Appendix A: Summary of Available Water Supplies

Summary of Available Water Supplies

This appendix includes a summary of available water supplies for the Cross Valley Contractors and their potential exchange partners.

Cross Valley Contractors

The seven Central Valley Project (CVP) Cross Valley Contractors (Table 1) are geographically located within the Friant Division but receive their CVP water supplies from the Delta. Due to direct conveyance hurdles, Cross Valley Contractors obtain their CVP supplies either by direct delivery from the Cross Valley Canal or via transfers associated with exchange agreements with participating contractors pursuant to Article 5(a) of their water service contracts.

Table 1 Cross Valley Contractors

Contractor	Contract Number	Contract Quantity (acre-feet per year)
County of Fresno[1]	14-06-200-8292A-IR16	3,000
County of Tulare[2]	14-06-200-8293A-IR16	5,308
Hills Valley Irrigation District[3]	14-06-200-8466A-IR16	3,346
Kern-Tulare Water District[3]	14-06-200-8601A-IR16	40,000
Kern-Tulare Water District (from Rag Gulch Water District)[4]	14-06-200-8367A-IR16	13,300
Lower Tule River Irrigation District[3]	14-06-200-8237A-IR16	31,102
Pixley Irrigation District	14-06-200-8238A-IR16	31,102
Tri-Valley Water District[3]	14-06-200-8565A-IR16	1,142

[1]County of Fresno includes Fresno County Service Area #34
[2]County of Tulare includes the following subcontractors: Alpaugh Irrigation District, Atwell Water District, City of Lindsay[3], City of Visalia, Hills Valley Irrigation District[3], Saucelito Irrigation District[3], Smallwood Vineyards, Stone Corral Irrigation District[3], Strathmore Public Utility District, and Styrotek, Inc.
[3]Lower Tule River Irrigation District, Saucelito Irrigation District, Stone Corral Irrigation District, Tri-Valley Water District, Kern-Tulare Water District, Hills Valley Irrigation District, and City of Lindsay receive CVP water under more than one contract, either as Friant Division and/or Cross Valley Contractors.
[4]Kern Tulare Water District and Rag Gulch Water District consolidated on January 1, 2009.

As shown in Table 1, some of the Cross Valley Contractors are comprised of subcontractors. The following description characterizes each Cross Valley Contractor and associated subcontractor.

County of Fresno

The County of Fresno has a Cross Valley CVP water service contract for up to 3,000 acre-feet per year (AF/y) that is provided for municipal and industrial (M&I) purposes to specific developments within its CVP service area. County Service Area 34 (CSA 34) was formed to provide potable water to approximately 3,500 residential, commercial, and public facility water connections within the Millerton New Town Specific Plan Area. CSA 34 currently provides residential potable water to a population of over 700 and supplies surface to a golf course from its surface water supply contract including banking, transfers, or exchanges and a standby groundwater well. There is no agricultural demand within CSA 34. Within the next five years,

the development is on track to add four more subdivisions with an additional 698 residential water connections for a total of 955 residential water connections by 2022 (County of Fresno 2017).

CSA 34 draws their water directly from Millerton Lake after the County's Cross Valley CVP water supply has been exchanged with Arvin-Edison Water Storage District (Arvin-Edison) for Friant CVP water supplies. The County's Cross Valley CVP water supplies have been administered by Arvin-Edison for the last 20 years pursuant to an agreement between the County and Arvin-Edison.

County of Tulare

The County of Tulare is comprised of 10 subcontractors – both agricultural and M&I. Of those 10 subcontractors, only five have routinely taken water deliveries via the Cross Valley Canal exchanges or through direct water purchases from Friant Division Contractors via the County of Tulare's interim contract in recent years. The County of Tulare's 5,308 AF Cross Valley CVP contract supply is divided among the 10 subcontractors as shown below:

- Alpaugh Irrigation District – 100 AF (agricultural)
- Atwell Island Water District – 50 AF (agricultural)
- City of Lindsay – 50 AF (M&I)
- City of Visalia – 300 AF (M&I)
- Hills Valley Irrigation District – 2,913 AF (agricultural)
- Saucelito Irrigation District – 100 AF (agricultural)
- Smallwood Vineyards – 400 AF (agricultural)
- Stone Corral Irrigation District – 950 AF (agricultural)
- Strathmore Public Utility District – 400 AF (M&I)
- Styrotek Inc. – 45 AF (M&I)

Alpaugh Irrigation District

Alpaugh Irrigation District (Alpaugh ID) is comprised of approximately 10,500 acres, of which 5,400 are irrigated. Groundwater is the primary water supply for the district. Alpaugh ID operates 18 wells and 3 regulating reservoirs that cover approximately 800 acres and have a maximum capacity of 4,000 AF. Alpaugh ID provides approximately 300 AF/y of potable groundwater to the Community of Alpaugh.

Alpaugh ID is a subcontractor with the County of Tulare for up to 100 AF/y of CVP water. Historically, Alpaugh ID has entered into exchange arrangements with Arvin-Edison. Friant CVP water is delivered to Alpaugh ID at milepost (MP) 102.69 (Deer Creek turnout) off the Friant-Kern Canal (FKC).

Alpaugh ID does not have any other contracts or water rights to surface water supplies. However, during wet years Alpaugh ID has been able to utilize excess water available in the Homeland Canal, which if not used, would flow into the historic Tulare Lake.

Atwell Island Water District

Atwell Island Water District (Atwell Island) is comprised of 7,136 acres, of which, 4,645 are irrigated. Atwell Island does not operate or maintain groundwater recharge or extraction facilities. Landowners must provide privately owned wells to sustain irrigation during periods when the district does not have surface water available. The district uses primarily surface water supplies when it is available and relies on groundwater only when surface water is unavailable. In wet years, Atwell Island purchases water supplies for use in the district in lieu of pumping groundwater.

In 1993, Atwell Island and Hills Valley Irrigation District (Hills Valley) entered into subcontracts with the County of Tulare for 954 AF/y each of the County's Cross Valley CVP water supply. Hills Valley later obtained Atwell Island's 904 AF/y under the agreement resulting in a reduction of Atwell Island's Cross Valley CVP water supply to 50 AF/y.

City of Lindsay

The city of Lindsay is located on the east side of the San Joaquin Valley in Tulare County near the base of the Sierra Nevada foothills. The City has a CVP Friant Division M&I water service contract (5-07-20-W0428) for up to 2,500 AF/y of Class 1[1] water. The City also receives up to 50 AF/y of Cross Valley CVP water under its subcontract with the County of Tulare. Lindsay obtains its CVP water supply from the FKC at the Honolulu Street turnout. The City's water treatment plant is at the same location and provides filtration, chemical additions, and chlorination.

City of Visalia

The city of Visalia, located in Tulare County, receives up to 400 AF/y of Cross Valley CVP water under its subcontract with County of Tulare. The City exchanges its Cross Valley CVP water supply for Hills Valley's Wutchumna Water rights from the Kaweah River. Hills Valley takes physical possession of the City's Cross Valley CVP water. However, this water is considered non-Project water and is applied to ineligible lands. The City 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.

Hills Valley Irrigation District

Hills Valley, located primarily in Fresno County with a small portion in Tulare County, is comprised of approximately 4,223 acres, of which 3,913 are irrigated permanent crops (Hills Valley Irrigation District 2017). Hills Valley has three regulating reservoirs: Anchor Reservoir (0.53 million gallons), American Reservoir (2.0 million gallons), and a 15 AF regulating reservoir. The district does not own groundwater extraction facilities; therefore, individual landowners must provide their own wells to sustain irrigation during periods when Hills Valley does not have surface water available. Hills Valley only serves water to agricultural users.

Hills Valley originally entered into a Cross Valley contract for up to 2,146 AF/y. In 1995, the contract amount was amended to 3,346 AF/y. Hills Valley also entered into subcontracts with

[1] Friant Division Class 1: The supply of water in or flowing through Millerton Lake which, subject to the contingencies described in the water service or repayment contracts, will be available for delivery from Millerton Lake and the Friant-Kern and Madera Canals as a dependable water supply during each Contract Year.

the County of Tulare for 954 AF/y and 1,100 AF/y, respectively. Hills Valley later acquired 904 AF/y from Atwell Island's subcontract with the County of Tulare. Hills Valley's total Cross Valley CVP water supply is up to 6,304 AF/y. Historically, the district has received its Cross Valley CVP water supplies through an exchange with Arvin-Edison.

1n 2012, Hills Valley became a Friant Division CVP contractor by receiving two partial assignments from Lewis Creek Water District (for up to 250 AF/y of Class 1 Friant water supplies) and Porterville Irrigation District (for up to 1,000 AF/y of Class 1 Friant water supplies). Hills Valley receives its CVP water supplies from its turnout off the FKC at MP 41.15L.

Saucelito Irrigation District

Saucelito Irrigation District (Saucelito) is comprised of 19,453 acres, of which 19,057 are irrigated. Deer Creek, an intermittent stream, crosses the District for about 5 miles from its southern boundary, but there are no District diversions off Deer Creek. Saucelito has a CVP Friant Division water service contract (I75r-2604D) for up to 21,200 AF/y of Class 1 and up to 32,800 AF/y of Class 2[2] water. 1n 2012, Saucelito received a partial assignment from Tea Pot Dome Water District (for up to 300 AF/y of Class 1 Friant water supplies). Saucelito also receives up to 100 AF/y of CVP water under its subcontract with County of Tulare. Saucelito obtains its CVP water supplies from four diversion points on the FKC between milepost (MP) 100.64 and 107.35 and the Deer Creek diversion at MP 102.69. The district has five individual water users that have rights in Poplar Irrigation Company of 9.5 shares at 55 AF per share from Mole Ditch. Saucelito has one recharge pond that covers approximately ½ acre. Deer Creek also provides groundwater recharge in wet years.

Smallwood Vineyards

Smallwood Vineyards has a subcontract with the County of Tulare for up to 400 AF/y of Cross Valley CVP water; however, the turnout where the water was previously received has been removed and no Cross Valley water supplies are delivered to this area under this contract.

Stone Corral Irrigation District

Stone Corral, located in Tulare County, is comprised of 6,495 acres, of which 5,470 acres are irrigated. Stone Corral has a Friant Division CVP contract (Contract No. 175r-2555D) for up to 10,000 AF/y of Class 1 water. The District also receives up to 950 AF/y of CVP water under its subcontract with County of Tulare. Stone Corral receives its CVP water from the FKC at MP 57.90, 59.33, 60.90 and 62.68. The District serves only agricultural water.

Strathmore Public Utility District

Strathmore Public Utility District (Strathmore) provides wastewater treatment for a population of approximately 1,900 in the city of Strathmore. Strathmore receives up to 400 AF/y of Cross Valley CVP water through its subcontract with the County of Tulare. The CVP water is diverted from Strathmore's turnout on the FKC and injected into a well to be used for blending with the

[2] Friant Division Class 2: The supply of water which can be made available subject to the contingencies described in the water service or repayment contract for delivery from Millerton Lake and the Friant-Kern and Madera Canals in addition to the supply of Class 1 water. Because of its uncertainty as to availability and time of occurrence, such water will be undependable in character and will be furnished only if, as, and when it can be made available.

wastewater before it reaches the headworks of the wastewater treatment plant. 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 Cross Valley CVP water under its subcontract 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.

Kern-Tulare Water District

Kern-Tulare Water District (Kern-Tulare), located on the eastern side of the San Joaquin Valley in Kern and Tulare Counties, is comprised of approximately 20,256 acres of which approximately 17,406 acres are irrigated (Kern-Tulare Water District 2015). The District does not supply M&I water.

Kern-Tulare has two Cross Valley Contracts (Contract Nos.14-06-200-8601A and 14-06-200-8367A) for a combined total of up to 53,300 AF/y. The District also has a Friant Division CVP contract (Contract No. I1r-1460A) with a Class 2 allocation for up to 5,000 AF/y. When available, the District also purchase other supplemental surface water supplies including, Friant Division Section 215[3] water, Class 1 and Class 2 water supplies from other Friant Contractors, State Water Project (SWP) water from Kern County Water Agency, and Kern River Water from the City of Bakersfield (Kern-Tulare Water District 2015).

Due to the variability of the surface water supplies, the District has invested significantly in groundwater banking and exchange programs. Surface water is captured when available and later utilized in years when the CVP allocation is insufficient to meet irrigation demands (Kern-Tulare Water District 2017).

Lower Tule River Irrigation District

Lower Tule River Irrigation District (Lower Tule), located on the eastern side of the San Joaquin Valley in Tulare County, is comprised of approximately 103,086 acres of which 84,169 acres are irrigated (Lower Tule River Irrigation District 2012). The District does not supply M&I water.

Currently, the water supply for landowners within the District is derived from groundwater, pre-1914 water rights on the Tule River (average annual supply of 70,000 AF), and surface water from its Friant Division CVP water service contract (Contract No. I75r-2771D) for up to 61,200 AF/y of Class 1 and 238,000 AF/y of Class 2 water supplies, as well as its Cross Valley CVP water service contract (Contract No. 14-06-200-8237A) for up to 31,200 AF/y (Lower Tule River Irrigation District 2012).

All groundwater pumping is done by landowners who utilize privately owned wells when surface water supplies are insufficient to meet demands (Lower Tule River Irrigation District 2012).

[3] Section 215 water is defined under Section 215 of the Reclamation Reform Act of 1982 (RRA), as unstorable irrigation water to be released due to flood control criteria or un-managed flood flows.

Lower Tule maintains and operates 18 recharge and regulating basins, covering approximately 4,500 acres. When excess surface water is available, Lower Tule uses the 18 groundwater recharge facilities to recharge the aquifer.

