres with approximately 255,000 acres located in western portion of Tulare County and the balance, or about 82,000 acres, in the northeastern portion of Kings County. KDWCD is comprised of four districts that are entirely or partially within KDWCD boundary and are listed below:

Lakeside Irrigation W.D. is discussed elsewhere in this EA.

Kings County W.D. is discussed elsewhere in this EA.

Corcoran I.D.
Corcoran Irrigation District encompasses the area around the town of Corcoran, at the eastern edge of Kings County and receives CVP water via the Kings River where it is diverted out of the FKC. Corcoran Irrigation District diverts the CVP water out of the Kings River into the Lakeland/Highline Canal that enters at Kansas Avenue. In addition, water can enter the Kaweah/St. John River system and can be diverted into Cross Creek which will enter at Kansas Avenue. There are no recorded occurrences of threatened or endangered species in Corcoran Irrigation District.

St. Johns W.D.
Encompasses in part or in total of the Kaweah River water rights of Jennings Ditch Company, Modoc Ditch Company, Goshen Ditch Company, and St. Johns Ditch Company.
Tulare I.D. is discussed elsewhere in this EA.

KDWCD lands are primarily agricultural, although the cities of Visalia and Tulare constitute significant areas of urbanization. Farmersville is the other incorporated area. Smaller unincorporated rural communities include Goshen, Ivanhoe, Waukena, and Guernsey.

A high degree of agricultural development exists in the KDWCD, with approximately 266,000 acres presently devoted to the production of a variety of irrigated crops, 3,200 acres idle or fallow (including roads and canals), 13,000 acres in farmsteads, 23,300 acres undeveloped and approximately 31,500 acres of urbanized land. The principal crops are cotton, miscellaneous field crops, deciduous fruit and nut trees and alfalfa.

KCWCD encompasses the alluvial fan of the Kaweah River, extending about 40 miles in a southwesterly direction from the foothills of the Sierra Nevada Mountains on the east to the center of the San Joaquin Valley in the vicinity of the Tulare Lake bed on the west. KDWCD is generally bounded on the north and west by the service area of the Kings River and on the south by the service area of the Tule River.

Numerous public and private entities within KDWCD's boundaries divert water from the Kaweah River and its distributaries. Nearly all of the lands served with Kaweah River water also use groundwater wells to supply irrigation water, primarily due to the erratic, relatively undependable, nature of flow on the Kaweah River. All municipal and industrial water uses within KDWCD are supplied from groundwater.

Terminus Dam and Lake Kaweah, located on the Kaweah River about 3.5 miles to the east of KDWCD, was completed in 1961 by the U.S. Army Corps of Engineers. This project was constructed for flood control purposes on the Kaweah River and to provide river control and water conservation for irrigation purposes. KDWCD has a contract with

the United States for repayment for the project costs allocated to water conservation. The reservoir currently holds about 143,000 acre-feet, with construction underway to expand capacity to 183,300 acre-feet.

KDWCD and its sub-entities have historically received substantial quantities of water surplus to the needs of CVP Contractors. Over the past 50 years, an excess of 5 million acre-feet of CVP water has been imported into KDWCD.

KDWCD can take delivery of CVP water from the FKC, which passes through the eastern portion of KDWCD. The waste way on the FKC at the St. Johns River crossing (FKC Milepost 69.48) and the waste way at the Kaweah River crossing (FKC Milepost 71.29) deliver CVP water into the Kaweah River distributaries' system. Additionally, the turnout for the Tulare Irrigation District (FKC Milepost 68.14) serves as a significant point of diversion for CVP water used within KDWCD. All diversion points are in Tulare County.

KDWCD and the Kaweah River groundwater basin have experienced long-term groundwater overdraft estimated in 1972 to b3 89,000 acre-feet per year. KDWCD is currently undergoing new studies of groundwater data to determine the extent and volume of groundwater overdraft within its boundaries. There are currently 40 recharge basins within KDWCD covering approximately 5,000 acres. While KDWCD owns and operates many of the groundwater recharge basins, it does not provide water-banking services for others.

Conversion of land from agricultural uses to urban/commercial uses has occurred, is occurring and is expected to continue to occur in these communities consistent with the general plans and zoning for these communities as may be amended. While KDWCD owns and operates numerous groundwater recharge basins within its boundaries, it does not provide water banking for others.

Kern County Water Agency

Kern County Water Agency (KCWA) comprises all of Kern County in the Southern San Joaquin Valley. KCWA currently has approximately 861,000 irrigated acres. This is in contrast to its peak to the KCWA's peak irrigation acres, 973,000 acres in 1984 and its lowest recent level of irrigation acres, 729,400 acres in 1991 due to a severe drought. There are about 110,000 to 120,000 acres per year that are idled for various reasons. In an extreme case, if all of this land was cropped in a single year, irrigated acreage could return to its peak without the conversion of any native lands. In 1991 there were about 266,200 acres of permanent crops and in 1998 permanent crops amounted to about 316,500 acres. This trend is expected to continue.

KCWA was created by a special act of the State Legislature in 1961. It holds the master contract with the State of California for delivery of a maximum yearly supply of 1,000,949 acre-feet of SWP water supplies to 21 subcontracting water agencies ("Member Units") within Kern County listed below:

Agency	Surface Water Rights/ Contract Rights	Irrigated Acreage	Percent in Permanent Plantings
Belridge Water Storage District	SWP	--	--
Berrenda Mesa WD	SWP	--	--
Buena Vista WSD	SWP, KR	38,411	1%
Cawelo WD	SWP, KR, MS, Oilfield waste	34,300	97%
Henry Miller WD	SWP, KR	18,100	0%
Kern County Water Agency Improvement District No. 4	SWP, KR	4,900	0%
Kern Delta WD	SWP, KR, MWD	93,100	7%
Lost Hills WD	SWP	57,600	29%
Rosedale-Rio Bravo WSD	SWP, KR	33,400	17%
Semitropic WSD	SWP, MS MWD	129,100	23%
Tehachapi-Cummings CWD	SWP, local streams	--	--
Tejon-Castaic WD	SWP, local streams	--	--
West Kern WD	SWP	--	--
Wheeler Ridge-Maricopa WSD	SWP, MS	93,600	37%
Arvin-Edison WSD (LTRC)	CVP, KR, MS	99,000	48%
Southern San Joaquin MUD (LTRC)	CVP	50,500	56%
Shafter-Wasco ID (LTRC)	CVP, MS	30,900	48%
Delano-Earlimart ID (LTRC)	CVP, MS	51,000	80%
Kern Tulare WD (LTRC)	CVP, KR	20,202	100%
Rag Gulch WD (LTRC)	CVP, KR	5138	100%

--: No CVP water would be delivered to these districts. Therefore, no data or further analysis is required.
CVP: Central Valley Project
SWP: State Water Project
KR: Kern River
MS: Minor Streams
LTRC: CVP Long-term Contractor

The matrix below depicts the SWP supplies for KCWA member units.

KCWA Member Unit SWP Supplies

Member Unit	Supply	Allocation (60%)	Water Shortage
Belridge WSD	121,508	72,905	48,603
Berrenda Mesa WD	108,600	65,160	43,440
Buena Vista WSD	21,300	12,780	8,520
Cawelo WD	38,200	22,920	15,280
Henry Miller WD	35,500	21,300	14,200
Improvement District No. 4	82,946	49,768	33,178
KCWA	8,000	4,800	3,200
Kern Delta WD	25,500	15,300	10,200
Lost Hills WD	119,110	71,466	47,644
Semitropic WSD	155,000	93,000	62,000
Rosedale Rio-Bravo WSD	29,900	17,940	11,960
Tehachapi-Cummings CWD	19,300	11,580	7,720
Tejon-Castac WD	5,278	3,167	2,111
West Kern WD	25,000	15,000	10,000
Wheeler Ridge-Maricopa WSD	197,088	118,253	78,835
Total	998,730	559,238	339,492

Arvin-Edison WSD, Southern San Joaquin MUD, Shafter-Wasco ID, Delano-Earlimart ID, Kern Tulare WD and Rag Gulch WD are LTRC CVP contractors and are within the focus of this EA. Belridge WSD, Berrenda Mesa WD, Tehachapi-Cummings CWD, Tejon-Castac WD and West Kern WD are not within the Place of Use under Reclamation's water rights permits for this action, therefore are not included in this Environmental Assessment or Proposed Action.

As stated earlier, each proposal would be reviewed individually for compliance with this EA, related biological assessments, applicable laws and policies including Reclamation’s water rights permits prior to approval. KCWA Improvement District #4 supplies are M&I water and the remaining districts are agricultural. The KCWA was established to make water available for any beneficial use or uses of lands or inhabitants; provide flood

control; drain and reclaim lands; acquire, appropriate, store, conserve and import water; prevent contamination of water; develop and sell at wholesale hydroelectric energy to aid in financing water projects.

The KCWA is seeking to be able to deliver CVP water to all areas within Kern County that within the Places of Use as defined in Reclamation's water rights permits. The primary method of delivery of CVP water supplies to KCWA is via the Kern River at the primary method of delivery of CVP water supplies to KCWA is via the Kern River at the FKC terminus. The water travels downstream in the Kern River channel, where it is diverted for use by water districts within the Place of Use as defined in Reclamation's water rights permits or for groundwater recharge projects located along the Kern River fan.

KCWA is the largest agricultural water contractor on the SWP and the second largest overall with 1,000,949 acre-feet of annual supply. Kern County ranks in the top four California counties in agricultural production, behind Fresno, Tulare and Monterey Counties. For the year 2000, the last year for which statistics are available, Kern County agricultural production was valued at $2.2 billion. Grapes were the biggest crop with a value of $438 million, followed by citrus at $291 million and cotton at $226 million. Kern County leads the state in production of several crops including almonds, pistachios, carrots, watermelons, sheep and wool. Agriculture has been Kern County's number one industry for many years. Approximately one out of every four jobs in Kern County is related to agriculture.