Pixley Irrigation District

Pixley Irrigation District (Pixley), located in Tulare County, is comprised of 69,571 acres, of which 59,283 are irrigated (Pixley Irrigation District 2012). The District's water supply is derived from the use of groundwater, surface water diverted from Deer Creek when available, and surface water from its Cross Valley CVP contract (Contract No. 14-06-200-8238A) for up to 31,102 AF/y. The District does not own or operate groundwater extraction facilities.

All groundwater pumping is done by landowners who utilize privately owned wells when surface water supplies are insufficient to meet demands (Pixley Irrigation District 2012). Pixley operates a conjunctive use program so that in wetter years surface water supplies are used to replenish groundwater levels through the Deer Creek channel, its unlined canal distribution system, and approximately 800 acres of groundwater recharge/regulating reservoirs (Pixley Irrigation District 2012).

Tri-Valley Water District

Tri-Valley Water District (Tri-Valley), located in eastern Fresno County, is comprised of approximately 2,284 acres, of which approximately 1,840 are irrigated (Tri Valley Water District 2016).

Currently, the water supply for landowners within the District is derived from groundwater and surface water from its Cross Valley CVP water service contract (Contract No. 14-06-200-8565A) for up to 1,142 AF/y as well as a Friant Division CVP water service contract (Contract No175r-2485D) for up to 400 AF/y of Class 1 water supplies. The District's provides its CVP water directly from the FKC through approximately seven miles of pipeline which is shared and operated by Orange Cove Irrigation District (Tri Valley Water District 2016).

The District does not own or operate any canals, recharge basins, regulating reservoirs, or groundwater extraction facilities. All groundwater pumping is done by landowners who utilize privately owned wells when surface water supplies are insufficient to meet demands; however, due to the proximity to the Sierra Nevada foothills, groundwater supplies are typically inadequate for agricultural uses (Tri Valley Water District 2016).

Potential Friant Division Exchange Partners

There are 32 Friant Division CVP contractors located on the eastern side of the San Joaquin Valley in Merced, Madera, Fresno, Tulare, Kings, and Kern Counties. CVP water for these contractors comes from Millerton Lake via the FKC or the Madera Canal. Water conveyed to these contractors is categorized as Class 1 or Class 2 water depending on its reliability and allocation circumstances. As some of these contractors also include Cross Valley Contractors, only those that would participate as potential exchange partners are included in Table 2 below.

Table 2 Contract Quality of Friant Division Contractors

Contractor	Class 1 (AF/y)	Class 2 (AF/y)	Other Surface Supply (AF/y)
Arvin-Edison Water Storage District	40,000	311,675	Kern River
Delano-Earlimart Irrigation District	108,800	74,500	None
Exeter Irrigation District	11,100	19,000	None
Fresno Irrigation District	0	75,000	Kings River ~800,000
Garfield Water District	3,500	0	None
Ivanhoe Irrigation District	6,500	500	Wutchumna Water Company ~3,950 St. Johns River Cotton Creek
Kaweah Delta Water Conservation District[1]	1,200	7,400	Kaweah River Cottonwood Creek Cross Creek Kings River Tule River
Lewis Creek Water District	1,200	0	None
Lindmore Irrigation District	33,000	22,000	None
Lindsay-Strathmore Irrigation District	27,500	0	Wutchmna Water Company Stock ~5-45,000
Orange Cove Irrigation District	39,200	0	None
Porterville Irrigation District	15,000	30,000	Tule River ~12,900 average Porter Slough
Shafter-Wasco Irrigation District	50,000	39,600	None
Southern San Joaquin Municipal Utility District	97,000	45,000	None
Tea Pot Dome Water District	7,200	0	None
Terra Bella Irrigation District	29,000	0	None
Tulare Irrigation District	30,000	141,000	None

[1]Kaweah Delta Water Conservation District is comprised of four districts: Lakeside Irrigation Water District, Kings County Water District, Corcoran Irrigation District, and Tulare Irrigation District.

Potential Non-CVP Contractors

Below is a list of potential non-CVP exchange partners:

- Buena Vista Water Storage District
- Cawelo Water District
- Consolidated Irrigation District
- Corcoran Irrigation District
- Deer Creek & Tule River Authority
- Kaweah Delta Water Conservation District
- Kern County Water Agency
- Kern Delta Water District
- Kern Water Bank Authority
- Kings County Water District
- Kings River Conservation District
- Lakeside Irrigation District
- Liberty Water District

- North Kern Water Storage District
- Rosedale-Rio Bravo Water Storage District
- Semitropic Water Storage District
- Tulare Lake Basin Water Storage District

Some of these districts have sub-entities which may include CVP and/or SWP contractors as shown in Tables 3 through 7 below. Only those contractors that could participate as potential exchange partners (i.e., are located within the CVP Consolidated Place of Use) are included in the tables below.

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 Deer Creek & Tule River Authority Contractors

Contractor	Class 1 (AF/y)	Class 2 (AF/y)	Other Surface Supply (AF/y)
Porterville Irrigation District	15,000	30,000	Tule River ~ 12,900 Porter Slough
Terra Bella Irrigation District	29,000	0	0

Note: Lower Tule, Pixley, Saucelito, and Stone Corral are also members.

Table 4 Kern County Water Agency Contractors

Contractor	Surface Water Supplies (AF/y)
Buena Vista Water Storage District	21,300 SWP Kern River
Cawelo Water District	45,000 AF/y SWP Poso Creek (wet years only) 27,000 Kern River Reclaimed oil field water Section 215 CVP water
Kern Delta Water District	Kings River Kaweah River
North Kern Water Storage District	SWP Kern River
Rosedale-Rio Bravo Water Storage District	SWP Kern River
Semitropic Water Storage District	SWP Poso Creek
West Kern Water District	SWP
Wheeler Ridge-Maricopa Water Storage District	SWP Local streams

Note: Belridge Water Storage District, Berrenda Mesa Water District, Henry Miller Water District, Lost Hills Water District, Tehachapi-Cummings Co. Water District, and Tejon-Castaic Water District are also members but are outside the Consolidated Place of Use and cannot participate in the Proposed Action.

Table 5 Kern Water Bank Authority Contractors

Contractor	Surface Water Supplies (AF/y)
Dudley Ridge Water District	SWP
Kern County Water Agency	SWP Kern River
Semitropic Water Storage District	SWP Poso Creek
Westside Mutual Water Company	SWP
Wheeler Ridge-Maricopa Water Storage District	SWP Local streams

Note: Tejon-Castaic Water District is also a member but is outside the Consolidated Place of Use and cannot participate in the Proposed Action.

Table 6 Kings River Conservation District Contractors

Contractor	Surface Water Supplies (AF/y)
Alta Irrigation District	Kings River
Burrel Ditch Company	Kings River via Murphys Slough
Clark's Fork Reclamation District No. 2069	Kings River
Consolidated Irrigation District	Kings River Section 215 CVP water
Corcoran Irrigation Company	Kings River via Lakelands Canal
Corcoran Irrigation District	Kings River
Crescent Canal Company	Kings River via Crescent Canal
Empire West Side Irrigation District	Kings River SWP
Fresno Irrigation District	Kings River Friant CVP
James Irrigation District	Kings River CVP
John Heinlen Mutual Water Company	Kings River
Kings County Water District	SWP Kings River Kaweah River Section 215 CVP water
Kings River Water District	Kings River Section 215 CVP water
Laguna Irrigation District	Kings River CVP
Lakeside Irrigation Water District	Kings River St. Johns River Cross Creek Section 215 CVP water
Last Chance Water Ditch Company	Kings River via Last Chance Ditch
Lemoore Canal and Irrigation Company	Kings River via Lemoore Canal
Liberty Canal Company	Kings River via Liberty Canal
Liberty Mill Race Company	Kings River via Murphys Slough
Liberty Water District	Kings River via Liberty Canal Section 215 CVP water
Lovelace Water Corporation	Kings River South Fork Canal and Tulare Lake Canal
Mid-Valley Water District	Kings River
Peoples Ditch Company	Kings River via operations of People's Weir
Raisin City Water District	Kings River
Riverdale Irrigation District	Kings River
Reed Ditch Company	Kings River via Murphys Slough
Southeast Lake Water Company	Kings River
Stratford Irrigation District	Kings River
Stinson Canal and Irrigation Company	Kings River via Stinson Canal
Tranquillity Irrigation District	Kings River CVP

Contractor	Surface Water Supplies (AF/y)
Tulare Lake Canal Company	Kings River via Tulare Lake Canal
Tulare Lake Reclamation District No. 761	Kings River SWP
Upper San Jose Water Company	Kings River

Note: Tejon-Castaic Water District is also a member but is outside the Consolidated Place of Use and cannot participate in the Proposed Action.

Table 7 Tulare Lake Basin Water Storage District Contractors

Contractor	Surface Water Supplies (AF/y)
Tulare Lake Basin Water Storage District	Kings River Tule River Kaweah River Kern River Deer Creek SWP
Angiola Water District	SWP (605, if available) 15,000 Kings River (5,145 average) 6,000 Tule River/Deer Creek (975 average) 60,000 Tulare Lake flooding (7,787 average)
Melga Water District	SWP Kings River Tule River Kaweah River Kern River

References

County of Fresno. 2017. Memorandum: Fresno County Service Area No. 34 Water System United States Bureau of Reclamation CVP Long-term Renewal Contract: Evaluation of Non-Renewal Impacts. Department of Public Works and Planning. October 12, 2017.

Hills Valley Irrigation District. 2017. Memorandum: No Action Alternative Impacts Renewal of Water Service Contract – 2018. September 28, 2017.

Lower Tule River Irrigation District. 2012. Lower Tule River Irrigation District Water Management Plan – 2008 Criteria. Final May 18, 2012.

Kern-Tulare Water District. 2017. No Action Alternative Effects of Non-Renewal of Water Service Contract. September 25, 2017.

Kern-Tulare Water District. 2015. Kern-Tulare Water Management Plan – 2014 Criteria. Revised December 29, 2015.

Pixley Irrigation District. 2012. Pixley Irrigation District Water Management Plan – 2008 Criteria. Final May 18, 2012.

Tri Valley Water District. 2016. Triv-Valley Water District Municipal Service Review and Sphere of Influence Update. Report to the Fresno Local Agency Formation Commission. February 19, 2016.

Appendix B: Potential Imbalanced Exchange Scenarios

Potential Imbalanced Exchange Scenarios

Scenario 1 – Evaporation and Conveyance Losses

In some cases the exchange parties are miles apart or the exchanged 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 Central Valley Project (CVP) contractors, including Cross Valley and Friant Contractors. These varying conditions could result in less water being 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

Cross Valley Contractors' CVP water is delivered to State Water Project (SWP) facilities when an opportunity exists for the California Department of Water Resources (DWR) to convey this water. This opportunity is often outside of the growing season when the water is not needed for crops in the Cross Valley Contractors' service areas. In these cases, the Cross Valley Contractors could enter into exchange agreements with an exchange partner that is able to take the water at the time it is available. Later during the growing season, an amount of water would be returned to the Cross Valley Contractor. The amount returned to the Cross Valley Contractor would be less than the amount delivered to the exchange partner to compensate the partner for the service of providing this water to the Cross Valley Contractor 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 Cross Valley Contractor's CVP 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.

Potential Exchange Mechanisms

Historical Exchanges with Arvin-Edison Water Storage District

1. Reclamation allocates CVP water to the Cross Valley Contractor(s) from the Delta.

2. If capacity is available at the Jones Pumping Plant, the San Luis and Delta-Mendota Water Authority (SLDMWA) conveys the Cross Valley Contractors' CVP water in CVP facilities to O'Neill Forebay (Reclamation provides Federal power at Jones Pumping Plant). DWR then wheels the Cross Valley Contractor(s) CVP water in State Water Project (SWP) facilities from O'Neill Forebay to Arvin-Edison Water Storage District (Arvin-Edison) under the following scenarios (Reclamation provides Federal power at Dos Amigo Pumping Plant):

    - Directly to Arvin-Edison via their existing turnouts off the California Aqueduct.
    - Directly to the Cross Valley Canal turnout off the California Aqueduct where it is conveyed by Kern County Water Agency (KCWA) to Arvin-Edison's turnout off of the Cross Valley Canal.

3. If capacity is available at Banks Pumping Plant, DWR conveys the Cross Valley Contractor(s) CVP water in SWP facilities directly to Arvin-Edison under the following scenarios (Reclamation provides Federal power at Banks and Dos Amigo Pumping Plants):

    - Directly to Arvin-Edison via their existing turnouts off the California Aqueduct.
    - Directly to the Cross Valley Canal turnout off the California Aqueduct where it is conveyed by KCWA to Arvin-Edison's turnout off of the Cross Valley Canal.

4. Arvin-Edison provides Friant CVP water from Millerton Lake in exchange for the Cross Valley Contractor CVP water received. The point(s) of delivery for Friant CVP water are the Cross Valley Contractors' existing turnouts off of the Friant-Kern Canal. The exchanges may be unbalanced (up to 2:1 average exchange ratio over a 10-year period).

Exchange with Other Friant CVP Contractors

1. Reclamation allocates CVP water to the Cross Valley Contractor(s) from the Delta.

2. If capacity is available at the Jones Pumping Plant, SLDMWA conveys the Cross Valley Contractors' CVP water in CVP facilities to O'Neill Forebay (Reclamation provides Federal power at Jones Pumping Plant). DWR then wheels the Cross Valley Contractors' CVP water in SWP facilities from O'Neill Forebay to the Cross Valley Canal (Reclamation provides Federal power at Dos Amigo Pumping Plant). KCWA then conveys the Cross Valley Contractors' CVP water through the Cross Valley Canal/Friant-Kern Canal Intertie for introduction into the Friant-Kern Canal. The Cross Valley Contractors' CVP water enters the Friant-Kern Canal as CVP water subject to Reclamation Law with no requirement for a

Warren Act contract. The Friant Water Authority (FWA) delivers the Cross Valley Contractors' CVP water to Friant Division contractors.

3. If capacity is available at the Banks Pumping Plant, DWR conveys the Cross Valley Contractors' CVP water in SWP facilities directly to the Cross Valley Canal (Reclamation provides Federal power at Banks and Dos Amigo Pumping Plants). KCWA then conveys the Cross Valley Contractors' CVP water through the Cross Valley Canal/Friant-Kern Canal Intertie for introduction into the Friant-Kern Canal. The Cross Valley Contractors' CVP water enters the Friant-Kern Canal as CVP water subject to Reclamation Law with no requirement for a Warren Act contract. FWA delivers the Cross Valley Contractors' CVP water to Friant Division contractors.

4. Friant Division CVP contractors provide Friant CVP water from Millerton Lake in exchange for the Cross Valley Contractor CVP water received. The point(s) of delivery are the Cross Valley Contractors' existing turnouts off of the Friant-Kern Canal. The exchanges may be unbalanced (up to 2:1 average exchange ratio over a 10-year period).

Exchange with SWP Contractors

1. Reclamation allocates CVP water to the Cross Valley Contractors from the Delta.

2. Point of delivery for the Cross Valley Contractors CVP water to SWP Contractors is in the Delta.

3. SWP Contractors convey the Cross Valley Contractors' CVP water under Article 55 of their SWP contract to their existing turnouts off the California Aqueduct (Reclamation provides Federal power at Banks and Dos Amigo Pumping Plants).

4. SWP Contractors provide water to the Cross Valley Contractors under the following scenarios:

    - SWP contractors convey SWP water through SWP facilities to the Cross Valley Canal. KCWA then conveys the water through the Cross Valley Canal/Friant-Kern Canal Intertie for introduction into the Friant-Kern Canal. The water enters the Friant-Kern Canal as CVP water subject to Reclamation Law with no requirement for a Warren Act contract. FWA delivers the water to the Cross Valley Contractors.

    - SWP contractors provide previously banked CVP, SWP, Kern River, 215, or abandoned water as recovered groundwater to the Cross Valley Canal. KCWA then conveys the water through the Cross Valley Canal/Friant-Kern Canal Intertie for introduction into the Friant-Kern Canal. The water enters the Friant-Kern Canal as CVP water subject to Reclamation Law with no requirement for a Warren Act contract. FWA delivers the water to the Cross Valley Contractors.

- The point(s) of delivery are the Cross Valley Contractors' existing turnouts off of the Friant-Kern Canal. The exchanges may be unbalanced (up to 2:1 average exchange ratio over a 10-year period).

Exchange with Tulare Lake Basin Water Storage District

1. Reclamation allocates CVP water to the Cross Valley Contractors from the Delta.

2. Point of delivery for the Cross Valley Contractors' CVP water to Tulare Lake Basin Water Storage District (TLBWSD) is in the Delta.

3. TLBWSD conveys the Cross Valley Contractors' CVP water under Article 55 of their SWP contract to their existing turnouts off the California Aqueduct (Reclamation provides Federal power at Banks and Dos Amigo Pumping Plants).

4. TLBWSD delivers non-CVP water from Pine Flat, Kaweah or Success Reservoirs to Friant Division CVP contractors located along the same local systems. The Friant Division Contractors then deliver a like amount of Friant Division CVP water to the Cross Valley Contractors.

5. The point(s) of delivery are the Cross Valley Contractors' existing turnouts off of the Friant-Kern Canal. The exchanges may be unbalanced (up to 2:1 average exchange ratio over a 10-year period).

Appendix C: Purpose and Methodology for Water Needs Assessments

ATTACHMENT 1

CENTRAL VALLEY PROJECT (CVP) WATER NEEDS ASSESSMENTS:
PURPOSE AND METHODOLOGY

Purpose:

Water needs assessments have been performed for each CVP water contractor eligible to participate in the CVP long-term contract renewal process. These water needs assessments serve three purposes:

1. Confirm past beneficial use of CVP water;

2. Provide water demand and supply information under current and future conditions for the environmental documents; and

3. Provide an estimate of contractor-specific needs for CVP water by the year 2025 to serve as a starting point for discussions regarding contract quantities in the negotiation process.

Small Contractors exempt from Detailed Water Needs Assessments:

In order to minimize the informational burdens on CVP water contractors with small amounts of CVP supply under contract, an exemption from the requirement for detailed water needs assessments has been provided to these contractors. The exemption applies to contractors who provide agricultural water to a service area of 2000 irrigable acres, or less, and/or provide urban water now, or in the future, in the amount of 2000 acre-feet annually, or less. A contractor may be exempt from the water needs assessment requirement for its urban water service, but not for its agricultural water service, or vice-a-versa. These contractors are assumed to demonstrate future need if they have beneficially used their CVP supplies in the past.

Approach to Confirm Past Beneficial Use and Depict Current Conditions:

Originally, Reclamation requested water demand and supply information for the 1979 through 1997 timeframe. Reclamation believes that evaluations of beneficial use, current and future CVP needs based on information for a 19-year period of record, including both wet and dry periods, is a scientifically defendable way of conducting water needs assessments. However, the concerns of the CVP water contractors with respect to the magnitude of the information request persuaded Reclamation to perform the assessments using a representative snapshot year approach, instead. Although less scientifically rigorous, the snapshot year approach appears adequate for cursory evaluations of water needs.

The year 1989 is the snapshot year chosen to confirm past beneficial use of CVP water for the American, Delta, Contra Costa, Sacramento, and San Felipe regions (refer to the definitions below). This year was chosen because the majority of CVP water contractors received full delivery of their requested water supplies and the total annual precipitation for most CVP regions was in the normal range. Since 1989 was a drought year in the Friant region, 1996 is the snapshot

year selected to calculate past beneficial use for this region. Water Need Assessments for the Stanislaus Region have been deferred pending the resolution of operational issues in the Stanislaus River basin. Some contractors have elected to deviate from the selected snapshot year because of the unavailability of information for that year. Following is a description of the regions:

American: American River Division

Delta: Delta Division combined with West San Joaquin Division, but not the Contra Costa Unit

Contra Costa: Contra Costa Unit

Stanislaus: East Side Division

Friant: Friant Division combined with Hidden Unit, Buchanan Unit, and Cross Valley Canal

Sacramento: Sacramento River Division combined with Trinity River and Shasta Divisions

San Felipe: San Felipe Division

Following is a description of the process to evaluate past beneficial use of CVP water supplies:

For contractors who supply water to meet agricultural demands, Reclamation estimated the district irrigation efficiency associated with the crop water information provided for the snapshot year. Both the district irrigation efficiency and the amount of intra-district conveyance losses are evaluated for reasonableness. Past beneficial use of CVP supplies is confirmed if the district irrigation efficiency is close to the current statewide average of 75 percent, or if a trend towards increasing district irrigation efficiencies over time is apparent; **and** if intra-district conveyance losses total 10 percent, or less, of the district's total water supply. In situations where some, or all, of these conveyance losses contribute to groundwater recharge for later use by the contractor, these "conveyance losses" are shown as groundwater recharge rather than conveyance losses.

For contractors who supply municipal and industrial water, the primary test of past beneficial use of CVP supplies is whether the calculated per capita demand in column 36 is reasonably close to the reference per capita demand value in column 35. Acceptable explanations for calculated per capita demands that significantly exceed the reference number might include a large industrial water demand, or a significant percentage of residences on larger than average-size city lot parcels.

The environmental documentation associated with the CVP long-term contract renewals specifies 1995 as the base year. Therefore, water supply and demand information is indicated on the water needs assessments for the 1995 level of development, if available. In many cases, the

information provided to demonstrate past beneficial use is also reasonably representative of 1995 level water supplies and demands.

Definition of Need for CVP Water Supplies:

An important function of these assessments is the estimation of year 2025 CVP water needs. The assessments compare all demands and all supplies (including CVP supplies) estimated for the 2025 level of development for a normal hydrologic year. The results are displayed in Column 39 as Unmet Demand. If the number in this column is positive or only slightly negative[1] then the CVP water contractor is deemed to have full future need of the maximum annual CVP supply currently under contract for all year types.

Demands include agricultural, urban and, on occasion, environmental water demands.
CVP supplies in the assessments are set at the maximum annual contractual amount for each water contractor, except in the Friant Division. The Friant Division's Class II contract amounts are based on a wet hydrologic year. To reflect a normal hydrologic year, CVP supplies for the Friant Division are set at the maximum annual Class I contract amount plus 40% of the maximum annual Class II contract amount.

Dry year and critically dry year analyses were only performed for urban contractors who did not demonstrate full future need of their CVP contract supply in a normal hydrologic year.

The methodology used to estimate agricultural and urban water demands as well as to estimate the availability of non-CVP supplies is described in the following sections.

Agricultural Water Demand:

Agricultural water demand is defined as the sum of the district's irrigation water demand and the intra-district conveyance losses, where irrigation water demand is the product of the irrigated acreage in a district and the average farm delivery requirement. The farm delivery requirement is defined as the unit amount of water necessary to supply crop water needs in excess of effective precipitation and varies based on crop type, climate, irrigation water quality, soil salinity and irrigation method. The district's irrigation water demand is not necessarily the sum of all the on-farm irrigation water demands because such measures as recycling of intra-district return flows are effective in reducing the overall district irrigation water demand. The assumption for this analysis is that the continued implementation of water use efficiency measures between now and the year 2025 will further reduce the unit amount of water needed to grow crops in the future. Often, it is also assumed that district conveyance losses will decrease in the future. Specifically, district irrigation efficiencies are assumed to increase from an average of 75 percent currently to 85 percent by the year 2025, where district irrigation efficiency is defined as follows:

[1] If the negative amount is within 10% for contracts in excess of 15,000 acre-feet, or within 25% for contracts equal to, or less than, 15,000 acre-feet; the test of full future need of CVP supplies under contract is deemed to be met.

District Irrigation Efficiency= Supply - Non Recoverable Losses to the District[2]
Supply

Or, approximately =

Sum of On-farm Crop Water Requirements of Applied Water (ETAW) + Intra-District Reuse
District's Irrigation Water Demand

Certain districts, such as those with large elevation differences within their boundaries, have target district irrigation efficiencies of 80 percent based on the unavailability of certain water management options to increase overall district irrigation efficiency.

Estimating Crop Water Requirements:

Generally, the CVP water contractors' Water Management Plans provide historical information on crop water requirements. This information was used in the snapshot year analyses to confirm past beneficial use of CVP supplies and to reflect the base condition in the environmental documents.

Reclamation estimated crop water requirements for the year 2025 level of development based on the CVP water contractors' estimates of future crops and acreage planted multiplied by estimates of the farm delivery requirements for each crop. Reclamation staff initially estimated crop water requirements for all regions using evapotranspiration (ET) and effective precipitation (EP) data from several sources: 1) California Department of Water Resources (DWR) Bulletin 160-98, 2) DWR Bulletin 113-3, and 3) Reclamation knowledge and experience. The ET and EP information was tabulated on a Detailed Analysis Unit (DAU) basis and then proportioned to each district based on the district's area in a DAU. The data was then used in combination with other traditional methodologies for determining crop water requirements to estimate each district's total irrigation water demand in the year 2025.

In February 2000, representatives of the Friant and Delta Region CVP water contractors expressed the following concerns with using this methodology:

• The crop water requirements estimated are too low;

• The effective precipitation component to meeting crop water requirements is too high for some areas.

In order to address these concerns a number of evaluations were performed.

[2] The general equation for district efficiency includes conveyances losses; however, for these assessments intra-district conveyance losses are not included in the district efficiency equation because these are treated as a separate parameter for the purposes of evaluating beneficial use of CVP supplies.

One analysis compared the agricultural water demand calculations performed by a private consultant to CVP contractors and those performed by Reclamation staff for the water districts in the Delta Region. This analysis indicated that Reclamation's and the consultant's estimation of these water demands on a regional basis is close (within 8%). However, the results of the agricultural water demand determinations diverge as the regional area is broken into sub-regions and especially when the comparison is made at the district level.

A comparison of calculations of ET and EP for alfalfa in the Friant Region using the methodologies of Bulletin 160-98, Reclamation and the Natural Resources Conservation Service (NRCS) indicates that Bulletin 160-98 consistently estimates EP higher than the other two methods at the district level. One reason for this difference appears to be that the Bulletin 160-98 methodology estimates the contribution of rainfall to the soil moisture profile in the non-irrigation season in a different way than the other two methodologies. Similarly, a comparison of ET values shows that the Bulletin 160-98 values are consistently lower than the NRCS values at the district level. This difference is most likely the result of Bulletin 160-98's use of "actual" ET values. "Actual" ET is potential ET modified to reflect regional agricultural practices by farmers. The NRCS method uses potential ET values without modification.

Based on discussions with DWR, the affected CVP water contractors and their consultants; Reclamation concluded that the regional agricultural practices taken into account by Bulletin 160-98 may not be reflective of current and/or future practices by the CVP water contractors. For this reason, Reclamation determined that it was more prudent to use potential ET values than the "actual" ET values from Bulletin 160-98 in evaluating 2025 crop water requirements for water districts located in the Friant and Delta Regions.