Kern County has a total population of 662,000 people. Bakersfield, the largest incorporated city in the county has a population of 247,000 people.

City	Population
McFarland	9,600
Delano	38,800
Shafter	12,700
Wasco	21,200

Buena Vista WSD, Cawelo WD, Kern Delta WD, North Kern WSD, Rosedale-Rio Brave WSD, and Semitropic may enter into exchange arrangements with the Cross Valley Contractors under separate agreements and are described elsewhere in this Section.

Henry Miller Water District

Henry Miller Water District is located approximately 17 miles northwest of the southern intersection of Interstate 5 and California Highway 99. The total district acreage as calculated by Reclmation staff using ArcMap is roughly 26,000 acres. Annually, HMWD provides about 35,500 af/y of irrigation water to approximately 19,500 acres of irrigated lands.

HMWD is served by a large network of small private canals from the east. The California Aqueduct traverses the western portion of HMWD. Lake Webb and Lake Evans are located in the Buena Vista Recreational Area on the eastern side. These two man-made lakes are kept full for recreational purposes by the Buena Vista Water Storage District as a mitigation measure for the permanent dewatering of the Buena Vista Lake after construction of Lake Isabella in 1953.

The buena vista lake shrew (Sorex ornatus relictus) has been historically present within the boundaries of HMWD. The last sighting, however, was in 1991 near Lake Evans. The giant garter snake (Thamnophis gigas) has also been historically present within the boundaries of HMWD. The most recent sighting of this species was in 1999, in the central northwest portion of HMWD. With the increases of flexibility and supply of irrigation water in HMWD there is a chance that these species will suffer some effect.

Improvement District No. 4

In the late 1960's KCWA formed it Improvement District No. 4 to import state project water to the urban Bakersfield area for municipal purposes. Today, more than 80,000 af/y of SWP water is reserved for importation into the area. Fifty-thousand af/y is set aside to replenish ground water basins, while 34,000 af is treated and distributed through KCWA's Henry C. Garnett Water Purification Plant. The treated water is delivered to four domestic water systems that serve parts of northern and eastern Metropolitan Bakersfield through the following entities:

North of the River Municipal Water District

North of the River Municipal Water District receives roughly 10,000 af of treated water from the Henry C. Garnett Water Purification Plant on an annual basis. The District is both a retailer and wholesaler of water. In times of drought the District is able to pump groundwater. The District delivers approximately 7,000 af/y to it contractor, the Oildale Mutual Water Company, the remainder of the District's water is delivered directly to municipal customers. The primary consumers for the District are residential, with a small portion going to warehouse type businesses. None of the water is used for agriculture.

Oildale Mutual Water Company

Oildale Mutual Water Company was incorporated in 1919 and currently has 6,800 connections providing KCWA I.D. #4 treated water and groundwater to approximately 7,000 af/y of M&I water to a population of approximately 25,000 in Bakersfield.

California Water Service Company

California Water Service Company is a privately held company serving water to consumers in various portions in California. A small service area for the California Water Service Company is located near Bakersfield

East Niles Community Services District

East Niles Community Services District has 6700 connections and serves a population of approximately 27,000. East Niles Community Services District boundaries overlap with Arvin Edison Water Storage District. In addition to serving municipal and industrial

water the District serves approximately 4,600 irrigated acres with 11,000 af/y of water. The District's water resources are KCWA I.D. #4 treated water, groundwater and Arvin-Edison raw water. The main crop is oranges. The District does not have underground storage or recharge.

Within the boundaries of the Kern County Water Agency ID #4 are San Joaquin woolythreads (Monolopia congdonii), Bakersfield cactus (Opuntia basilaris var. treleasei), San Joaquin kit fox (Vulpes macrotis mutica) and valley elderberry longhorn bettle (Desmocerus californicus dimorphus). These species were last reported in 1992, 1995, 1986 and 1991 respectively.

Wheeler Ridge-Maricopa Water Storage District

Wheeler Ridge-Maricopa Water Storage District (WR-MWSD) is a public agency whose jurisdiction encompasses about 147,000 acres of land in Kern County at the extreme southern end of the San Joaquin Valley twenty miles south of Bakersfield. A large portion of the WR-MWSD is within the designated Places of Use as defined in Reclamation's Water Rights Permits.

WR-MWSD provides irrigation water supplies to about 90,000 acres of farmland within its boundaries. A small percentage of the water is supplied on a temporary basis for industrial, groundwater recharge, and in-lieu of groundwater pumping purposes. WR-MWSD provides no water treatment or M&I service. Except for a few locations along Interstate 5, WR-MWSD is exclusively rural. There are no cities or towns within MR-MWSD boundaries. No significant new water distribution facilities have been constructed since 1986, and none are planned.

WR-MWSD is a member unit of the KCWA and has contracted with KCWA for a water supply from the SWP. Water from the SWP is delivered to WR-MWSD through the California Aqueduct which transects WR-MWSD from west to east. Water from the SWP is the primary source of supplemental water utilized by WR-MWSD. Other sources have included banked water from the various banking programs in Kern County in which WR-MWSD participates including the Kern Water Bank, the Pioneer Project, and the Berrenda-Mesa Project. Direct delivery of water from the CVP is accomplished by releases from the terminus of the FKC into the Kern River channel. Water released to the Kern River can either be conveyed directly to the Kern Water Bank Canal or diverted into the River Canal and delivered downstream to the Kern Water Bank Canal. From the Kern Water Bank Canal the water is conveyed to the California Aqueduct and thence into WR-MWSD turnout and pipeline facilities located along the California Aqueduct.

Most of the WR-MWSD water supply is distributed to 72,074 acres of farmlands within its Surface Water Service Area under the terms of recorded long-term agricultural water service contracts. Current facilities can also provide temporary water service to about 18,000 acres of farmlands. An additional 20,000 acres of farmlands and 10,000 acres of other developed lands rely primarily on groundwater supplies. Another 27,000 acres are undeveloped and used primarily for grazing. The primary use of the CVP water by WR-

MWSD would be for delivery into the various banking programs for later recovery and use.

KCWA WATER SUPPLY

SWP - KCWA is the second largest participant in the SWP, a water storage and delivery system of reservoirs, aqueducts, power plants and pumping plants. The project, which extends for more than 600 miles (two-thirds the length of California), was planned, built, and is operated by the California Department of Water Resources. About $4 billion have been spent on project construction.

The project's main purpose is to store water during wet periods and distribute it to areas of need in Northern California, the San Francisco Bay area, the San Joaquin Valley, and Southern California. The State has contracts to supply up to 4.2 million acre-feet annually of SWP water to 29 public agencies. Other project functions include flood control, power generation, recreation, and fish and wildlife enhancement.

The first deliveries of water from the project to Kern County began in 1968. KCWA has contracted to receive a maximum yearly supply of 1,000,949 acre-feet of water. Of that amount, 134,000 acre-feet is allocated to municipal and industrial use, and 866,949 acre-feet is used for agricultural use.

Water from the SWP reaches Kern County through the California Aqueduct which passes through the west side of Kern County before crossing the Tehachapi Mountains into Southern California. A portion of that water is brought to Bakersfield and other eastern portions of the San Joaquin Valley through a series of seven pumping stations in the 22-mile long Cross Valley Canal operated by the KCWA.

CVP - The FKC is an essential part of the Kern County agricultural water supply system. It delivers more than 400,000 acre-feet per year to DEID, SJMUD, SWID, AEWSD, KTWD and RGWD.

Kern River - The Kern River supplies water for agriculture, municipal use, industrial use and hydroelectric power. Flows average 700,000 acre-feet yearly or about 22% of the water for Kern County users. The Kern River originates in two forks near Mt. Whitney in the southern Sierra Nevada Mountains and flows south. A large dam has been constructed to form Lake Isabella. The Kern River is the largest local source of surface water in Kern County. Districts that have water rights include, KDWD, City of Bakersfield, BVWSD, Henry Miller Water District, Olcese Water District, and La Hacienda Inc. Kern River water is also delivered to Rosedale Rio-Bravo Water Storage District, Cawelo Water District, Kern-Tulare Water District, Rag Gulch Water District and the KCWA's Improvement District No. 4.

Agricultural Use

Kern County is the fourth most productive agricultural county in the nation. A semiarid region, it must rely on adequate imported water supply. A vast underground water basin

supplies 43% of the water used for domestic and agricultural purposes. Other sources of supply include the Kern River (22%), the SWP (23%), and the FKC (11%). With years of flood and years of drought spaced among periods of normal supply, careful management practices have been developed and applied. Kern County farmers are among the most efficient water managers in the state. It is estimated that 75% of the water applied to local crops goes to satisfying actual crop requirements. Significant improvement in efficient irrigation has been made through the utilization of drip and low volume application methods, as well as careful management of row and border systems. Laser leveling helps achieve uniform distribution. Researchers have determined that irrigation practices in Kern County are among the most efficient in the nation.

With national and worldwide demands for food and fiber increasing, the water and agricultural industries of Kern County will continue to develop efficient technologies to meet future irrigation requirements.

Groundwater

Sediments that comprise Kern County's main groundwater basin are unconsolidated deposits of Tertiary and Quaternary age, including alluvium, lacustrine, deltaic and flood basin deposits of sand and gravel. Thin lenses of silt and clay are scattered throughout the basin at various depths, but are most pronounced in the southwestern and northwestern portions of the Tulare Lake Basin. This basin is located within the Tulare Lake hydrologic region and is bounded on the north by the Kern County line, on the east by the Sierra Nevada foothills, on the south by the Tehachapi and San Emigdio Mountains and on the west by the coast ranges. The Kern River is the principal watershed drainage. The main groundwater basin in the San Joaquin Valley portion of Kern County covers about 963,000 acres. KCWA estimates total storage capacity of the top 500 feet is about 50 million acre-feet. Total groundwater in storage within this space is estimated at 40 million acre-feet, with about 10 million acre-feet of dewatered storage space.