In addition, Reclamation and representatives of the Friant and Delta Region water contractors agreed on a different methodology to estimate EP than the one used in Bulletin 160-98 because of the lack of dependable rainfall. The bulletin assumes rainfall is effective if it can be stored in the soil moisture profile, or directly meet crop water needs during any month. However, in actual practice to effectively manage farm operations, a farmer may need to pre-irrigate one or more fields earlier in the month only to have a major precipitation event occur later in the month, thus reducing the effectiveness of the rainfall during that month.

Revised Agricultural Water Demand Methodology for the Friant and Delta Regions:

Following is a description of the revised methodology for estimating ET and EP:

• EP is estimated to be 50 percent of long-term average annual rainfall with the exception of citrus EP. For citrus groves, it is estimated that one inch of the initial rainfall is stored before the soil seals over and the runoff begins; then about 10% of the additional rainfall for the season is estimated to be effective.

• ET is determined using California Irrigation Management Information System (CIMIS) potential ET data and crop coefficients supplied by the University of California Cooperative Extension.

No change was made to the ET and EP determinations for the CVP water contractors in the other regions because these regions are located in areas of higher precipitation not as sensitive to the issues raised in the comparative analyses.

Urban Water Demand:

Urban water demand is defined as the sum of residential, nonresidential and distribution system demands. The components of residential demand include indoor and outdoor demand. Originally, information on residential and a portion of nonresidential demand was requested in terms of these two components; however, most CVP water contractors were unable to provide the information in that format. Therefore, the information request was revised to a combined figure for indoor and outdoor use. Nonresidential demand includes commercial, institutional and industrial demands. Distribution system demands consist of unaccounted beneficial use and distribution system losses where:

• Unaccounted beneficial use includes water for such uses as firefighting, mainline flushing, storm drain flushing, sewer and street cleaning, construction site use, water quality testing and other testing.

• Distribution system losses accounts for water lost because of leaks in storage and distribution systems, evaporation, illegal connections, and water theft.

Projected M&I water demand will be influenced over time by many factors, including future land use changes, population shifts, and improvements in residential and distribution system efficiencies over time. As is the case for agricultural water demands, the methodology assumes that the implementation of water conservation measures in the next 25 years will increase the efficiency of urban water use and reduce unit M&I water demands. Specifically, the reference average per capita usage upon which the urban beneficial use evaluation is based decreases from 5% to 14% by the year 2025, depending on the location in the state.

Non-CVP Water Supplies:

Non-CVP water supplies can include groundwater including the conjunctive use of surface and groundwater, State Water Project (SWP} supplies, local surface water supplies, recycled water, inter-district return flows and water transfers. The methodology considers water transfers a beneficial use of water. Water transfers are, therefore, included in the 2025 level assessments if there is evidence of a commitment by both parties to engage in the transfer in this timeframe.

Average values for SWP and local surface supplies are used in the 2025 level assessments unless the analysis is for dry or critically dry year conditions. Often the source of information is the 10-year average surface water supply from the contractor's Water Management Plan. If there is an indication that surface water supplies will decrease in the future because of increased upstream diversions or increased environmental requirements, the surface water supply is reduced to reflect these considerations in the 2025 level assessment.

Where available, groundwater safe yields are used to estimate future groundwater pumping. Safe yield is defined as the amount of groundwater a district can pump on a long-term average and not cause the long-term decline of groundwater levels leading to excessive depths for pumping or leading to degradation of groundwater quality. A safe yield value is the result of a complex interaction between many factors; a change in any one of the factors can have an impact on the value obtained from safe yield computations. The main factors involved in safe yield computations can include, but are not limited to, water supply, consumptive use, losses to the system, and water quality. Adding to the complexity of the analysis is that many, if not most, of the factors involved in a safe yield computation are time dependent, and have both short-term and long-term trends--which may be quite different. If a safe yield analysis is not available for the contractors' groundwater resources, groundwater pumping and recharge, if applicable, is estimated from historical information for the 2025 level assessments.

Originally, groundwater pumping for the Friant Region was estimated based on historical estimates of groundwater pumping for 1996 from the water contractors' Water Management Plans. During the February 2000 discussions with representatives of the Friant Region water contractors, the issue of groundwater was raised. Specifically, Reclamation was requested to evaluate the possibility of using the original safe yields estimated by Reclamation as the supply available from groundwater in the 2025 level assessments. Reclamation agreed to investigate the use of these original safe yields because the original safe yields were developed for ultimate build-out and included CVP groundwater recharge. Following is a summary of the analysis performed to estimate groundwater pumping for the Friant Region in the 2025 level assessments.

Analysis of Groundwater Pumping in the Friant Region:

Groundwater technical studies were conducted by Reclamation in the 1940's and 1950's to characterize the geohydrology, groundwater occurrence and groundwater conditions in each district, and to determine each district's safe yield. Prior to the delivery of CVP water supplies, farmers irrigated mainly with groundwater, although some local surface water sources were also used. Because recharge of groundwater could not keep pace with the use of water primarily for agricultural purposes, groundwater levels had declined in many areas, and groundwater overdraft was common throughout the region.

A review of Reclamation's original safe yields for the Friant Region shows that these safe yield estimates are generally less than the estimated amounts of groundwater pumping for 1996. Reclamation's original safe yield estimates are also generally less than the updated safe yield estimates performed by Reclamation for some of the districts in the early 1990's. However, the 1990's safe yield estimates are considered preliminary numbers and were never adopted by Reclamation nor accepted by the Friant water contractors. Historical estimates of groundwater pumping indicate that these water contractors are pumping groundwater in excess of the original safe yields.

The groundwater pumping in excess of safe yield has resulted in the continued decline in the groundwater tables underlying most of the districts. A review of hundreds of individual well hydrographs shows that this increase in pumping has not been supported by the aquifer. Most districts are still experiencing declining groundwater levels since the inception of CVP

deliveries. With the exception of five districts (Delano Earlimart, Exeter, Lindmore, Lindsay-Strathmore and Orange Cove), cumulative groundwater storage has decreased in the remaining 19 Friant districts since the CVP began importing water into those districts. The five districts that show overall rises in groundwater storage change have unique geohydrologic conditions and were evaluated individually to determine appropriate levels of groundwater pumping for the 2025 level assessments.

From the analysis performed, it can be concluded that CVP deliveries since 1986, as evidenced by a continuous decline in storage from 1986 to 1992, have not been sufficient to maintain reasonably stable groundwater levels, nor have CVP deliveries supported an increase in groundwater levels in wet years under the conjunctive use operations practiced by most districts. Safe yield pumping in combination with surface water supplies should have sustained or raised groundwater levels to some stable level. However, historical groundwater pumping has been higher than the safe yield values. In addition, unforeseen factors in the original safe yield analysis such as the magnitude of groundwater use by non-district entities primarily for urban needs within the boundaries of the district, the magnitude of groundwater and surface water use by adjacent districts, changes in the type of crops, droughts and reductions in CVP water deliveries may render even the original safe yield values as too high. However, the unavailability of critical information and the lack of time to perform an analysis make the determination of new safe yields for the Friant Region infeasible at this time. Therefore, Reclamation concurs that the original safe yields are appropriate to depict groundwater pumping for 19 contractors in the Friant Region for the 2025 level assessments unless recharge is significantly higher than under the pre-project condition. In that case, groundwater pumping is assumed to be the safe yield plus a certain percentage of recharge. It is assumed that up to 10% of a district's supply may be lost in conveyance or recharge losses; the remainder of the recharge is assumed to be available for groundwater pumping.

Sources of Information

The Water Management Plans that most water districts have prepared in response to the mandates of the Central Valley Project Improvement Act and the Reclamation Reform Act provide information on agricultural, urban and environmental water demands as well as on water supplies available to meet these demands. In most cases, these plans depict information for a representative year, although some plans provide a number of years of historical information as well as projections for the future. Fortunately, the representative year for many of these plans is either 1989, or 1996. The water contractors were asked to verify that information contained in these plans may be used to calculate past beneficial use and/or to depict current conditions for the purposes of the environmental documentation. In addition, the agricultural water contractors were requested to provide projections of types of crops planted, irrigated acres and amounts and types of non-CVP water supplies for the year 2025. Similarly, the urban water contractors were asked to provide population projections, projections of nonresidential water demand and amounts and types of non-CVP water supplies for the year 2025. Department of Finance population projections were used to assess whether the contractors' population projections appear reasonable.

Other sources of information included DWR Bulletin 160-98, DWR Bulletin 113-3, CIMIS information, crop coefficients from various sources, Reclamation's annual crop reports, the January 2000 Water Forum Agreements for the American River, Reclamation's groundwater safe yield studies and miscellaneous planning and environmental documents.

WATER NEEDS ASSESSMENTS FOR CENTRAL VALLEY PROJECT LONG TERM RENEWAL

Purpose

Section 3406 (c) of the Central Valley Project Improvement Act states that upon request, the Secretary shall renew any existing long-term repayment or water service contract for the delivery of water from the Central Valley Project for a period of twenty-five years and may renew such contract for successive periods of up the 25 years each. In response to this provision, the Region submitted a Basis of Negotiation (BON) to the Commissioner on January 26, 1999 which required the Region to conduct water needs demand assessments for as many as 113 Long Term Renewal Contacts. As stated in the BON, the water demands in conjunction with information on available water supplies will be used to demonstrate historic beneficial use of both CVP and non-CVP water for each contractor. Also, a determination of future need for CVP will be made water based on comparisons of future water demands and the determination of non-CVP water supplies for each contractor.

Background

On October 23, 1998, Reclamation's Mid-Pacific Region announced its intent to undertake a water needs assessment for each contactor as part of the CVP long term contract renewal process. The letter requested written comments on the draft water needs assessment methodologies be submitted to Reclamation by December 11, 1998. As part of the scoping process, four public workshops were held in early November 1998 to address the development of water demand methodologies for both irrigation and M&I purposes. The various proposed steps to assess potential water needs for irrigation and M&I purposes and subsequent total potential demands for CVP water are detailed in the document entitled "Proposed Water Need Methodologies, LTRC, Central Valley Project."

On December 30, 1998, Reclamation requested information for water needs assessment for Long Term Contract Renewal from All CVP Interim Renewal Irrigation and M&I Contractors, and All CVP Irrigation and M&I Contractors Subject to Binding Agreement. The request stated that although Reclamation recognized the water demand methodologies where still in draft form and the comment period had been extended to January 8, 1999. Reclamation believed the required information would likely be needed irrespective of any changes in methodologies. The information was to be provided by February 19, 1999.

On January 29, 1999, Reclamation held technical discussions on the proposed irrigation contractor methodology for the needs assessment. As an outcome of this meeting, Reclamation committed to perform comparisons in order to streamline the irrigation water demand analysis. 1) Evaluate crop water needs plus distribution system water requirement for the years 1979 through 1997 for six representative districts to arrive at an "average" beneficial use of water for that time frame to establish a correlation between scientifically calculated beneficial use and actual deliveries. 2) Compare the result to determine if a close correlation between scientifically calculated beneficial use and actual deliveries can be made. 3) Using the districts' Water Management Plans, calculate the crop water needs and distribution system water

requirements for the "representative" year (either 1989 or 1996) and compare that with the actual water deliveries in that year. 4) Determine whether the "representative year" method appears to be a scientifically credible substitute for the "average year" method.

Based on Reclamation's analysis, a letter was sent out February 22, 1999, to update Reclamation's December 30 1998, request for information from the irrigation contractors. The letter extended the deadline for the submittal of information and provided contractors with the findings of the comparative analysis described in the previous paragraph. The conclusion in the comparative analyses was that the information provided in the water management plans was sufficient to meet the current water demand and supply information and the determination whether the historical water deliveries were beneficially used. Therefore, contractors were provided the opportunity to have the information presented in their water management plans as the basis for the analysis of historic and current use. If that information was not available, contractors where requested to submit information for 1995.

A similar letter was also sent to M&I contractors on February 22, 1999. This letter extended the deadline for submittal of water needs assessment information to March 19, 1999, and provided the contractors with the option of using information provided in their water management plan or current Integrated Resource Plan if that plan contained information corresponding to that information in Reclamation's December 30, 1998 information request.

A follow up letter dated June 3, 1999 was sent to those contractors which had not yet submitted the water assessment information requesting. The letter requested that the information be submitted by close of business June 25, 1999.

In the fall of 1999, Reclamation staff completed development of an Access© Data Base Program which was used to analyze the data submitted by the contractors. An output file was developed which provided information on the contractors' water supply, and agricultural and/or urban water demands. A summary column on the output provided information on the amount of water by which the contractors' water demands exceeded or were less than its supplies. Information was input for each contractor for a historic year to demonstrate beneficial use and for a future year (2025) to demonstrate future need. Between November 1999 and March 2000 this information was sent to most of contractors in draft form with results of the assessment. The contractors were asked to review the assessment to determine if all the information and assumptions were accurate.

Future demand was projected in most cases for year 2025. The data requested from the districts in December 1998, was for the future year 2025 because it was believed at that time the contracts would be finalized by 2000 and the irrigation contracts would be for 25 years. Although M&I water service contracts are for 40 years, it was assumed build out would occur by 2025. In the few instances in which an M&I contractor could demonstrate that build out would not occur by 2025, those contractors were allowed to provide projection to the year 2040.

Although all of the contracts were executed after 2000, it was assumed that the cropping patterns initially projected for 2025 would still be valid after that date since additional information to

discern annual out year cropping pattern changes was not available. Therefore, any estimated changes in cropping patterns after 2025 would be highly speculative.

The assessments were performed by technical staff in the Mid-Pacific Region's Resources Division and Reclamation's Technical Service Center. Reclamation used expertise from the California Department of Water Resource and the TSC to perform the urban water assessments. The Reclamation technical staff used to perform the agricultural needs analysis included agricultural engineering staff from the Region and the TSC and water conservation staff from the Region. These staff interacted with contractors and other stakeholders to develop the assessment tools based on a combination of technical literature and personal knowledge. When background information such as crop evapotranspiration information was in dispute, Reclamation funded consultants with technical expertise in the field to service as an independent source of information.

Resources that Reclamation staff used to substantiate estimates provided by the contractors included, the State Water Plan Bulletin 160-98 for (urban and agricultural water use trends and water use efficiency estimates), California Department of Finance (population trends), County Master Plans and Land Use Planning Reports (population trends, water supplies, and land use trends), Agricultural Commissioners Annual County Crop Reports (agricultural crop acreages) and Bulletin 113-3 (crop evapotranspiration).

The methodology for the water needs assessments was finalized in May of 200 I with the inclusion of provisions for the Friant Unit (attachment). M&I contractors with a contracted water supply of 2,000 acre feet or less, and Irrigation contractors with an irrigable acreage of 2,000 acre feet or less were exempted from the needs assessment. Along with general assumptions for all of the needs assessments, the methodology contained specific assumptions on evapotranspiration and effective precipitation for the Friant and Delta Regions and an assessment of groundwater conditions in the Friant Region resulting in the assumptions used to determine the safe yield of groundwater.

Reclamation began sending final water needs assessments to CVP contractors starting in September 2000. The majority of the assessments were sent under cover letter for each of the major divisions in the CVP. The divisions included the Sacramento Division, Tehama-Colusa Canal; Friant Division, Buchanan Unit, Hidden Unit, and Cross Valley Canal; Delta Division; Delta Mendota Canal, Delta Mendota and San Luis Unit. These assessments were analyzed as groups since data and methodology developed for the analysis were unique to each of these divisions. Contractors with a majority of their supplies used for M&I purposes each went out under an individual cover letter. The last final needs assessment was completed in December 2004.

Transmittal letters sent with each water needs assessment included a determination of whether the contractor had been beneficially using its past water supplies and if it was anticipated that the contractor needed its current allocation of CVP water to meet future demands.

Revisions to final needs assessments were made in a few cases. These revisions were required when new information was either presented by the contractors or identified by Reclamation that

would impact either the contractor's water demand or water supply. New information could include an anticipated change in water use such as agricultural or urban, or a change in the future amount of local water supply that will be available to the contractors. In each case, a letter identify the revised information was sent to the specific contractor.

Sacramento River Settlement Contractors Water Needs Assessments

Water needs assessments were performed for 11 settlement contractors participating in the Basin-wide Water Management Plan and 8 other settlement contractors on the Sacramento River.

For other areas of the CVP, Reclamation requested actual historic water demand and supply information to determine a contractor's past beneficial use and the contractor's estimated cropping pattern to determine future beneficial use. In the case of the Sacramento River Settlement Contractors Reclamation was able to use information developed as part of the BWMP which used a representative "normal" year approach based on normalized data for 1995 and 2020. The normal year approach allowed for a consistent and fair WNA for the SRSCs.

WNA's for water service contracts included non-contract water supplies such as groundwater including the conjunctive use of surface and groundwater, State Water Project (SWP) supplies, local surface water supplies, recycled water, inter-district return flows and water transfers. Due to the nature of the settlement contracts, Reclamation used the full contract quantities the year 2020 analysis as the contractors' only water supply because the settlement contracts were negotiated in lieu of the contractors exercising their water rights on the Sacramento River and its tributaries. Furthermore, The Settlement Contracts are different than water service contracts. These contracts were negotiated to settle disputes over the respective rights of the contractors and the United States. The contractors' use of water during the contract period is not to be used as a reference to how the contractors would have used the water under their water right(s). The contractors would have exercised due diligence to fully protect or prove their water rights. Existing language in the Settlement Contracts provides that the contractors' water use during the term of the contract cannot be construed as an admission that such water use was not water it would have been entitled to under their water rights.

Two SRSC's, Anderson-Cottonwood Irrigation District and Sutter Mutual Water Company, did not meet the criteria for renewing their contracts for the full amount. Long term historic cropping patterns and water diversions were analyzed to determine the highest reasonable annual diversions. The calculated annual diversion was used to negotiate the contract quantities for these two SRSC's.

Appendix D: Contractors Water Needs Assessments

Division: **Delta/Cross Valley**

Water Needs Assessment

District: 202235

Date: 12/27/2017

Agricultural Water Supply

ALPAUGH ID

Contractor's Water Supply Sources and Quantities (acre-feet)

Timeframe 1	Surface Water Supply: Reference Delivery 2	USBR Total Deliv/Max 3	SWP 4	Local 5	Local Source	Trsfr/Rtrn /Recycle In 7	Trsfr/ Out 8	Groundwater Supply: District 9	Private 10	Safe Yield 11	Recharge 12	Total Supply 13
2016	100	0	0	0	6	0	0	9,555	0		0	9,555
2050	100	100	0	0		0	0	0	0		0	100

Contractor's Agricultural Water Demands

Maximum ProductiveAcres= 5,160

Timeframe 1	Crop Water Requirement (acre-feet) 15	District Irrig. Efficiency (%) 16	Effective Precip (acre-feet) 17	Reference Effective Precip (acre-ft) 18	Calculated Net Crop Water Req (acre-feet) 19	USBR Net Crop Water Req (acre-feet) 20	Average Irrigated Acres (acres) 21	Reference Irrigated Acres (acres) 22	Calculated FDR (AF/acre) 23	USBR FDR (AF/acre) 24	Conveyance Loss (acre-feet) 25	Total Ag Demand (acre-feet) 26
2016	7,514	78	416	1,458	9,100	13,073	3,781	3,781	2.41	3.37	455	9,555
2050	18,810	85	2,009	2,009	19,766	18,810	5,160	5,160	3.83	3.43	1,139	20,905

Contractor's M&I Water Demands

Timeframe 1	Residential Water Demand: Population 28	Per Capita Demand (gpcd) 29	Total Demand (acre-feet) 30	Nonresidential Water Demand: Industrial (acre-feet) 31	Comm/ Institt (acre-feet) 32	Total Demand (acre-feet) 33	Loss: Unacc /Distr (acre-feet) 34	Ref Urban Per Capita Dmd (gpcd) 35	Calc Urban Per Capita Dmd (gpcd) 36	Total M&I Demand (acre-feet) 37	Total Ag+ M&I Dmd (acre-feet) 38	Unmet Demand (acre-feet) 39
2016						0	0			0	9,555	0
2050						0	0			0	20,905	20,805

* Represents Maximum Contract Amount

Notes:

Division: **Delta/Cross Valley**

Water Needs Assessment

District: 202245 Date: 1/3/2018

Agricultural Water Supply

ATWELL ISLAND WD

Contractor's Water Supply Sources and Quantities (acre-feet)

Timeframe 1	Surface Water Supply: Reference Delivery 2	USBR Total Deliv/Max 3	SWP 4	Local 5	Local Source	Trsfr/Rtrn /Recycle In 7	Trsfr/ Out 8	Groundwater Supply: District 9	Private 10	Safe Yield 11	Recharge 12	Total Supply 13
2015 - 2016	50	0	0	0	6	0	0	214	6,809		0	7,023
2050	50	50	0	0		0	0	0	0		0	50

Contractor's Agricultural Water Demands

Maximum ProductiveAcres= 7,059

Timeframe 1	Crop Water Requirement (acre-feet) 15	District Irrig. Efficiency (%) 16	Effective Precip (acre-feet) 17	Reference Effective Precip (acre-ft) 18	Calculated Net Crop Water Req (acre-feet) 19	USBR Net Crop Water Req (acre-feet) 20	Average Irrigated Acres (acres) 21	Reference Irrigated Acres (acres) 22	Calculated FDR (AF/acre) 23	USBR FDR (AF/acre) 24	Conveyance Loss (acre-feet) 25	Total Ag Demand (acre-feet) 26
2015 - 2016	6,004	75	495	468	7,345	5,103	7,023	7,023	1.05	5.3	146	7,491
2050	6,130	80	3,284	3,284	3,558	3,558	7,059	7,059	0.50	0.50	754	4,312

Contractor's M&I Water Demands

Timeframe 1	Residential Water Demand: Population 28	Per Capita Demand (gpcd) 29	Total Demand (acre-feet) 30	Nonresidential Water Demand: Industrial (acre-feet) 31	Comm/ Institt (acre-feet) 32	Total Demand (acre-feet) 33	Loss: Unacc /Distr (acre-feet) 34	Ref Urban Per Capita Dmd (gpcd) 35	Calc Urban Per Capita Dmd (gpcd) 36	Total M&I Demand (acre-feet) 37	Total Ag+ M&I Dmd (acre-feet) 38	Unmet Demand (acre-feet) 39
						0	0			0	7,491	468
						0	0			0	4,312	4,262

Represents Maximum Contract Amount

Notes: As a result of limited data, water usage was supplied by the District in 2016 and crop data from SCCAO for 2015 was used.

Division: **Delta/Cross Valley**

Water Needs Assessment

District: 202325

Date: 10/31/2017

M&I Water Supply

FRESNO, COUNTY OF

Contractor's Water Supply Sources and Quantities (acre-feet)

Timeframe 1	Surface Water Supply: Reference Delivery 2		USBR Total Deliv/Max 3	SWP 4	Local 5	Local Source	Trsfr/Rtrn /Recycle In 7	Trsfr/ Out 8	Groundwater Supply: District 9	Private 10	Safe Yield 11	Recharge 12	Total Supply 13
2016	3,000	*	3,000	0	0	6	0	0	0	0		0	3,000
2050	3,000	*	3,000	0	0		0	0	0	0		0	3,000

Contractor's Agricultural Water Demands

Maximum ProductiveAcres=

Timeframe 1	Crop Water Requirement (acre-feet) 15	District Irrig. Efficiency (%) 16	Effective Precip (acre-feet) 17	Reference Effective Precip (acre-ft) 18	Calculated Net Crop Water Req (acre-feet) 19	USBR Net Crop Water Req (acre-feet) 20	Average Irrigated Acres (acres) 21	Reference Irrigated Acres (acres) 22	Calculated FDR (AF/acre) 23	USBR FDR (AF/acre) 24	Conveyance Loss (acre-feet) 25	Total Ag Demand (acre-feet) 26
2016												
2050												

Contractor's M&I Water Demands

Timeframe 1	Residential Water Demand: Population 28	Per Capita Demand (gpcd) 29	Total Demand (acre-feet) 30	Nonresidential Water Demand: Industrial (acre-feet) 31	Comm/ Institt (acre-feet) 32	Total Demand (acre-feet) 33	Loss: Unacc /Distr (acre-feet) 34	Ref Urban Per Capita Dmd (gpcd) 35	Calc Urban Per Capita Dmd (gpcd) 36	Total M&I Demand (acre-feet) 37	Total Ag+ M&I Dmd (acre-feet) 38	Unmet Demand (acre-feet) 39
2016	729	195.9	160	0	362	362	39	257.0	686.6	561	561	-2,439
2050	9,800	166.6	1,829	0	930	930	99	166.0	260.4	2,858	2,858	-142

* Represents Maximum Contract Amount

Notes:

Division: **Delta/Cross Valley**

Water Needs Assessment

District: 202350

Date: 1/17/2018

Agricultural Water Supply

HILLS VALLEY ID

Contractor's Water Supply Sources and Quantities (acre-feet)

Timeframe 1	Surface Water Supply: Reference Delivery 2		USBR Total Deliv/Max 3	SWP 4	Local 5	Local Source	Trsfr/Rtrn /Recycle In 7	Trsfr/ Out 8	Groundwater Supply: District 9	Private 10	Safe Yield 11	Recharge 12	Total Supply 13
2016	3,346	*	814	0	0	6	3,720	0	0	4,590		0	9,124
2050	3,346	*	3,346	0	0		1,250	0	0	0		0	4,596

Contractor's Agricultural Water Demands

Maximum ProductiveAcres= 4,314

Timeframe 1	Crop Water Requirement (acre-feet) 15	District Irrig. Efficiency (%) 16	Effective Precip (acre-feet) 17	Reference Effective Precip (acre-ft) 18	Calculated Net Crop Water Req (acre-feet) 19	USBR Net Crop Water Req (acre-feet) 20	Average Irrigated Acres (acres) 21	Reference Irrigated Acres (acres) 22	Calculated FDR (AF/acre) 23	USBR FDR (AF/acre) 24	Conveyance Loss (acre-feet) 25	Total Ag Demand (acre-feet) 26
2016	9,396	85	1,800	1,704	8,936	10,316	3,407	3,407	2.62	3.20	470	9,406
2050	13,063	95	2,157	2,157	11,480	13,063	4,314	4,314	2.66	3.20	521	12,001

Contractor's M&I Water Demands

Timeframe 1	Residential Water Demand: Population 28	Per Capita Demand (gpcd) 29	Total Demand (acre-feet) 30	Nonresidential Water Demand: Industrial (acre-feet) 31	Comm/ Institt (acre-feet) 32	Total Demand (acre-feet) 33	Loss: Unacc /Distr (acre-feet) 34	Ref Urban Per Capita Dmd (gpcd) 35	Calc Urban Per Capita Dmd (gpcd) 36	Total M&I Demand (acre-feet) 37	Total Ag+ M&I Dmd (acre-feet) 38	Unmet Demand (acre-feet) 39
2016						0	0			0	9,406	282
2050						0	0			0	12,001	7,405

* Represents Maximum Contract Amount

Notes: This contractor has two Friant Division CVP contracts (Contract No. 14-06-200-191E and I75r-4309E) with Class 1 allocations for up to 250 AF and 1,000, respectively. As Class 1 allocations are considered a dependable water supply as opposed to Class 2 allocations, they have been included as “transfers-in” in Column 7 for the benchmark year 2050. Also the contractor has a partial assignment (Contract No. 14-06-200-1911E) for 250 AF of Class 1 water.