The main San Joaquin Valley basin has two primary water bearing zones; an unconfined zone generally above the Corcoran Clay and a confined zone generally below the Corcoran Clay. There are multiple confined zones in some parts of the valley. The southeastern corner of the Valley contains the White Wolf basin, which is separated from the main Kern County basin by the White Wolf Fault. In the northeastern portion of the

basin some groundwater production occurs in the Santa Margrarita and Olcese formations. These deep, confined aquifers are on the edge of the Valley with limited yields and marginal to poor groundwater quality.

Natural recharge of the groundwater basin is estimated to be about 180,000 acre-feet annually. Annual groundwater pumping exceeds the natural recharge of the basin. The conjunctive use of surface and groundwater supplies has increased the operational yield of the groundwater basin to about 2 million acre-feet annually.

There are about 5,500 to 6,000 active groundwater wells in the Kern County groundwater basin. Basin yield varies across the valley. The lowest pump yields are in the northeastern portion of the valley, and the highest yields are typically in the Kern Fan area. Typical yields may vary from about 700 gallons per minute to over 3,000 gallons per minute (Management Plan, October 2001).

FACILITIES

The following is a description of the conveyance facilities within the KCWA service area. These include the California Aqueduct, Cross Valley Canal, FKC, the Kern Water Bank canal and Kern River. These facilities are briefly described below.

California Aqueduct

KCWA has an allocated Aqueduct capacity of 3,277 cfs. Along both sides of the Aqueduct within the Kern County portion of the DWR San Joaquin Field Division are a number on Member Unit turnouts used to convey water from the Aqueduct into each district delivery system. Following is a list of the Member Units and number of turnouts: Semitropic WSD - 2; Buena Vista WSD - 6; Cawelo - 1[1]; Rosedale Rio-Bravo WSD - 1[2]; Henry Miller WD- 2[3]; Wheeler Ridge-Maricopa WSD - 17. The Aqueduct is used to convey water including the transfer and exchange water, to Kern Tulare Rag Gulch.

Recovered groundwater that is conveyed to the California Aqueduct, can be delivered to districts or exchanged with the DWR. Exchanges with the DWR can be simultaneous, or delayed exchanges. In a simultaneous exchange water delivered from the Aqueduct to an upstream district at the same time the recovered groundwater is transported to the Aqueduct. With a delayed exchange, water might be delivered by the DWR to the receiving district from storage before or after the recovered groundwater is received.

Cross Valley Canal

The Cross Valley Canal (CVC) extends from the California Aqueduct near Tupman to Bakersfield. It consists of four reaches which have capacities ranging from 890 cfs through the first two pump plants to 342 cfs in the unlined extension near Bakersfield.

The canal is a joint-use facility operated by the KCWA for the CVC participants. Water can be conveyed through the CVC to the Kern Water Bank, the City of Bakersfield 2800 Acres, the Berrenda Mesa Property, the Kern River channel, Pioneer Banking project and the various member units recharge sites.

The CVC is also used to convey banked groundwater after it is recovered. Once in the

[1] Cawelo WD takes delivery of SWP water via the CVC.

[2] Rosedale-Rio Bravo WSD takes delivery of their SWP water via the CVC.

[3] Henry Miller WD takes their SWP water via Buena Vista turnouts.

CVC, recovered water can be delivered to CVC participants in exchange for water in the California Aqueduct. During periods when water is not available for exchange, the CVC can be operated in reverse flow. When operated in reverse flow, water flows from the CVC directly into the California Aqueduct. In 1991, water levels in the Aqueduct were low enough for the flow to be by gravity. When water levels in the California Aqueduct are too high for gravity flow, the water must be pumped into the Aqueduct. In 1992, the DWR constructed a temporary pump station to lift 80 cfs from the CVC into the California Aqueduct. A similar station may be reconstructed in the future if reverse flows into the California Aqueduct are needed when levels in the California Aqueduct are too high for gravity flow. In addition, raising the lining in the CVC reach adjacent to the California Aqueduct would allow reverse flow without a pump station.

Kern River/Alejandro/Outlet Canals

Water from the FKC, the CVC, or from the Kern River can be conveyed in the Kern River channel or in the Kern River Canal to the Pioneer Banking project or other recharge areas. Conveyance of water in the Kern River Canal requires an agreement with the City of Bakersfield. Conveyance of water in the Alejandro Canal requires an agreement with the Buena Vista Water Storage District.

The Kern River Canal can also be used to convey water from the Kern River to the California Aqueduct directly via the Alejandro Canal, the Buena Vista Aquatic Lakes and Outlet Canal and a pumping plant, or indirectly via an exchange.

It should be noted that depending on groundwater pumping operations, water in the Buena Vista Aquatic Lake may contain high concentrations of arsenic. These high concentrations are caused when groundwater from nearby wells is pumped into the Buena Vista Aquatic lakes for agricultural use and to make up evaporation losses.

<u>Recovery</u>

The CVC is also used to convey banked groundwater after it is recovered. Once in the CVC, recovered water can be delivered to CVC participants in exchange for water in the California Aqueduct. During periods when water is not available for exchange, the CVC can be operated in reverse flow. When operated in reverse flow, water flows from the CVC directly into the California Aqueduct. In 1991, water levels in the Aqueduct were low enough for the flow to be by gravity. When water levels in the California Aqueduct are too high for gravity flow, the water must be pumped into the Aqueduct. In 1992, the DWR constructed a temporary pump station to lift 80 cfs from the CVC into the California Aqueduct. A similar station may be reconstructed in the future if reverse flows into the California Aqueduct are needed when levels in the California Aqueduct are too high for gravity flow. In addition, raising the lining in the CVC reach adjacent to the California Aqueduct would allow reverse flow without a pump station.

<u>Kern River/Alejandro/Outlet Canals</u>

Water from the FKC, the CVC, or from the Kern River can be conveyed in the Kern River channel or in the Kern River Canal to the Pioneer Banking project or other recharge areas. Conveyance of water in the Kern River Canal requires an agreement with the City of Bakersfield. Conveyance of water in the Alejandro Canal requires an agreement with the Buena Vista Water Storage District.

The Kern River Canal can also be used to convey water from the Kern River to the California Aqueduct directly via the Alejandro Canal, the Buena Vista Aquatic Lakes and Outlet Canal and a pumping plant, or indirectly via an exchange.

It should be noted that depending on groundwater pumping operations, water in the Buena Vista Aquatic Lake may contain high concentrations of arsenic. These high concentrations are caused when groundwater from nearby wells is pumped into the Buena Vista Aquatic lakes for agricultural use and to make up evaporation losses.

Friant-Kern Canal

The FKC is operated by the Friant Water Users Authority to convey water supplies from the San Joaquin River through the Friant Division of the Central Valley Project to several districts in Kern County, including the KCWA.

In addition to conveying CVP water, the canal is sometimes used to convey floodwaters from the Kings, Kaweah and Tule rivers which are pumped into the FKC in major flood years. If not pumped into the FKC these waters would flood the Tulare Lake bed. Such floodwaters in the FKC are released into the Kern River channel downstream of Bakersfield where the water can flow into the California Aqueduct via the Kern River - California Aqueduct Intertie or be diverted and recharged into the groundwater basin in Kern County. Alternatively, water from the FKC can be conveyed to the California Aqueduct or recharge areas via the CVC operating in reverse mode.

Kern Water Bank Canal

The Kern Water Bank (KWB) canal is a bi-directional canal constructed by the Kern Water Bank Authority. The canal has a single pumping plant for delivering water for recharge. The forward flow capacity is 950 cfs. Reverse flow capacity is approximately 650 cfs. The Canal is used to convey SWP water and other waters from the California

Aqueduct to the local banking projects for groundwater recharge. The Canal is also used to convey pumped groundwater during a surface water short year, back to the California Aqueduct, either directly or by exchange, to districts for a supplemental water supply.

Potential Sources of Exchange Water

The KCWA member units have access to the following potential sources of water that could be exchanged for CVP water supplies:

1. SWP water – Accessed from turnouts along the California Aqueduct and subsequently from public and privately owned canals and pipelines that transport the water for use within Kern County.

2. Kern River water – Accessed from existing turnouts and diversion points along the Kern River and related public and privately owned canals and pipelines that transport the water for use within Kern County, or through additional exchange to CVP surface water supplies.

3. Poso Creek, Caliente Creek or other minor streams within Kern County – Existing points of diversion are within Cawelo WD, Semitropic WSD, Kern Delta WD, Henry Miller WD, Arvin-Edison WSD and portions of Wheeler Ridge-Maricopa WSD.

4. Kaweah, Tule, St. Johns and Kings River water – Historically has been available to Kern County NLTC via diversion of flows at established points of diversion into the FKC and into the Kern River.

5. Groundwater – Exchanges involving groundwater could occur virtually anywhere within the Kern NLTC area, including groundwater recharge and recovery facilities, which have access directly or through additional exchange to CVP surface water supplies. Groundwater banking is not included in this analysis and separate NEPA review would be needed.

Potential Scope of Exchange Water Deliveries

The distribution systems in Kern County are heavily interconnected. The Cross Valley Canal interconnects the SWP, Kern River and Friant-Kern systems. The SWP is further interconnected with the Friant-Kern system via Arvin-Edison WSD's turn-in/out to the California Aqueduct. Also, most of the KCWA member units have distribution systems which are interconnected with the distribution systems of neighboring districts. As an example, Semitropic Water Storage District and Shafter Wasco Irrigation District have a pipeline interconnection which can move water directly from the California Aqueduct through Semitropic's distribution system and into Shafter-Wasco, a Friant long-term contracting district. In reverse, water from the FKC can be moved through Shafter-Wasco directly to Semitropic, a non-long-term CVP district and a SWP contractor.

Natural streams also provide conveyance capability to facilitate exchanges. As an example, Poso Creek, itself a source of potential exchange supplies, traverses a couple of districts (and the Kern National Wildlife Refuge) and has served as a conveyance vehicle of CVP supplies in the past. All of these interconnections can be used to directly or indirectly deliver exchange water. This illustrates the potential for exchanges between various entities within Kern County and those elsewhere within the CVP or the SWP.

As an important aside, several facilities exist which can be used to deliver water to the Kern National Wildlife Refuge. While CVP supplies or purchased non-CVP supplies

available to the KNWR are not typically available to water districts, exchanges have historically been done with the KNWR to provide water to the refuge on their preferred demand pattern. Additional exchanges have been offered and considered with the KNWR where refuge supplies could be delivered and stored in the groundwater of KCWA districts and subsequently returned from groundwater or other surface supplies back to the KNWR on its preferred demand schedule. There may be monetary or water resource gains associated with facilitating such exchanges. CVP water from the Friant Division can not be used for wildlife habitat since the water rights permits do not include fish and wildlife or their habitat as a purpose of use. This EA does not cover exchanges to refuges and separate NEPA analysis would be required.

Kern Delta Water District

Kern Delta Water District (KDWD) is located in the southern portion of the CVP Service Area, directly south of City of Bakersfield, and west of Arvin-Edison. Two major highways, Interstate 5 on the west and State Highway 99 on the east, join at KDWD southern boundary. To the west, KDWD's border roughly follows the Buena Vista Canal, while its eastern border is located west of the City of Arvin (population approximately 13,000 in 2000). KDWD encompasses the historic Kern Lakebed.

KDWD comprises of 129,000 acres which are primarily agricultural but also encompassing about 5,000 acres of residential and commercial land uses. Most urban areas are found in the north portion of Kern Delta, where the City of Bakersfield is slowly growing to the south. In addition, there is sparse urban development along the two major east-to-west roads (Panama Land and Taft Highway). Land use south of the City of Bakersfield is mainly agricultural (87%), but there are about 8,000 acres dedicated to petroleum extraction. Planned suburban and commercial development is generally focused on the areas immediately south of Bakersfield.

Major infrastructure in Kern Delta consists of two oil fields: the Ten-Section Oil Field on the west, south of Panama Lane, and a much smaller oil field just south of Panama Lane near the town Lamont at the eastern edge of Kern Delta. There are a number of oil and gas pipelines running through KDWD and several major power line easements. The Arvin-Edison Canal runs through portions of the northern end of Kern Delta, connecting to five existing irrigation canals that serve Kern Delta growers. From west to east, these existing earth-lined canals are the Buena Vista, Stine, Farmers, Kern Island Main, Kern Island Central, and Eastside Canals. All but the Kern Island Main and Eastside Canals generally follow the alignment of historic streams. KDWD is completely within the Friant Places of Use. Lands north of Bear Mountain Blvd, within KDWD, are covered in the Metropolitan Bakersfield Habitat Conservation Plan which has been completed. Kern County is currently developing a HCP which encompasses the remaining lands in KDWD.

KDWD has historically received CVP surplus water either by direct contract with Reclamation, through participation with the KCWA, or by exchange with Arvin-Edison WSD. Regardless of the contract method, KDWD receives CVP water through a direct connection with Arvin-Edison WSD. KDWD has the capability of taking CVP water

from the Arvin-Edison Intake Canal running mostly west to east across the northern portion of KDWD and crossing several of KDWD's canals. KDWD has the capability of taking water from the Arvin-Edison Intake Canal into the Stine and Farmers service areas through the Stine Canal and the Kern Island service area through the Kern Island Canal. The Buena Vista service area can also receive CVP water by moving water from the Arvin-Edison Intake Canal to the Kern River Canal then to the Buena Vista Canal. KDWD does not require special exchanges to take delivery of CVP water.

Kern Water Bank Authority

The Kern Water Bank Authority (KWBA) located in the southwestern San Joaquin Valley, occupies approximately 30 square miles (20,000 acres) of land in Kern County. The primary purpose of the KWBA is to recharge, store and recover water (water banking) in order to improve the water supply for its participants during periods of water shortages. It also conducts other activities that include farming and habitat management.

The KWBA is a Joint Powers Authority comprised of six subcontracting water agencies, as listed below**.** All members of the KWBA have a contract, either directly or indirectly, for water from the SWP. KWBA provides the mechanism to help mitigate the various reliability problems inherent in the SWP. The following are KernWater Bank Authority Member Units:

Dudley Ridge Water District	Tejon-Castac Water District
Kern County Water Agency	Westside Mutual Water Company
Semitropic Water Storage District	Wheeler Ridge-Maricopa Water Storage District

The KWBA operates by recharging surplus water for direct groundwater recharge within recharge basins when it is plentiful. KWBA does not ownership of any of the water recharged onto the property. All water is owned by the participants purchasing and recharging the water to maintain balance of water supplies. As such, KWBA does not use its banked water for growing crops, although its member districts do use the water for farming within their districts.

The majority of KWBA land, 17,000 of the 20,000 acres were farmed intensively prior to 1991. Currently, the water conservation activities of the water bank are allowing re-establishment of intermittent wetland and upland habitat. The CVP water, if approved, would be delivered for recharge of the aquifer.

KWBA receives FKC water via the CVC or the Kern River. Both the CVC and Kern River will then convey the water to the Kern Water Bank facilities for groundwater storage until needed by the Kern Water Bank participants. When the stored water is requested by the KWBA participants, the water can be pumped from the ground and delivered through the Kern Water Bank canal, CVC and the California Aqueduct directly or by exchange to the participant's service areas so long as they are within the Place of Use boundaries as defined in Reclamation's water rights permits.

Kings County Water District

The Kings County Water District (KCWD) was formed in 1954 under the County Water District Act to provide a legal entity for water management in the northeast portion of Kings County. The basic missions of KCWD are:

1) Protection, conservation, and stabilization of groundwater.

2) Negotiating and contracting for supplemental water.

3) Maintaining facilities for surface water distribution for irrigation and groundwater recharge.

4) Preserving the existing surface water rights held by mutual water companies through a program of water stock acquisition and retention.

KCWD encompasses the northeastern portion of Kings County, from the Kings River on the north to approximately six miles south of Hanford. To the east, KCWD extends to the County's east boundary, and to the west it extends approximately 5 miles west of Hanford to the eastern edge of the City of Lemoore.

KCWD is located in the east central part of the Kings River service area, and is entirely within Kings County. The City of Hanford, with a population of 38,000, lies near the center of KCWD. The total area of KCWD is 143,000 acres, of which 51,150 acres are also with the boundaries of Division 5 of the Kings River Conservation District; 82,610 acres are also within the boundaries of Kaweah Delta Water Conservation District; and 9,240 acres are within the area where the two districts overlap. KCWD's population excluding City of Hanford is 25,000. Although, KCWD boundaries encompass the Cities of Hanford and a portion of Lemoore, KCWD does not supply any M&I water.

KCWD includes portions of the service areas of three major mutual ditch companies. Peoples Ditch Company and Last Chance Water Ditch Company both possess water rights on the Kings River, and Lakeside ditch Company holds water rights on the Kaweah River. KCWD boundary completely encompasses the area of the Lakeside Irrigation Water District, a California water district formed to administer the water rights and distribution system of the Lakeside Ditch Company stockholders, and acquire additional surface water supplies. KCWD also operates and maintains the Riverside Ditch, a conveyance system used to distribute KCWD and People's Ditch Company water.

KCWD has recharge basins that are located near the conveyance systems of the ditch companies in which they own stock. KCWD also uses Old Slough and river channels, and has a continuing program of purchasing and leasing property for groundwater recharge. KCWD currently has over 1,100 acres of artificial recharge area and also uses some 230 miles of unlined canals owned by the ditch companies that contributes to incidental recharge. Maintenance of these recharge basins is performed by KCWD and consists mainly of weed control and efforts to maintain permeability.

The quantity of water used in the recharge program has only recently been totally measured. Critically dry years such as 1976-77 resulted in zero recharge while wet years such as 1982-83 can yield 125,000 af/y recharged in KCWD. The results of the program are monitored by semiannual measurements of the groundwater level in 230 wells through a cooperative effort. The average of the measurements are taken in these wells each autumn. These measurements depict an erratic decline in groundwater levels. Since KCWD formation in 1954, the average depth to groundwater has gone from 37 feet to 74 feet measured in the autumn of 1997.

The average yearly decline in groundwater levels is .86 feet per year since 1954. This equates to an annual average overdraft of 12,300 af/y. To counteract this overdraft, KCWD has practiced a conjunctive use of both surface and groundwater, plus the planned artificial recharge of the groundwater by importing available surplus water and flood release water from reservoirs on the San Joaquin, Kings, and Kaweah Rivers and placing it in recharge basins. KCWD practices appear to be producing positive results because the rate of decline in groundwater levels is less after 1954 than in years preceding formation of KCWD. KCWD efforts are enhanced by the cooperation of Last Chance, Peoples, Settlers, and Lakeside Ditch Companies that provide the conveyance system to these basins and help regulate the rate of recharge. Furthermore, they help distribute surface water purchased by KCWD to local farmers who would otherwise pump groundwater.

Approximately 135,000 acres (nearly 95 percent) in KCWD is irrigated agriculture. Surface water supplies for irrigation come from diversions of the Kings and Kaweah Rivers, and from exchanges and purchases of CVP and SWP water. The supply of surface water is inconsistent, and ranges from a low of 30,000 af in 1997 to a high of 327,000 af in 1983. The estimated average surface supply is 150,000 af.

Due to inadequate surface water supplies, even in wet years, to meet the total demands for water within KCWD, groundwater is pumped through private wells owned by landowners to meet their individual needs. In addition, all the water requirements to meet M&I users is pumped. Approximately 282,500 af of groundwater is pumped annually resulting in overdraft. This condition is expected to worsen as the urban population grows.