Division: **Delta/Cross Valley**

Water Needs Assessment

District: 202385

Date: 11/13/2017

Agricultural Water Supply

KERN-TULARE WD

Contractor's Water Supply Sources and Quantities (acre-feet)

Timeframe 1	Surface Water Supply: Reference Delivery 2		USBR Total Deliv/Max 3	SWP 4	Local 5	Local Source	Trsfr/Rtrn /Recycle In 7	Trsfr/ Out 8	Groundwater Supply: District 9	Private 10	Safe Yield 11	Recharge 12	Total Supply 13
2014 Mgmt. Plan	53,300	*	15,320	0	6,685	6	0	0	0	24,667		0	46,672
2050	53,300	*	53,300	0	0		0	0	0	0		0	53,300

Contractor's Agricultural Water Demands

Maximum ProductiveAcres= 20,259

Timeframe 1	Crop Water Requirement (acre-feet) 15	District Irrig. Efficiency (%) 16	Effective Precip (acre-feet) 17	Reference Effective Precip (acre-ft) 18	Calculated Net Crop Water Req (acre-feet) 19	USBR Net Crop Water Req (acre-feet) 20	Average Irrigated Acres (acres) 21	Reference Irrigated Acres (acres) 22	Calculated FDR (AF/acre) 23	USBR FDR (AF/acre) 24	Conveyance Loss (acre-feet) 25	Total Ag Demand (acre-feet) 26
2014	46,672	95	15	5,222	49,113	56,997	17,406	20,259	2.82	3.73	0	49,113
2050	65,745	95	6,078	6,078	65,745	65,745	20,259	20,259	3.10	3.73	0	62,807

Contractor's M&I Water Demands

Timeframe 1	Residential Water Demand: Population 28	Per Capita Demand (gpcd) 29	Total Demand (acre-feet) 30	Nonresidential Water Demand: Industrial (acre-feet) 31	Comm/ Institt (acre-feet) 32	Total Demand (acre-feet) 33	Loss: Unacc /Distr (acre-feet) 34	Ref Urban Per Capita Dmd (gpcd) 35	Calc Urban Per Capita Dmd (gpcd) 36	Total M&I Demand (acre-feet) 37	Total Ag+ M&I Dmd (acre-feet) 38	Unmet Demand (acre-feet) 39
2014						0	0			0	49,113	2,441
2050						0	0			0	62,807	9,507

* Represents Maximum Contract Amount

Notes: 14-06-200-8601A water service contract for 40,000 AF
14-06-200-8367A assignment contract for 13,300 AF

This contractor has a Friant Division CVP contract (Contract No. I1r-1460A) with a Class 2 allocation for up to 5,000 AF. As Class 2 water supplies are considered undependable and furnished only they can be made available by Reclamation after all Class 1 allocations have been met, this amount is not included as a source of water supply for the benchmark year 2050. Maximum productive acres includes contracts 14-06-200-8601A and 14-06-20-8367A combined acreage.

Division: **Delta/Cross Valley**

Water Needs Assessment

District: 202445 Date: 1/3/2018

M&I Water Supply

LINDSAY, CITY OF

Contractor's Water Supply Sources and Quantities (acre-feet)

Timeframe 1	Surface Water Supply: Reference Delivery 2		USBR Total Deliv/Max 3	SWP 4	Local 5	Local Source	Trsfr/Rtrn /Recycle In 7	Trsfr/ Out 8	Groundwater Supply: District 9	Private 10	Safe Yield 11	Recharge 12	Total Supply 13
2016	50	*	1,324	0	0	6	0	0	1,110	0		0	2,434
2050	50	*	50	0	0		2,500	0	0	0		0	2,550

Contractor's Agricultural Water Demands

Maximum ProductiveAcres= 0

Timeframe 1	Crop Water Requirement (acre-feet) 15	District Irrig. Efficiency (%) 16	Effective Precip (acre-feet) 17	Reference Effective Precip (acre-ft) 18	Calculated Net Crop Water Req (acre-feet) 19	USBR Net Crop Water Req (acre-feet) 20	Average Irrigated Acres (acres) 21	Reference Irrigated Acres (acres) 22	Calculated FDR (AF/acre) 23	USBR FDR (AF/acre) 24	Conveyance Loss (acre-feet) 25	Total Ag Demand (acre-feet) 26
2016												
2050												

Contractor's M&I Water Demands

Timeframe 1	Residential Water Demand: Population 28	Per Capita Demand (gpcd) 29	Total Demand (acre-feet) 30	Nonresidential Water Demand: Industrial (acre-feet) 31	Comm/ Institt (acre-feet) 32	Total Demand (acre-feet) 33	Loss: Unacc /Distr (acre-feet) 34	Ref Urban Per Capita Dmd (gpcd) 35	Calc Urban Per Capita Dmd (gpcd) 36	Total M&I Demand (acre-feet) 37	Total Ag+ M&I Dmd (acre-feet) 38	Unmet Demand (acre-feet) 39
2016	14,200	253.9	4,038	186	329	515	0	257.0	286.2	4,553	4,553	2,119
2050	22,029	166.0	4,095	289	510	799	0	166.0	198.3	4,894	4,894	2,344

* Represents Maximum Contract Amount

Notes: This contractor has a Friant Division CVP contract (Contract No. 5-07-20-W0428) with a Class 1 allocation for up to 2,500 AF. As Class 1 allocations are considered a dependable water supply as opposed to Class 2 allocations, they have been included as “transfers-in” in Column 7 for the benchmark year 2050.

Division: **Delta/Cross Valley**

Water Needs Assessment

District: 202460 Date: 1/8/2018

Agricultural Water Supply

LOWER TULE RIVER ID

Contractor's Water Supply Sources and Quantities (acre-feet)

Timeframe 1	Surface Water Supply: Reference Delivery 2	USBR Total Deliv/Max 3	SWP 4	Local 5	Local Source	Trsfr/Rtrn /Recycle In 7	Trsfr/ Out 8	Groundwater Supply: District 9	Private 10	Safe Yield 11	Recharge 12	Total Supply 13
2010 Mgmt. Plan	31,102	171,428	0	89,215	6	0	8,111	0	192,184		23,044	421,672
2050	31,102	31,102	0	70,000	Pre-1914	61,200	0	0	0		0	162,302

Contractor's Agricultural Water Demands

Maximum ProductiveAcres= 103,086

Timeframe 1	Crop Water Requirement (acre-feet) 15	District Irrig. Efficiency (%) 16	Effective Precip (acre-feet) 17	Reference Effective Precip (acre-ft) 18	Calculated Net Crop Water Req (acre-feet) 19	USBR Net Crop Water Req (acre-feet) 20	Average Irrigated Acres (acres) 21	Reference Irrigated Acres (acres) 22	Calculated FDR (AF/acre) 23	USBR FDR (AF/acre) 24	Conveyance Loss (acre-feet) 25	Total Ag Demand (acre-feet) 26
2010	367,038	95	1	36,602	386,355	440,362	111,938	103,086	3.45	5.12	105,259	491,614
2050	414,443	95	32,761	32,761	401,771	414,443	103,086	103,086	3.90	5.12	7,542	409,313

Contractor's M&I Water Demands

Timeframe 1	Residential Water Demand: Population 28	Per Capita Demand (gpcd) 29	Total Demand (acre-feet) 30	Nonresidential Water Demand: Industrial (acre-feet) 31	Comm/ Institt (acre-feet) 32	Total Demand (acre-feet) 33	Loss: Unacc /Distr (acre-feet) 34	Ref Urban Per Capita Dmd (gpcd) 35	Calc Urban Per Capita Dmd (gpcd) 36	Total M&I Demand (acre-feet) 37	Total Ag+ M&I Dmd (acre-feet) 38	Unmet Demand (acre-feet) 39
2010						0	0			0	491,614	69,942
2050						0	0			0	409,313	247,011

* Represents Maximum Contract Amount

Notes: This contractor has a Friant Division CVP contract (Contract No. 175r-2771D) with Class 1 and Class 2 allocations for up to 61,200 AF and 238,000 AF, respectively. As Class 1 allocations are considered a dependable water supply as opposed to Class 2 allocations, they have been included as "transfers-in" in Column 7 for the benchmark year 2050.

Division: **Delta/Cross Valley**

Water Needs Assessment

District: 202500

Agricultural Water Supply

PIXLEY ID

Contractor's Water Supply Sources and Quantities (acre-feet)

Timeframe 1	Surface Water Supply: Reference Delivery 2		USBR Total Deliv/Max 3	SWP 4	Local 5	Local Source	Trsfr/Rtrn /Recycle In 7	Trsfr/ Out 8	Groundwater Supply: District 9	Private 10	Safe Yield 11	Recharge 12	Total Supply 13
2008 Mgmt. Plan	31,102	*	0	0	1,000	6	30,296	0	0	117,333		0	148,629
2050	31,102	*	31,102	0	0		0	0	0	0		0	31,102

Contractor's Agricultural Water Demands

Maximum ProductiveAcres= 69,571

Timeframe 1	Crop Water Requirement (acre-feet) 15	District Irrig. Efficiency (%) 16	Effective Precip (acre-feet) 17	Reference Effective Precip (acre-ft) 18	Calculated Net Crop Water Req (acre-feet) 19	USBR Net Crop Water Req (acre-feet) 20	Average Irrigated Acres (acres) 21	Reference Irrigated Acres (acres) 22	Calculated FDR (AF/acre) 23	USBR FDR (AF/acre) 24	Conveyance Loss (acre-feet) 25	Total Ag Demand (acre-feet) 26
2008	158,160	95	16,962	16,962	148,629	158,160	53,274	69,571	2.79	3.5	0	148,629
2050	262,411	95	21,104	21,104	254,007	262,411	69,571	69,571	3.65	4.12	0	254,007

Contractor's M&I Water Demands

Timeframe 1	Residential Water Demand: Population 28	Per Capita Demand (gpcd) 29	Total Demand (acre-feet) 30	Nonresidential Water Demand: Industrial (acre-feet) 31	Comm/ Institt (acre-feet) 32	Total Demand (acre-feet) 33	Loss: Unacc /Distr (acre-feet) 34	Ref Urban Per Capita Dmd (gpcd) 35	Calc Urban Per Capita Dmd (gpcd) 36	Total M&I Demand (acre-feet) 37	Total Ag+ M&I Dmd (acre-feet) 38	Unmet Demand (acre-feet) 39
2008						0	0			0	148,629	0
2050						0	0			0	254,007	222,905

* Represents Maximum Contract Amount

Notes:

Division: **Delta/Cross Valley**

Water Needs Assessment

District: 202540

Date: 1/4/2018

Agricultural Water Supply

SAUCELITO ID

Contractor's Water Supply Sources and Quantities (acre-feet)

Timeframe 1	Surface Water Supply: Reference Delivery 2		USBR Total Deliv/Max 3	SWP 4	Local 5	Local Source	Trsfr/Rtrn /Recycle In 7	Trsfr/ Out 8	Groundwater Supply: District 9	Private 10	Safe Yield 11	Recharge 12	Total Supply 13
2016	100	*	19,219	0	2,623	6	5,210	0	0	40,413		0	67,465
2050	100	*	100	0	0		21,500	0	0	0		0	21,600

Contractor's Agricultural Water Demands

Maximum ProductiveAcres= 19,737

Timeframe 1	Crop Water Requirement (acre-feet) 15	District Irrig. Efficiency (%) 16	Effective Precip (acre-feet) 17	Reference Effective Precip (acre-ft) 18	Calculated Net Crop Water Req (acre-feet) 19	USBR Net Crop Water Req (acre-feet) 20	Average Irrigated Acres (acres) 21	Reference Irrigated Acres (acres) 22	Calculated FDR (AF/acre) 23	USBR FDR (AF/acre) 24	Conveyance Loss (acre-feet) 25	Total Ag Demand (acre-feet) 26
2016	59,850	85	2,965	6,969	66,924	25,465	18,425	18,425	3.63	3.07	541	67,465
2050	57,076	90	7,494	7,494	55,091	57,076	19,737	19,737	2.79	3.05	802	55,893

Contractor's M&I Water Demands

Timeframe 1	Residential Water Demand: Population 28	Per Capita Demand (gpcd) 29	Total Demand (acre-feet) 30	Nonresidential Water Demand: Industrial (acre-feet) 31	Comm/ Institt (acre-feet) 32	Total Demand (acre-feet) 33	Loss: Unacc /Distr (acre-feet) 34	Ref Urban Per Capita Dmd (gpcd) 35	Calc Urban Per Capita Dmd (gpcd) 36	Total M&I Demand (acre-feet) 37	Total Ag+ M&I Dmd (acre-feet) 38	Unmet Demand (acre-feet) 39
2016						0	0			0	67,465	0
2050						0	0			0	55,893	34,293

* Represents Maximum Contract Amount

Notes: This contractor has a Friant Division CVP contract (Contract No. I75r-2771D) with Class 1 and Class 2 allocations for up to 21,200 AF and 32,800 AF, respectively also a partial assignment for 300 AF (Contract No. 14-06-200-7430E). As Class 1 allocations are considered a dependable water supply as opposed to Class 2 allocations, they have been included as "transfers-in" in Column 7 for the benchmark year 2050.