KCWD 1996 Crop Map, showing land use information from DWR 1996 Land Use Survey, indicated that approximately one-half of KCWD's area is field crops, with high proportions of the remaining land used to grow grain and hay, deciduous fruits and nuts. There is a smaller amount of land planted in vineyards as well as citrus, plus truck, nursery and berry crops. The City of Hanford (population approximately 40,0000), the County seat of Kings County, is situated in the geographical center of the KCWD. The 1996 map indicated that approximately 25 percent of KCWD's area is semi-agricultural or non-agricultural. According to KCWD, there is a slow but steady development trend change in land uses from agriculture to urban as the City expands and small county acreages are converted to home sites.

The lands that are served by KCWD have been in cultivation for several decades or longer, with some of the People's Ditch Company ditches dating back to the 1870-1890 period. KCWD has purchased varying amounts of CVP water since 1956. Water purchases have ranged from a low of 1,639 af in 1997-98 to a high of 28,969 af in 1998-99.

KCWD receives FKC water when it is diverted from FKC into the Kings River by an existing diversion structure. Water is diverted from the Kings River at People's Weir, just west of Highway 99. Water is diverted into the People's Ditch Company's main canal, of which KCWD is a stockholder. From the main canal KCWD can divert water into several ditches within their boundaries to be delivered to the landowners.

Lakeside Irrigation Water District

Lakeside Irrigation Water District (LIWD) is located east of the city of Hanford and the northern portion is crossed by State Hwy 198. LWD is situated within Kings County Water District, Kaweah Delta Water Conservation District and a portion within Kings River Conservation District. LIWD is not represented by the above listed umbrella agencies. LIWD is a member of the Mid-Valley Water Authority; however, Mid Valley Water Authority is not included as a participant in this Proposed Action and environmental analysis

LIWD has a total of 31,917 acres. In LIWD's 1998 Annual Report, approximately 27,155 acres were irrigated agricultural land, 1,817 acres were non-agricultural land and 2,945 acres were idle/fallow land that could be irrigated.

LIWD has maintained a crop survey since its formation in 1962. In 2000 the four largest crops were cotton (9,879 ac), corn (7,697 ac), silage grains (6,521 ac), and alfalfa (5,133 ac). Portions of these crops were single or double cropped for a total of 33,643 acres planted. The balance of agricultural land was planted to various tree crops, grasses, vegetables and sugar beets.

LIWD receives CVP water from the FKC via the Kings River and Lakelands Canal or through the St. Johns River and Cross Creek to the headgate of the LIWD distribution system.

There have been no sightings of Federally listed threatened or endangered species within the bounds of LIWD.

Liberty Water District

Liberty Water District (LWD) is located in Fresno County south of the city of Caruthers and northerly of the cities of Riverdale and Laton and is bisected by Hwy 41. LWD comprises 21,189 acres and all are irrigated agriculture. LWD has historically grown row crops, alfalfa, grains which have been planted to tree crops, and vines with little or no change in the annual crop water demand. LWD would utilize CVP water exclusively for agricultural use or recharge of groundwater and would not transfer the CVP water. LWD has no M&I use within LWD.

LWD has consistently entered into short-term and temporary water service contracts with Reclamation for the purchase of surplus CVP water. LWD has also acquired CVP water through transfers from long-term CVP contractors, as available. LWD could receive CVP water through the FKC via the Kings River where the water is diverted into the Liberty Canal and distributed within LWD.

North Kern Water Storage District

The North Kern Water Storage District is situated in the San Joaquin Valley portion of Kern County and encompasses about 70,000 acres divided into two project areas. The 1950 North Kern Water Storage District project of about 60,000 acres (North Kern hereinafter) and the 1979 Rosedale Ranch Improvement District project of about 10,000 acres. Both are fully developed to irrigated agriculture, with almonds and grapes accounting for about 50% of the cropped area and stone fruit and other permanent and annual crops comprising the remaining amount. North Kern is comprised of approximately 64,813 irrigated acres and about 74% is planted to permanent crops. Water supplies include Kern River, Poso Creek, oilfield waste water, and other smaller creeks.

1950 North Kern Project

The historical surface water supplies of North Kern have ranged from 6,000 acre-feet in a dry year to nearly 394,000 acre-feet in a wet year. Owing to the highly variable Kern River supply, North Kern has been forced to regulate available surface water supplies from times of surplus (wet years) to times of need (dry years). This regulation has been accomplished, to a large extent, through use of the underlying groundwater reservoir. During wet years on the Kern River, significant deliveries of surface water are made to irrigation and spreading (for groundwater recharge). For the purpose of groundwater recharge, North Kern makes use of about 1,500 acres of recharge basins (water spreading areas); the dry channel of Poso Creek and several other controlled-flow facilities. In wet years, more than 200,000 acre-feet of water have been directed into recharge basins for replenishment of the groundwater aquifer. During dry years, deliveries of surface water to irrigation are greatly reduced and groundwater pumping is significant. Extraction of groundwater by means of North Kern wells has ranged from zero to more than 80,000 acre-feet in one year. North Kern has successfully operated its conjunctive use project for 50 years. The underlying groundwater is part of the larger groundwater basin which underlies the southern San Joaquin Valley. While North Kern is in balance respecting water supplies and uses within its boundaries, groundwater levels are tied to the larger basin, which is in a condition of overdraft.

1979 Rosedale Ranch Improve District Project

After the above 1950 project was implemented lands were annexed to North Kern with the specific requirement that the newly annexed lands would not share in the water supplies of the original project. The lands thus developed a distinct and separate project with the purchase of water supplies during wet years from Kern River rights of the City of Bakersfield. The Rosedale Ranch project has approximately 14 miles of unlined canals for the direct delivery of water or irrigation. The focus of the project was

groundwater recharge through a combination of in-lieu-pumping deliveries and canal losses which has totaled up to 31,000 af. North Kern does not supply M&I water service.

The FKC bisects North Kern with less than 50% uphill of the FKC. There is a turnout on the North side of Poso Creek on the FKC. North Kern has a weir across Poso Creek on the Calloway Canal approximately 1-1/2 miles below the FKC. NKWSD, in a program with kern-Tulare and Rag gulch Water districts recently constructed a turnout off of the KDC 1 mile north of 7th Standard Road. In addition, North Kern has a pump station on the Calloway Canal at Kimberlina Road that is used to deliver water supplies to Shafter-Wasco Irrigation District (SWID) via SWID's North Pipeline. The pump station can also allow water to flow into the Calloway Canal at this location. NKWSD also has a gravity outlet on the Calloway Canal near the intersection of Cherry and Fresno Avenues that is used to deliver water supplies from the Shafter-Wasco Irrigation District South Pipeline into the Calloway Canal. Finally, water supplies delivered at the end of the FKC can be exchanged for Kern River supplies being delivered at lower elevations. The Kern River supplies intended for lower elevations are diverted into the District's higher elevation Beardsley Canal to be delivered to lands uphill of the FKC.

Rosedale-Rio Bravo Water Storage District

Rosedale-Rio Bravo Water Storage District (R-RBWSD) is located west of Bakersfield in Kern County. R-RBWSD has a gross area of approximately 43,000 acres with a net estimate of 33,400 irrigated agricultural acres. Approximately 3,900 acres are fallow lands, 2,500 acres undeveloped lands and 1,100 acres of canals and recharge basins. R-RBWSD is primarily planted to alfalfa hay, almonds, grain, cotton and corn. All water coming into R-RBWSD has been used for groundwater recharge and overdraft correction. R-RBWSD does not serve M&I water.

Water was historically supplied from landowner wells pumping from the groundwater basin, with a small amount (an average about 15,000 af/y) of irrigation diversions to lands adjacent to the R-RBWSD's groundwater recharge project. Prior to operation of its groundwater recharge project, pumping extractions exceeded the safe yield of the local groundwater supply, and a substantial overdraft in the range of 40,000 to 50,000 af/y occurred annually. As a result of this overdraft, groundwater levels were declining at a rate of 8 to 10 feet per year.

In 1959, the R-RBWSD was formed to develop a groundwater recharge project to offset the overdraft. Construction of the recharge project was completed in 1962. The physical features of the project include facilities to divert waters from the Kern River and the joint use Cross Valley Canal into the Goose Lake Slough Channel, the channel itself and recharge basins.

R-RBWSD has completed construction of additional recharge basins and now has a wetted area of approximately 840 acres available for groundwater recharge. R-RBWSD is also a recharge participant in the Pioneer Project, and as such, has first priority to 25% of the total recharge capacity. This provides an additional 50 cfs of recharge capacity.

R-RBWSD acquires water for recharge purposes from the Kern River through a water service agreement with the city of Bakersfield, from the FKC of the CVP, as available, and from the SWP through a water supply contract with the KCWA. Water supplies from these three sources have averaged about 62,000 af/y for the years 1962 through 1999 or about 79% of the cumulative consumptive use during those years.

The SWP contract was originally to provide an average (firm and surplus) of about 35,000 af/y. However, R-RBWSD is now expected to receive only about 76% of its firm supply or about 22,700 af/y. R-RBWSD has also been unable to renew its short-term contract with Reclamation and is now only able to obtain CVP water through transfers or surplus (flood water) supplies.

The CVP surplus water makes its way into the R-RBWSD by flowing southerly to the terminus of the FKC. At this point, the water can flow into the Kern River Channel and then flow southwesterly for two miles to R-RBWSD Kern River headworks. The other option is for the water to enter the Arvin-Edison bypass into the CVC and then flow southwesterly to the R-RBWSD's CVC turnout #2.

Semitropic Water Storage District

Semitropic Water Storage District (SWSD) is located in north-central Kern County in the San Joaquin Valley, about 20 miles northwest of the City of Bakersfield. Semitropic was organized in 1958 to supply supplemental water within its boundaries. The total land area within Semitropic is approximately 221,000 acres (345 square miles), with about 143,000 acres (223 square miles) irrigated area. Geographically, SWDS is located at the South End of the San Joaquin Valley, which is generally hotter and drier than other parts of the Valley.

During the 1960's, Semitropic developed plans for main conveyance and distribution system facilities to extend from the Governor Edmund G. Brown California Aqueduct (California Aqueduct) to farm delivery locations. Prior to construction of the facilities, irrigated crops within Semitropic were totally dependent on groundwater pumping.

Semitropic initially contracted with the Kern County Water Agency (KCWA), for an annual firm supply of 158,000 acre-feet of State Water Project (SWP) water and 25,100 acre-feet per year of surplus water. Semitropic gave up 3,000 acre-feet of supply to buy into Kern Water Bank (KWB) and now has 155,000 acre-feet annual firm supply of SWP water. This is used to irrigate approximately 42,300 acres in its Contract Water Service Area (CWSA). Other water is available from the KCWA on an interruptible basis to deliver to other service areas totaling about 58,000 acres (consisting of a Conjunctive Surface Water/Groundwater Surface Area (CSWGSA) of about 28,500 acres and an In-Lieu Service Area (ILSA) of about 29,500 acres). Farmers in all the service areas maintain wells to supplement Semitropic Supplies and protect against shortages. Nearly 42,700 acres rely exclusively on groundwater. Landowners within SWSD apply approximately 480,000 acre-feet of water of which, in a very good year 350,000 acre-feet can be imported surface water with the remaining 130,000 acre-feet applied in the groundwater service area.

Approximately 72% of the land area in SWSD is included in the Buttonwillow and Pond Poso Improvement Districts leaving 28% in the "unorganized area". The "unorganized area" is a large, contiguous area in the northwest quarter of SWSD. This area is mostly not irrigated and does not benefit from the Proposed Action nor is it envisioned to be developed to irrigated agriculture.

SWSD provides water banking and owns a portion of the Kern Water Bank. It should be noted that water banking for later (beyond one-year) is not included in this analysis and review process. SWSD also provides banking for conjunctive use for in-lieu storage to alleviate groundwater pumping. The Proposed Action could result in providing CVP water to SWSD for the purpose of groundwater recharge or conjunctive use.

SWSD has three ways of recovering water from the FKC. (1) Via Poso Creek through a FKC discharge structure into the creek. It is conveyed to SWSD's permitted diversion structure and delivered to irrigated lands and duck clubs in the surface water area of SWSD. (2) Via interconnection facilities with Shafter-Wasco Irrigation District which conveys water from the FKC by pipeline directly into our canal system. Water is then conveyed to irrigated lands. (3) Via spreading facilities located on the Kern Fan. SWSD is part owner of the Pioneer Project and the Kern Water Bank, both of which are located on the Kern River Fan area. Water from the CVP has historically been delivered to these projects for storage purposes from the end of the FKC where it spills into the Kern River. It is then diverted from the river into these two projects.

Tulare Lake Basin Water Storage District

Tulare Lake Basin Water Storage District (TLBWSD) has a service area of 185,800 acres and its boundaries include nearly the entire Tulare Lake Bed. TLBWSD is located southwest of the city of Corcoran in Kings County. TLBWSD was formed in 1926 at which time all the lands in TLBWSD were fully developed. All deliveries from TLBWSD are for agricultural purposes.

TLBWSD manages Kings River South Fork water deliveries at Empire No. 2 Weir near Stratford (immediately below State Route 41) in Kings County. Empire No. 2 Weir diverts Kings River water into the Tulare Lake, Kings River-South Fork and Blakeley canals which serve the Tulare Lake Bed. TLBWSD is a SWP contractor and is connected to the California Aqueduct by Lateral A and B. Despite its state contract, the Tulare Lake Bed units rely most heavily on Kings River water for irrigation purposes.

CVP water is conveyed to TLBWSD via the California Aqueduct or released into the Kings River, Kaweah River or Tule River from the FKC. Subsequent exchanges would likely be conveyed from the Kings River and Tule River systems by gravity. No other exchanges are contemplated. While TLBWSD has no formal water banking facilities, it does practice conjunctive use.

The area served by TLBWSD remain vulnerable to occasional flooding and drought-caused water supply shortages. The result, economically and physically, is that the

Tulare Lake Bed is farmed in large tracts upon which annual field crops are produced. Small farmers cannot endure the financial burdens of Tulare Lake Bed agricultural operations. Main crops are cotton, seed alfalfa and grain.

Kings River Conservation District

The Kings River Conservation District (KCRD) is a water resources and energy management agency located in the central San Joaquin Valley.

KRCD is a public agency created in 1951 through special legislation by the State of California. Its boundaries include the entire service area of the Kings River – an area of approximately 1,100,000 acres, plus an additional area of approximately 140,000 acres outside of the Kings River service area.

KRCD's mission is to provide flood protection, achieve a balanced and high quality water supply, and develop power resources within its boundaries.

KRCD works with and coordinates the common interests of the following thirty-five (35) entities:

Alta Irrigation District
Clark's Fork Reclamation District No. 2069
Consolidated Irrigation District
Corcoran Irrigation District
Empire West Side Irrigation District
Fresno Irrigation District
James Irrigation District
Kings County Water District
Kings River Water District
Laguna Irrigation District
Lakeside Irrigation Water District
Liberty Water District
Mid-Valley Water District
Raisin City Water District
Riverdale Irrigation District
Salyer Water District
Stratford Irrigation District
Tranquility Irrigation District
Tulare Lake Basin Water Storage District
Tulare Lake Reclamation District No. 761
Burrel Ditch Company
Corcoran Irrigation Company
Crescent Canal Company
John Heinlen Mutual Water Company
Last Chance Water Ditch Company
Lemoore Canal and Irrigation Company
Liberty Canal Company
Liberty Mill Race Company
Lovelace Water Corporation
Peoples Ditch Company
Reed Ditch Company
Southeast Lake Water Company
Stinson Canal and Irrigation Company
Tulare Lake Canal Company
Upper San Jose Water Company

Alta Irrigation District

Alta Irrigation District is located east and south of the Kings River and was California's first public irrigation district formed (in 1888) to actually deliver water to its users. The District's Alta Canal transports water into a system which serves the area from Reedley to an area west of Orange Cove in eastern Fresno County, and the Dinuba, Orosi, and Traver areas of northern Tulare County. The District's total area is 130,000 acres of

which irrigated ag is 90,000 and M&I is 40,000 acres. Main crops are peaches, nectarines, plums, citrus, and grapes.

Clark's Fork Reclamation District No. 2069

Clark's Fork Reclamation District No. 2069 delivers a limited amount of water to the Kings County "island" formed by the Kings River's Clark's Fork and South Fork channels northwest of Lemoore. The District has no District owned distribution system. Diversions are all by pumping through 30 individual pumping facilities along the Clark's Fork and South Fork channels. The service area is 1,920 acres. Irrigated acres are 1,800 and 120 acres are fallow. Main crops are cotton, alfalfa and wheat.

Consolidated Irrigation District

Consolidated Irrigation District (CID) has a service area of 155,000 acres serving a large portion of southeastern Fresno County and smaller areas in northeastern Kings County. CID extends from northeast of Sanger to south of Kingsburg and west of Caruthers. Communities served by CID include Sanger, Del Rey, Parlier, Fowler, Selma, Kingsburg and Caruthers. CID was a pioneer in developing groundwater recharge basins, storing water in the underground reservoirs in wet years for use (by pumping) in dry years and by those lacking access to surface water supplies in the San Joaquin Valley. CID also administers the Lone Tree Channel, a separate water delivery system. Lone Tree rights are held by approximately 80,000 acres within CID's boundaries.

CID receives CVP water via the Kings River. Water from the FKC would be released into the Kings River and Consolidated Irrigation District diverts the water approximately 100 yards downstream into CID' system.

Corcoran Irrigation District

Corcoran Irrigation District is described earlier in this document.

Empire West Side Irrigation District

Empire West Side Irrigation District serves a narrow territory which stretches more than seven miles along the South Fork's right (west) bank from above Empire No. 1 Weir, an area running northwest to southwest of Stratford in Kings County. Empire West Side Irrigation District also is a SWP contractor with deliveries made through TLBWSD Lateral A, which leaves the California Aqueduct at Kettleman City. Empire West Side Irrigation District serves agricultural water to its service area comprising 6,400 acres.

Fresno Irrigation District

Fresno Irrigation District (FID) is a member of KRCD and is also a CVP Long-Term Contract. FID takes delivery of the City of Fresno's Class 1 water amounting to 60,000 af/y and 75,000 af/y of Class 2 water from the Friant Division. The FID supply under the complex Kings River water diversion schedules is the largest in KRCD. Surface water transported by FID to groundwater recharge basins sustains the groundwater which is presently the only source of municipal and industrial water for the metropolitan Fresno-Clovis area. Surface water used for agricultural irrigation is also a major groundwater recharge contributor. FID stretches from the base of the Sierra foothills to west and south of Kerman. FID's internal water distribution system is extensive and complex. FID

provides water (through the Fresno supply) to the Freewater County Water District north of Sanger.

FID's territory encompasses much of the northern valley floor portion of Fresno County and embraces the cities of Fresno and Clovis. Other communities within FID's service area include Kerman and Biola. FID's service area is the largest of any member unit. The service area is 245,246 acres. Irrigated agriculture is 152,694 and M&I is 92,552 acres.

James Irrigation District

James Irrigation District (JID) formerly served its agricultural users with Kings River water diverted through the James Main and Beta Main canals. JID's mission is to deliver agricultural water and has a service area of 25,800 irrigated acres.

Since 1963, its primary surface water supply (under water exchange agreements with both JID and Tranquillity Irrigation Districts (TRID) and the lower Kings River units) has been CVP water pumped from the Mendota Pool. JID diverts Kings River water only when flood release flows are available. Water enters JID by diversions of Kings River water at the James Weir; Diversions of CVP water pumped from Mendota Pool into the James Bypass; diversions of San Joaquin River water from Mendota Pool through the James Bypass; delivery from a well field through lined canals and pipelines along Lassen Avenue and McMullin Grade Road; and spill from Fresno Irrigation District into a lined canal along McMullin Grade Road (not a supply). No water leaves JID.