Division: **Delta/Cross Valley**

Water Needs Assessment

District: 202570

Date: 12/21/2017

Agricultural Water Supply

STONE CORRAL ID

Contractor's Water Supply Sources and Quantities (acre-feet)

Timeframe 1	Surface Water Supply: Reference Delivery 2	USBR Total Deliv/Max 3	SWP 4	Local 5	Local Source	Trsfr/Rtrn /Recycle In 7	Trsfr/ Out 8	Groundwater Supply: District 9	Private 10	Safe Yield 11	Recharge 12	Total Supply 13
2016	950	6,171	0	0	6	1,120	424	0	8,651		0	15,518
2050	950	950	0	0		10,000	0	0	0		0	10,950

Contractor's Agricultural Water Demands

Maximum ProductiveAcres= 5,904

Timeframe 1	Crop Water Requirement (acre-feet) 15	District Irrig. Efficiency (%) 16	Effective Precip (acre-feet) 17	Reference Effective Precip (acre-ft) 18	Calculated Net Crop Water Req (acre-feet) 19	USBR Net Crop Water Req (acre-feet) 20	Average Irrigated Acres (acres) 21	Reference Irrigated Acres (acres) 22	Calculated FDR (AF/acre) 23	USBR FDR (AF/acre) 24	Conveyance Loss (acre-feet) 25	Total Ag Demand (acre-feet) 26
2016	14,046	85	750	1,107	15,642	16,450	5,160	5,160	3.03	2.6	300	15,942
2050	18,832	90	1,256	1,256	19,529	19,529	5,904	5,904	3.31	2.96	343	19,872

Contractor's M&I Water Demands

Timeframe 1	Residential Water Demand: Population 28	Per Capita Demand (gpcd) 29	Total Demand (acre-feet) 30	Nonresidential Water Demand: Industrial (acre-feet) 31	Comm/ Institt (acre-feet) 32	Total Demand (acre-feet) 33	Loss: Unacc /Distr (acre-feet) 34	Ref Urban Per Capita Dmd (gpcd) 35	Calc Urban Per Capita Dmd (gpcd) 36	Total M&I Demand (acre-feet) 37	Total Ag+ M&I Dmd (acre-feet) 38	Unmet Demand (acre-feet) 39
2016						0	0			0	15,942	424
2050						0	0			0	19,872	8,922

* Represents Maximum Contract Amount

Notes:

This contractor has a Friant Division CVP contract (Contract No. 175r-2555D) with a Class 1 allocation for up to 10,000 AF. As Class 1 allocations are considered a dependable water supply as opposed to Class 2 allocations, they have been included as “transfers-in” in Column 7 for the benchmark year 2050.

Division: **Delta/Cross Valley**

Water Needs Assessment

District: 202575

Date: 12/20/2017

M&I Water Supply

STRATHMORE PUD

Contractor's Water Supply Sources and Quantities (acre-feet)

Timeframe 1	Surface Water Supply: Reference Delivery 2	USBR Total Deliv/Max 3	SWP 4	Local 5	Local Source	Trsfr/Rtrn /Recycle In 7	Trsfr/ Out 8	Groundwater Supply: District 9	Private 10	Safe Yield 11	Recharge 12	Total Supply 13
2016	400	0	0	0	6	275	0	0	0		0	275
2050	400	400	0	0		0	0	0	0		0	400

Contractor's Agricultural Water Demands

Maximum ProductiveAcres= 0

Timeframe 1	Crop Water Requirement (acre-feet) 15	District Irrig. Efficiency (%) 16	Effective Precip (acre-feet) 17	Reference Effective Precip (acre-ft) 18	Calculated Net Crop Water Req (acre-feet) 19	USBR Net Crop Water Req (acre-feet) 20	Average Irrigated Acres (acres) 21	Reference Irrigated Acres (acres) 22	Calculated FDR (AF/acre) 23	USBR FDR (AF/acre) 24	Conveyance Loss (acre-feet) 25	Total Ag Demand (acre-feet) 26
2016												
2050												

Contractor's M&I Water Demands

Timeframe 1	Residential Water Demand: Population 28	Per Capita Demand (gpcd) 29	Total Demand (acre-feet) 30	Nonresidential Water Demand: Industrial (acre-feet) 31	Comm/ Institt (acre-feet) 32	Total Demand (acre-feet) 33	Loss: Unacc /Distr (acre-feet) 34	Ref Urban Per Capita Dmd (gpcd) 35	Calc Urban Per Capita Dmd (gpcd) 36	Total M&I Demand (acre-feet) 37	Total Ag+ M&I Dmd (acre-feet) 38	Unmet Demand (acre-feet) 39
2016	2,684	109.8	330	70	28	98	2	257.0	143.0	430	430	155
2050	3,765	166.0	700	98	39	137	3	166.0	199.2	840	840	440

* Represents Maximum Contract Amount

Notes:

Division: **Delta/Cross Valley**

Water Needs Assessment

District: 290008

Date: 1/3/2018

M&I Water Supply

STYRO-TEK

Contractor's Water Supply Sources and Quantities (acre-feet)

Timeframe 1	Surface Water Supply: Reference Delivery 2	USBR Total Deliv/Max 3	SWP 4	Local 5	Local Source	Trsfr/Rtrn /Recycle In 7	Trsfr/ Out 8	Groundwater Supply: District 9	Private 10	Safe Yield 11	Recharge 12	Total Supply 13
2016	45	0	0	0	6	45	0	0	0	0	0	45
2050	45	45	0	0			0	0	0	0	0	45

Contractor's Agricultural Water Demands

Maximum ProductiveAcres= 0

Timeframe 1	Crop Water Requirement (acre-feet) 15	District Irrig. Efficiency (%) 16	Effective Precip (acre-feet) 17	Reference Effective Precip (acre-ft) 18	Calculated Net Crop Water Req (acre-feet) 19	USBR Net Crop Water Req (acre-feet) 20	Average Irrigated Acres (acres) 21	Reference Irrigated Acres (acres) 22	Calculated FDR (AF/acre) 23	USBR FDR (AF/acre) 24	Conveyance Loss (acre-feet) 25	Total Ag Demand (acre-feet) 26
2016												
2050												

Contractor's M&I Water Demands

Timeframe 1	Residential Water Demand: Population 28	Per Capita Demand (gpcd) 29	Total Demand (acre-feet) 30	Nonresidential Water Demand: Industrial (acre-feet) 31	Comm/ Institt (acre-feet) 32	Total Demand (acre-feet) 33	Loss: Unacc /Distr (acre-feet) 34	Ref Urban Per Capita Dmd (gpcd) 35	Calc Urban Per Capita Dmd (gpcd) 36	Total M&I Demand (acre-feet) 37	Total Ag+ M&I Dmd (acre-feet) 38	Unmet Demand (acre-feet) 39
2016	0	0.0	0	45	0	45	0	0.0	0.0	45	45	0
2050	0	0.0	0	45	0	45	0	0.0	0.0	45	45	0

* Represents Maximum Contract Amount

Notes:

In 2016 CVC supply was unavailable to the Contractor. Water was purchased for use from Friant Division CVP contractor as a transfer in. This does not apply to 2050.

Division: **Delta/Cross Valley**

Water Needs Assessment

District: 202600

Date: 1/4/2018

Agricultural Water Supply

TRI-VALLEY WD

Contractor's Water Supply Sources and Quantities (acre-feet)

Timeframe 1	Surface Water Supply: Reference Delivery 2	USBR Total Deliv/Max 3	SWP 4	Local 5	Local Source	Trsfr/Rtrn /Recycle In 7	Trsfr/ Out 8	Groundwater Supply: District 9	Private 10	Safe Yield 11	Recharge 12	Total Supply 13
2014-2016	1,142	215	0	0	6	730	0	0	1,551		0	2,496
2050	1,142 *	1,142	0	0		400	0	0	0		0	1,542

Contractor's Agricultural Water Demands

Maximum ProductiveAcres= 2,284

Timeframe 1	Crop Water Requirement (acre-feet) 15	District Irrig. Efficiency (%) 16	Effective Precip (acre-feet) 17	Reference Effective Precip (acre-ft) 18	Calculated Net Crop Water Req (acre-feet) 19	USBR Net Crop Water Req (acre-feet) 20	Average Irrigated Acres (acres) 21	Reference Irrigated Acres (acres) 22	Calculated FDR (AF/acre) 23	USBR FDR (AF/acre) 24	Conveyance Loss (acre-feet) 25	Total Ag Demand (acre-feet) 26
2014-2016	2,607	85	515	368	2,461	6,502	973	1,840	2.53	3.53	35	2,496
2050	7,317	90	457	457	7,622	7,622	2,284	2,284	3.34	3.34	732	8,354

Contractor's M&I Water Demands

Timeframe 1	Residential Water Demand: Population 28	Per Capita Demand (gpcd) 29	Total Demand (acre-feet) 30	Nonresidential Water Demand: Industrial (acre-feet) 31	Comm/ Institt (acre-feet) 32	Total Demand (acre-feet) 33	Loss: Unacc /Distr (acre-feet) 34	Ref Urban Per Capita Dmd (gpcd) 35	Calc Urban Per Capita Dmd (gpcd) 36	Total M&I Demand (acre-feet) 37	Total Ag+ M&I Dmd (acre-feet) 38	Unmet Demand (acre-feet) 39
2014-2016						0	0			0	2,496	0
2050						0	0			0	8,354	6,812

* Represents Maximum Contract Amount

Notes: As a result of limited data, water usage was supplied by the Contractor in 2016 and crop data from SCCAO for 2014 was used.

This contractor has a Friant Division CVP contract (Contract No. I75r-2508e) with Class 1 allocation for up to 400 AF. As Class 1 allocations are considered a dependable water supply as opposed to Class 2 allocations, they have been included as “transfers-in” in Column 7 for the benchmark year 2050.

Division: **Delta/Cross Valley**

Water Needs Assessment

District: 290009

Date: 12/21/2017

M&I Water Supply

VISALIA, CITY OF

Contractor's Water Supply Sources and Quantities (acre-feet)

Timeframe 1	Surface Water Supply: Reference Delivery 2	USBR Total Deliv/Max 3	SWP 4	Local 5	Local Source	Trsfr/Rtrn /Recycle In 7	Trsfr/ Out 8	Groundwater Supply: District 9	Private 10	Safe Yield 11	Recharge 12	Total Supply 13
2016	300	0	0	0	6	0	0	24,853	0		0	24,853
2050	300	300	0	0		0	0	0	0		0	300

Contractor's Agricultural Water Demands

Maximum ProductiveAcres= 0

Timeframe 1	Crop Water Requirement (acre-feet) 15	District Irrig. Efficiency (%) 16	Effective Precip (acre-feet) 17	Reference Effective Precip (acre-ft) 18	Calculated Net Crop Water Req (acre-feet) 19	USBR Net Crop Water Req (acre-feet) 20	Average Irrigated Acres (acres) 21	Reference Irrigated Acres (acres) 22	Calculated FDR (AF/acre) 23	USBR FDR (AF/acre) 24	Conveyance Loss (acre-feet) 25	Total Ag Demand (acre-feet) 26
2016												
2050												

Contractor's M&I Water Demands

Timeframe 1	Residential Water Demand: Population 28	Per Capita Demand (gpcd) 29	Total Demand (acre-feet) 30	Nonresidential Water Demand: Industrial (acre-feet) 31	Comm/ Institt (acre-feet) 32	Total Demand (acre-feet) 33	Loss: Unacc /Distr (acre-feet) 34	Ref Urban Per Capita Dmd (gpcd) 35	Calc Urban Per Capita Dmd (gpcd) 36	Total M&I Demand (acre-feet) 37	Total Ag+ M&I Dmd (acre-feet) 38	Unmet Demand (acre-feet) 39
2016	130,231	115.3	16,817	2,367	4,526	6,893	1,144	257.0	170.4	24,854	24,854	1
2050	208,931	166.0	38,842	3,797	7,261	11,058	1,835	166.0	221.1	51,735	51,735	51,435

* Represents Maximum Contract Amount

Notes:

Appendix E: Reclamation's Cultural Resources Determination

CULTURAL RESOURCES COMPLIANCE
Division of Environmental Affairs
Cultural Resources Branch (MP-153)

MP-153 Tracking Number: 17-SCAO-249

Project Name: Central Valley Project Interim Renewal Contracts for Cross Valley Contractors 2018-2020

NEPA Document: EA-17-020

NEPA Contact: Kate Connor, Natural Resource Specialist

MP 153 Cultural Resources Reviewer: Scott Williams, Archaeologist SW

Date: August 24, 2017

Reclamation proposes to execute interim renewal contracts for the contracts listed in Table 1 (see below) for a two year period (March 1, 2018 through February 28, 2020). This is the type of undertaking that does not have the potential to cause effects to historic properties, should such properties be present, pursuant to the NHPA Section 106 regulations codified at 36 CFR § 800.3(a)(1). Reclamation has no further obligations under NHPA Section 106, pursuant to 36 CFR § 800.3(a)(1).