JID and TRID are the two most northwesterly units and have an exchange agreement resulting in water being imported into the Kings River service area on a regular basis. JID and TRID are also CVP Contractors. The two Districts leased their average annual Kings River supply to other lower Kings River units at a price equal to that paid by JID and TRID to purchase a like amount of CVP water delivered at Mendota Pool through the Delta-Mendota Canal under their CVP Long-Term contracts. Up to 26,600 acre feet of JID and TRID supply in any one year is credited by the lower Kings River units to help facilitate minimum Pine Flat releases for fish and wildlife, channel conveyance losses and other administrative purposes. JID and TRID benefit by avoiding enormous Kings River channel losses in exchange for 100% water deliveries from Mendota Pool while assisting other Kings River units in resolving their own channel loss problems.

Kings County Water District

Kings County Water District is described earlier in this Section as a separate individual entity.

Kings River Water District

Kings River Water District (KRWD) serves much of the Centerville Bottoms area northeast, east and southeast of Sanger. The Centerville Bottoms is a rich and beautiful delta containing many wooded areas and complex, secluded sloughs which, supplied by the Kings River, ultimately flow back into the main stream. KRWD's senior water rights and small delivery system capacity combine to enable KRWD to deliver water much of

the year. KRWD's service area is 25,800 acres of which 10,000 acres are irrigated agriculture. KRWD does not provide M&I water. Water enters by diversions from the Kings River. No water leaves KRWD.

Laguna Irrigation District

Laguna Irrigation District (LGID) serves an area of southern Fresno County and northern Kings County west of Laton and south, southeast and southwest of Riverdale. The total service area is 35,000 acres with a substantial portion that includes the historic Rancho Laguna de Tache grant. This grant was a 48,800 acre Mexican land grant which included a 26 mile stretch along the original Kings River channel's right bank (below the modern site of Kingsburg. LGID southerly boundary is generally along the Kings River. The grant was complex but played a pivotal role in the eventual settlement of Kings River water rights and supplies through its 1892 purchase by the Fresno Canal and Irrigation Company, and gained control of the grant's riparian water claims. In 1897, the manager of the Fresno canal system and the Laguna ranch owner negotiated the first partial Kings River water supply schedules. This ultimately led to later agreements that resolved all Kings River water rights and supply issues. LGID has a total area of 35,000 acres of which 20,700 are agricultural. LGID does not provide M&I water.

Lakeside Irrigation Water District

Lakeside Irrigation Water District is discussed earlier in this section.

Liberty Water District

Liberty Water District is discussed earlier in this section.

Mid Valley Water District

Mid Valley Water District is comprised of 13,406 agricultural acres. Water is delivered by pumping from the James Bypass. Mid Valley Water District does not provide M&I water.

Raisin City Water District

Raisin City Water District (RCWD) has a total of 53,500 acres, of which, 43,500 are agricultural, 5,000 are M&I and 5,000 are fallow. RCWD does not provide M&I water.

Riverdale Irrigation District

Riverdale Irrigation District (RID) serves rural portions of the Riverdale community between Murphy Slough and the King River's North Fork. RID's Kings River supply is combined with the Reed Ditch Company and Liberty Mill Race Company under the Murphy Slough Association. RID’s total area is 15,000 acres, of which, 14,000 acres are ag, 700 are M&I and 300 are fallow. Water is diverted from the Kings River near the town of Laton. No water is returned to the river.

Salyer Water District

Salyer Water District still exists but is no longer functioning and will not be a participant or receiving CVP water.

Stratford Irrigation District

Stratford Irrigation District service area is 9,750 agricultural acres and serves the left (east) bank of the South Fork, below Empire No. 1 Pool. Stratford Irrigation District serves the Stratford area of Kings County and does not provide M&I water. Water is diverted from the Kings River at Lemoore Weir into the Lemoore Canal, or from the Kings River at Empire Weir No. 1 or Empire Weir No. 2.

Tranquillity Irrigation District

Tranquillity Irrigation District (TRID) is a CVP Contractor and has already undergone extensive environmental review and is not the focus of this EA. TRID has a service area of 10,700 agricultural acres and is a CVP Long-Term contractor. TRID is the northwesterly unit in KRCD. TRID's surface water supply (under the Tranquillity exchange agreement) is pumped from the Mendota Pool. TRID's former Kings River diversion facilities, the Lone Willow Channel and Beta Main Canal, were last used in 1958 and are abandoned.

Tulare Lake Basin Water Storage District

Tulare Lake Basin Water Storage District is described elsewhere in this section

Tulare Lake Reclamation No. 761

Tulare Lake Reclamation District No. 761 receives most of its water supplies through the Blakeley Canal, originating at Empire Weir No. 2, and Lateral A from the SWP. Tulare Lake Reclamation No. 761 delivers water to lands on the western and southwestern sides of the Tulare Lake Bed in Kings County. Its service area is 37,000 acres, of which, 16,000 acres are agricultural and none are M&I. The remaining acres are fallow/idle and portions serve as wetlands. Main crops are wheat and alfalfa.

Burrel Ditch Company

Burrel Ditch Company has a service area of 4,500 agricultural acres and is a mutual water company. The company delivers water from Murphy Slough into the company's small service area in the Burrel area, east of Fresno Slough. Main crops are wine grapes, almonds, alfalfa and silage corn.

Corcoran Irrigation Company

Corcoran Irrigation Company has no designated service area and is a mutual water company serving the Corcoran area of eastern Kings County with water transported 25 miles through the Lakelands Canal system from People's Wier, south of Kingsburg. The Peoples Weir is the largest of all such Kings River structures and spans the main channel a mile south of the Fresno County of Kingsburg just inside the northeastern corner of Kings County. It creates a large pool from which water may be diverted into the Lakelands Canal, which flows from the left bank 25 miles to the Corcoran area, or into the People's Ditch. Those privately owned canals deliver water to users in a substantial portion of eastern Kings County, all the way south to the Tulare Lake Bed.

Crescent Canal Company

Crescent Canal Company has a service area of 13,100 agricultural acres and is a mutual water company serving an area west of the Kings River North Fork and Fresno Slough, several miles of west of Riverdale. Deliveries are through the company's Crescent Canal. The Crescent Weir is located a few miles southwest of Riverdale and four miles below State Route 41 where North Fork flood release quantities are typically measure and confirmed. Beginning here is the Crescent Canal Company's ditch. Main crops are cotton, seed alfalfa and safflower.

John Heinlen Mutual Water Company

John Heinlen Mutual Water Company has a service area of 13,100 agricultural acres and serves stockholders in a Kings County area north and northwest of Lemoore. Main crops are cotton and alfalfa.

Last Chance Water Ditch Company

Last Chance Water Ditch Company is a mutual water company which serves stockholders within a large portion of Kings County, southwest of Laton and north and west of Hanford, as well as, portions of the Tulare Lake Bed. The company has a service area of 39,000 agricultural acres. Main crops are stone fruit and walnuts.

Lemoore Canal and Irrigation Company

Lemoore Canal and Irrigation Company is a mutual water company serving stockholders in the Lemoore area of Kings County. The company's large service area has one of the most substantial lower river water supplies. The company's service area is 52,300 agricultural acres. Main crops are cotton, wheat and safflower.

Liberty Canal Company

Liberty Canal Company is a mutual water company and delivers water through the Liberty Canal which flows northwesterly from Laton to the company's service area of 5,300 irrigated acres north of Riverdale. Main crops are orchards, vines and row crops.

Liberty Mill Race Company

Liberty Mill Race Company is a mutual water company receiving water through Murphy Slough and serves an area, approximately 8,100 irrigated acres, north and northwest of Riverdale and near Burrel.

Lovelace Water Corporation

Lovelace Water Corporation, a private water company, serves the northern portion of the Tulare Lake Bed with deliveries make through the Kings River South Fork Canal and the Tulare Lake Canal. Lovelace Water Corporation has no designated service area.

People's Ditch Company

People's Ditch Company is a mutual water company providing water service over an extensive portion of northeastern Kings County (including the Hanford area), as well as, making deliveries to stockholders in the Tulare Lake Bed. The company operates People's Weir which was discussed in this section under Corcoran Irrigation Company.

In wet years, surplus water deliveries through the People's Ditch is ponded in the Kings County Water District's extensive system of groundwater recharge basins and channels. The People's Ditch Company has no designated service area.

Reed Ditch Company

Reed Ditch Company is a mutual water company serving a small area northwest of Riverdale with water delivered through Murphy Slough. The company's service area is 3,500 irrigated agricultural acres. Main crops are trees, row crops and vines.

Southeast Lake Water Company

Southeast Lake Water Company is a mutual water company with no designated service area. The company delivers water to stockholders in portions of the Tulare Lake Bed.

Stinson Canal and Irrigation Company

Stinson Canal and Irrigation Company is a mutual water company and has a service area of 15,500 irrigated agricultural acres serving an area west of the left bank of the North Fork and Fresno Slough, west and northwest of Burrel. Deliveries are through the company's Stinson Canal. Main crops are row crops.

Tulare Lake Canal Company

Tulare Lake Canal Company is a mutual water company and has no designated service area. The company provides water to stockholders in portions of the Tulare Lake Bed.

Upper San Jose Water Company

Upper San Jose Water Company serves a narrow area about seven miles along the western sides of the South Fork, Clark's Fork and the Crescent Bypass, just east of Lemoore Naval Air Station in Kings County. The company has no designated service area.

Ditch companies are entities that do not have specific geographic boundaries. However, they own canals and ditches that provide the mechanism to deliver water to the stock holders.

Besides groundwater potential water supplies are Kings River and streams tributary thereto, such as Mill Creek, Sand Creek, Wahtoke Creek and other minor streams flowing into KRCD, Kaweah, St. Johns and Tule Rivers, SWP, and CVP (Friant Division or Cross Valley Canal Divisions supplies).

APPENDIX F
STATE LISTED SPECIES AND SPECIES OF CONCERN

Common Name	**Scientific Name**	**Status**
Purposed Species		
Amphibians		
California tiger salamander	*Ambystoma californiense*	PT
Candidate Species		
Fish		
green sturgeon	*Acipenser medirostris*	C
Amphibians		
Yosemite toad	*Bufo canorus*	C
Mountain yellow-legged frog	*Rana muscosa*	C
Birds		
Western yellow-billed cuckoo	*Coccyzus americanus occidetalis*	C
Mammals		
Fisher	*Martes pennanti*	C
Plants		
Slender Moonwort (=narrowleaf grapefern)	*Botrychium lineare*	C
Species of Concern		
Invertebrates		
Ciervo aegialian scarab beetle	*Aegialia concinna*	SC
Midvalley fairy shrimp	*Branchinecta mesovallensis*	SC
San Joaquin tiger beetle	*Cicindela tranquebarica ssp*	SC
San Joaquin dune beetle	*Coelus gracilis*	SC
Kings Canyon cryptochian caddisfly	*Cryptochia excella*	SC
Wooly hydroporus diving beetle	*Hydroporus hirsutus*	SC
California linderiella fairly shrimp	*Linderiella occidentalis*	SC
Hopping's blister beetle	*Lytta hoppingi*	SC
Moestan blister beetle	*Lytta moesta*	SC
Molestan blister beetle	*Lytta molesta*	SC
Morrison’s blister beetle	*Lytta morrisoni*	SC
Dry Creek cliff strider bug	*Oravelia pege*	SC
Bohart's blue butterfly	*Philotiella speciosa bohartorum*	SC
Sierra pygmy grasshopper	*Tetrix sierrana*	SC

Common Name	Scientific Name	Status
Fish		
River lamprey	*Lampetra ayresi*	SC
Kern brook lamprey	*Lampetra hubbsi*	SC
Pacific lamprey	*Lampetra tridentate*	SC
Sacramento splittail	*Pogonichthys macrolepidotus*	SC
Longfin smelt	*Spirinchus thaleichthys*	SC
Amphibians		
Mount Lyell salamander	*Hydromantes platycephalus*	SC
Foothill yellow-legged frog	*Rana boylii*	SC
Western spadefoot toad	*Spea hammondii*	SC
Reptiles		
Silvery legless lizard	*Anniella pulchra pulchra*	SC
Northwestern pond turtle	*Clemmys marmorata marmorata*	SC
Southwestern pond turtle	*Clemmys marmorata pallida*	SC
San Joaquin coachwhip (= whipsnake)	*Masticophis flagellum ruddocki*	SC
California horned lizard	*Phrynosoma coronatum frontale*	SC
Birds		
Northern goshawk	*Accipiter gentiles*	SC
Tri-colored blackbird	*Agelaius tricolor*	SC
Western burrowing owl	*Athene cunicularia hypugaea*	SC
Oak titmouse	*Baeolophus inornatus*	SC
American bittern	*Botaurus lentiginosus*	SC
Aleutian Canada goose	*Branta Canadensis leucopareia*	SC
Ferruginous hawk	*Buteo regalis*	SC
Swainson's hawk	*Buteo swainsoni*	SC
Costa's hummingbird	*Calypte costae*	SC
Lawrence's goldfinch	*Carduelis lawrencei*	SC
Vaux's swift	*Chaetura vauxi*	SC
Mountain plover	*Charadrius montanus*	SC
American dipper	*Cinclus mexicanus*	SLC
Olive-sided flycatcher	*Contopus cooperi*	SC
Black swift	*Cypseloides niger*	SC
White-tailed (=black shouldered) kite	*Elanus leucurus*	SC
Little willow flycatcher	*Empidonax traillii brewsteri*	SC
American peregrine falcon	*Falco peregrinus anatum*	D
Greater sandhill crane	*Grus canadensis tabida*	CA
Loggerhead shrike	*Lanius ludovicianus*	SC
Lewis' woodpecker	*Melanerpes lewis*	SC
Long-billed curlew	*Numenius americanus*	SC

Common Name	**Scientific Name**	**Status**
Flammulated owl	*otus flammoolus*	SC
White-headed woodpecker	*Picoides albolarvatus*	SC
Nuttall's woodpecker	*Picoides nuttallii*	SLC
White-faced ibis	*Plegadis chihi*	SC
Bank swallow	*Riparia riparia*	SC
Rufous hummingbird	*Selasphorus rufus*	SC
Red-breasted sapsucker	*Sphyrapicus rubber*	SC
California spotted owl	*Strix occidentalis occidentalis*	SC
San Joaquin LeConte's thrasher	*Toxostoma lecontei macmillanorum*	SC
California thrasher	*Toxostoma redivivum*	SC
Mammals		
San Joaquin (=Nelson's) antelope squirrel	*Ammospermophilus nelsoni*	CA
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	SC
Pacific western big-eared bat	*Corynorhinus (=Plecotus) townsendii townsendii*	SC
Short-nosed kangaroo rat	*Dipodomys nitratoides brevinasus*	SC
Spotted bat	*Euderma maculatum*	SC
Greater western mastiff-bat	*Eumops perotis californicus*	SC
California wolverine	*Gulo gulo luteus*	CA
American (=pine) marten	*Martes Americana*	SC
Small-footed myotis bat	*Myotis ciliolabrum*	SC
Long-eared myotis bat	*Myotis evotus*	SC
Fringed myotis bat	*Myotis thysanodes*	SC
Long-legged myotis bat	*Myotis volans*	SC
Yuma myotis bat	*Myotis yumanensis*	SC
Southern grasshopper mouse	*Onychomys torridus Ramona*	SC
Tulare grasshopper mouse	*Onychomys torridus tularensis*	SC
San Joaquin pocket mouse	*Perognathus inornatus*	SC
Mt. Lyell shrew	*Sorex lyelli*	SC
Sierra Nevada red fox	*Vulpes vulpes necator*	SC
Plants		
Obovate-leaved thornmint	*Acanthomintha obovata ssp. Obovata*	SC
Forked fiddleneck	*Amsinckia vernicosa var. furcata*	SLC
Bodie hills rock cress	*Arabis bodiensis*	SC
Raven's milk-vetch	*Astragalus monoensis var. ravenii*	SC
Heartscale	*Atriplex cordulata*	SC
Brittlescale	*Atriplex depressa*	SC
Lesser saltscale	*Atriplexminuscula*	SC

Common Name	**Scientific Name**	**Status**
Subtle orache	*Atriplex subtilis*	SLC
Lost hills saltbrush	*Atriplex vallicola*	SC
South Coast Range morning-glory	*Calystegia Collina ssp. Venusta*	SLC
Mono Hot springs evening-primrose	*Camissonia sierrae ssp.. alticola*	SC
Carpenteria	*Carpenteria californica*	CA
Lemmon's jewelflower	*Caulanthus coulteri var lemmonii*	SLC
San Benito spineflower	*Chorizzanthe bilboba var. immemora*	SC
Fresno County bird's beak	*Cordylanthus tenuis ssp. Barbatus*	SC
Hall's tarplant	*Deinandra halliana*	SC
Recurved larkspur	*Delphinium recurvatum*	SC
Hoover's eriastrum (=woolly-star)	*Eriastrum hooveri*	D
Kern River daisy	*Erigeron multiceps*	SC
Cottony buckwheat	*Erigonum gossypinum*	SLC
Mouse buckwheat	*Erigonum nudum var. murinum*	SC
Kings River buckwheat	*Erigonum nudum var. regirivum*	SLC
Spiny-sepaled coyote-thistle (=button-celery)	*Eryngium spinosepalum*	SC
Stinkbells	*Fritillaria agrestis*	SLC
Serpentine bedstraw	*Galium andrewsii ssp. Gatense*	SLC
Monarch gilia	*Gilia yorkii*	SLC
Boggs Lake hedge-hyssop	*Gratiola heterosepala*	CA
Short-leaved hulsea (=shortleaf alphinegold)	*Hulsea brevifolia*	SLC
Field ivesia (=field mousetail)	*Ivesia campestris*	SLC
Delta tule-pea	*Lathyrus jepsonii var. jepsonii*	SC
Rayless layia	*Layia discoidea*	SC
Pale-yellow layia	*Layia heterotricha*	SC
Munz's tidy-tips	*Layia munzii*	SC
Panoche peppergrass	*Lepidium jaredii var. album*	SC
Yosemite lewisia	*Lewisia disepala*	SC
Long-petaled lewisia	*Lewisia longipetala*	SC
Madera linanthus	*Linanthus serrulatus*	SLC
Orange lupine	*Lupinus citrinus var. citrinus*	SC
Showy (=golden) madia	*Madia radiate*	SC
Indian Valley (=gray) bush mallow	*Malacothamnus aboriginum*	SLC
Slender-stalked monkeyflower	*Mimulus gracilipes*	SLC
Aromatic canyon gooseberry	*Ribes menziesii var ixoderme*	SLC
Valley sagittaria (=Sanford's arrowhead)	*Sagittaria sanfordii*	SC
No common name	*Schizymenium shevockii*	SLC
Tehipite Valley jewelflower	*Streptanthus fenestratus*	SC
Alpine streptanthus (=jewel-flower)	*Streptanthus gracilis*	SC
Parasol (=Bolander's) clover	*Trifolium bolanderi*	SC

Common Name	Scientific Name	Status
Species with Critical Habitat Proposed or Designated in this County		
California red-legged frog		PX
Fresno kangaroo rat		E
Keck's checker-mallow		PX
Vernal pool fairy shrimp		X
Vernal pool invertebrates		X
Vernal pool plants		X
Vernal pool tadpole shrimp		X
Key		
E	Endangered	
T	Threatened	
P	Proposed	
Critical Habitat – Area essential to the conservation of a species.		
PX	Proposed Critical Habitat	
C	Candidate	
CA	Listed by the State of California	
D	Delisted	
SC	Species of Concern	
SLC	Species of Local Concern	

APPENDIX G
FIGURES 3-1 THRU 3-4
MAPS