Table 1 Contractors, Existing Contract Amounts, and Expiration Dates

Contractor	Contract Number	Contract Quantity (acre-feet per year)	Expiration of Existing Interim Renewal Contract
County of Fresno[1]	14-06-200-8292A-IR15	3,000	2/29/2016
County of Tulare[2]	14-06-200-8293A-IR15	5,308	2/29/2016
Hills Valley Irrigation District[3]	14-06-200-8466A-IR15	3,346	2/29/2016
Kern-Tulare Water District	14-06-200-8601A-IR15	40,000	2/29/2016
Kern-Tulare Water District (from Rag Gulch Water District)[3,4]	14-06-200-8367A-IR15	13,300	2/29/2016
Lower Tule River Irrigation District	14-06-200-8237A-IR15	31,102	2/29/2016
Pixley Irrigation District	14-06-200-8238A-IR15	31,102	2/29/2016
Tri-Valley Water District	14-06-200-8565A-IR15	1,142	2/29/2016

[1]County of Fresno includes Fresno County Service Area #34
[2]County of Tulare includes the following subcontractors: Alpaugh Irrigation District, Atwell Water District, Hills Valley Irrigation District, Saucelito Irrigation District[4], Stone Corral Irrigation District[4], City of Lindsay[4], Strathmore Public Utility District, Styrotek, Inc., and City of Visalia.
[3]Lower Tule River Irrigation District, Saucelito Irrigation District, Stone Corral Irrigation District, Tri-Valley Water District, Kern-Tulare Water District, Hills Valley Irrigation District, and City of Lindsay receive CVP water under more than one contract, either as Friant Division and/or Cross Valley Contractors.
[4]Kern Tulare Water District and Rag Gulch Water District consolidated on January 1, 2009.

Interim renewal contracts are needed to provide for the continued beneficial use of the water developed and managed by the CVP and for the continued reimbursement to the federal government for costs related to the construction and operation of the CVP. Additionally, CVP

water is essential to continue agricultural and municipal viability for these contractors. The Proposed Action is to execute eight interim renewal contracts in order to extend the term of the contractors' existing interim renewal contracts for two years, beginning March 1, 2018 and ending February 28, 2020. There would be no impacts to cultural resources as a result of implementing the Proposed Action as the Proposed Action would facilitate the flow of water through existing facilities to existing users. No new construction or ground disturbing activities would occur as part of the Proposed Action. The pumping, conveyance, and storage of water would be confined to existing CVP facilities.

This document is intended to convey the completion of the NHPA Section 106 process for this undertaking. This action would not have significant impacts on properties listed, or eligible for listing, on the National Register of Historic Places as determined by Reclamation (LND 02-01) (43 CFR 46.215 (g). Please retain a copy in the administrative record for this action. Should changes be made to this project, additional NHPA Section 106 review, possibly including consultation with the State Historic Preservation Officer, may be necessary. Thank you for providing the opportunity to comment.

Appendix F: Conveyance Facilities and Waterways

Conveyance Facilities and Waterways

This appendix includes a summary of conveyance facilities and waterways that may be used for conveyance and exchange of available water supplies between the Cross Valley Contractors and their potential exchange partners.

Central Valley Project

The Central Valley Project (CVP) is one of the nation's major water conservation developments. It extends from the Cascade Range in the north to the semi-arid but fertile plains along the Kern River in the south. Initial features of the project were built primarily to protect California's Central Valley from crippling water shortages and menacing floods, but the CVP also improves Sacramento River navigation, supplies domestic and industrial water, generates electric power, conserves fish and wildlife, creates opportunities for recreation, and enhances water quality. The CVP serves farms, homes, and industry in California's Central Valley as well as major urban centers in the San Francisco Bay Area; it is also the primary source of water for much of California`s wetlands. In addition to delivering water for farms, homes, factories, and the environment, the CVP produces electric power and provides flood protection, navigation, recreation, and water quality benefits (Reclamation 2015).

Jones Pumping Plant

The Jones Pumping Plant consists of an inlet channel, pumping plant, and discharge pipes. Water in the Delta is lifted 197 feet into the Delta-Mendota Canal (DMC). Each of the six pumps at Tracy is powered by a 22,500 horsepower motor and is capable of pumping 767 cubic feet per second (cfs). Power to run the huge pumps is supplied by CVP powerplants. The water is pumped through three 15-foot-diameter discharge pipes and carried about 1 mile up to the DMC. The intake canal includes the Jones Fish Screen, which was built to intercept downstream migrant fish so they may be returned to the main channel to resume their journey to the ocean. Although Cross Valley Contractor supplies are predominantly pumped at Banks, infrequently, if pumping capacity exists after all other CVP needs have been met (typically in the spring), Cross Valley Contractor water supplies have been pumped at Jones and moved over to the SWP at O'Neill Forebay for conveyance to the Cross Valley Canal.

Delta-Mendota Canal

The DMC includes a combination of both concrete-lined and earthen-lined sections and is about 117 miles in length. The canal transports water from the Jones Pumping Plant to the Mendota Pool, located at the confluence of the San Joaquin River and the North Fork of the Kings River, approximately 30 miles west of the city of Fresno. The Mendota Pool is controlled by a concrete storage dam that was constructed in 1917 and serves as the terminus for the DMC. Capacity in the DMC is restricted by the physical limitations of the canal and the pumping limits of the Jones Pumping Plant.

Joint Use Facilities

Some CVP facilities (i.e., the San Luis Unit) were developed in coordination with the State Water Project (SWP). Both the CVP and the SWP use the San Luis Reservoir, O'Neill Forebay, and more than 100 miles of the California Aqueduct/San Luis Canal and its related pumping and generating facilities. These operations are closely coordinated at a Joint Operations Center in Sacramento and join with other agencies such as the National Weather Service and the U.S. Army Corps of Engineers for joint action during flood emergencies (Reclamation 2015).

O'Neill Forebay

This joint Federal/State facility is located on San Luis Creek, 2.5 miles downstream from San Luis Dam. The forebay, with a capacity of 56,400 acre-feet (AF), is used as a hydraulic junction point for Federal and State waters. The top 20,000 AF acts to re-regulate storage necessary to permit off-peak pumping and on-peak generation by the main San Luis Pumping-Generating Plant. The O'Neill Forebay Inlet Channel extends 2,200 feet from the DMC to deliver water to O'Neill Forebay. Six pumping units of the O'Neill Pumping-Generating Plant lift water 45 to 53 feet into the forebay.

California Aqueduct/San Luis Canal

The California Aqueduct is a feature of the SWP and is operated by the California Department Water Resources (DWR). Water is exported from the Delta at the Clifton Court Forebay through the Banks Pumping Plant and is pumped into the California Aqueduct. From there, water flows south via gravity into the San Luis Joint-Use Complex, which was designed and constructed by the federal government and is operated and maintained by DWR. The San Luis Canal is the federal section of the California Aqueduct. The San Luis Canal extends 102.5 miles from O'Neill Forebay, near Los Banos, in a southeasterly direction to a point west of Kettlemen City. The principle purpose of the CVP portion of the facility is to furnish approximately 1.25 million AF of water as a supplemental irrigation supply to roughly 600,000 acres located in the western portion of Fresno, Kings, and Merced counties. After Kettlemen City, the California Aqueduct (SWP portion) conveys SWP water to serve southern California mainly for municipal and industrial purposes (M&I) purposes.

The California Aqueduct/San Luis Canal is concrete-lined canal with a capacity ranging from 8,350 to 13,100 cfs. The California Aqueduct-Delta Mendota Canal Intertie was installed north of the O'Neill Forebay pumping plant to provide connectivity between the California Aqueduct and the DMC. The intertie allows CVP and SWP water to be moved back and forth between these facilities.

Dos Amigos Pumping Plant

This joint Federal/State facility, 17 miles south of O'Neill Forebay, is a relift plant in the San Luis Canal. The plant contains six pumping units, each capable of delivering 2,200 cfs at 125 feet of head.

Friant Division

The Friant Division was authorized by Congress under the concept of conjunctive use where CVP water was meant to be a supplemental supply to alleviate groundwater overdraft in the area. Based on the conjunctive use concept within the Friant Division, contractors are expected to continue mixed use of CVP and other surface water supplies and groundwater, with greater

emphasis on groundwater use during dry periods when surface water is limited or expensive and percolate excess surface water in wet years. The Friant Division is an integral part of the CVP, but is hydrologically independent and therefore operated separately from the other divisions of the CVP (Reclamation 2012). Major facilities of the Friant Division include Friant Dam and Millerton Lake, the Friant-Kern Canal and the Madera Canal.

Friant-Kern Canal

The Friant-Kern Canal conveys water supplies stored in Millerton Lake from the San Joaquin River to water districts in Fresno, Tulare, and Kern Counties. The canal extends 152 miles south from Friant Dam in Fresno County to the Kern River in Kern County four miles west of Bakersfield. The Friant-Kern Canal annually delivers about seven million AF of water for agricultural, urban, and wildlife purposes.

State Water Project

The SWP is a complex system of reservoirs, pumping and generating plants, and water conveyance facilities, including the California Aqueduct. The principal purpose of the SWP is to supply water to its 29 long-term urban and agricultural water supply contractors in Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California (DWR 2015).

Banks Pumping Plant

Located in the Sacramento-San Joaquin Delta, Banks lifts water 244 feet from the Clifton Court Forebay into the California Aqueduct. DWR has a priority system for pumping SWP and CVP water supplies at Banks. CVP water supplies have a lower priority compared to SWP uses. Prior to pumping CVP supplies at Banks (Joint Point of Diversion) there are environmental and water quality plans that must be submitted and approved and criteria that must be met. Under certain conditions, DWR does not have an opportunity to pump and convey the annual allocation of water supplies to the Cross Valley Contractors or pumping and conveyance may occur at a time that is outside of the growing season.

Cross Valley Canal

The Cross Valley Canal is a locally-financed facility completed in 1975 and operated by the Kern County Water Agency (KCWA). The canal extends from the California Aqueduct near Tupman to Bakersfield. It consists of 6 pumping lifts, with a capacity of 1,400 cfs from the Aqueduct to Arvin-Edison Water Storage District's (Arvin-Edison) Intake Canal (also near the Friant-Kern Canal terminus and Kern River). The Cross Valley Canal "extension", an unlined canal, continues past Arvin-Edison's Intake Canal, which is rated 342 cfs and has an additional 2 pumping lifts. The Cross Valley Canal is a joint-use facility owned by various participants, including Cross Valley Contractors and Arvin-Edison. The Cross Valley Canal can convey water from the Aqueduct to the Kern Water Bank, the City of Bakersfield groundwater recharge facility, the Berrenda Mesa Property, the Pioneer Banking Project, the Kern River channel, to Arvin-Edison's Intake Canal, or to various member units of KCWA and other districts who have access to the Cross Valley Canal. When needed, the Cross Valley Canal is also capable of

conveying 500 cfs, in reverse flow-gravity mode, to the Aqueduct. In 2008, as part of the Cross Valley Canal expansion project, an additional 500 cfs turnout was constructed from the Friant-Kern Canal that can deliver water by gravity into either the AEWSD Intake Canal or the CVC.

Kern River/Alejandro/Outlet Canals

The Kern River is about 165 miles long and is the southernmost river in the San Joaquin Valley. The river originates from the Sierra Nevada Mountains on the eastern side of Tulare County and terminates on the west side of Kern County where it is mainly diverted for local water supplies. The U.S. Army Corp of Engineers (Corps) operates Isabella Dam on the Kern River to serve agricultural, hydroelectric, and flood control uses. Flows downstream of the dam are monitored and managed by the Kern River Watermaster. Below the dam, the river is highly diverted through a series of canals to irrigate farms in the southern San Joaquin Valley and provide municipal water supplies to the City of Bakersfield and surrounding areas. The Kern River is one of the few rivers in the Central Valley which does not contribute water to the CVP; however, the Friant-Kern Canal joins the river approximately four miles west of downtown Bakersfield. Kern River water quality is generally similar to that in the Friant-Kern Canal since its origin is also from snow melt in the Sierra Nevada. 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.

Water from the Friant-Kern Canal, the Cross Valley Canal, 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. 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.

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 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 Aqueduct, either directly or by exchange, to water districts for a supplemental water supply.

Kings River

The Corps 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 AF. The Kings River is managed similarly to a canal system providing water for irrigation and to meet flow requirements for fish and wildlife purposes.

Kaweah and St. Johns Rivers

The Corps 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 River 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.

Tule River

The Corps operates Success Dam for flood control and water supply. 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. 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 third Middle Fork channel of 3 miles, all northerly of the community of Woodville. The average annual runoff of the Tule River is 141,630 AF.

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 Corps 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.

Appendix G: U.S. Fish and Wildlife Service Concurrence Memo

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Suite W-2605
Sacramento, California 95825-1846

In Reply Refer to:
08ESMF00-
2018-I-0744

FEB 27 2018

Memorandum

To: Chief, Environmental Compliance Branch, U.S. Bureau of Reclamation, South-Central California Area Office, Fresno, California

From: Chief, San Joaquin Valley Division, Endangered Species Program, Sacramento Fish and Wildlife Office, Sacramento, California Patricia Cole

Subject: Informal Consultation on the Central Valley Project Cross Valley Contractors Interim Renewal Contracts and Article 5 Exchanges for March 1, 2018 – February 29, 2020

This memorandum is in response to the U.S. Bureau of Reclamation's (Reclamation) December 13, 2017, request for concurrence with the determination that the proposed execution of Central Valley Project (CVP) Interim Renewal Water Service Contracts (IRCs) for Cross Valley (CV) Contractors and Article 5 Exchanges, from March 1, 2018 to February 29, 2020 may affect, but is not likely to adversely affect (NLAA) the federally-listed as endangered Buena Vista Lake ornate shrew *(Sorex ornatus relictus),* San Joaquin kit fox *(Vulpes macrotis mutica),* Tipton kangaroo rat *(Dipodomys nitratoides nitratoides),* blunt-nosed leopard lizard *(Gambelia sila),* Kern mallow *(Eremalche kernensis),* and San Joaquin woolly-threads *(Monolopia congdonii).* The districts involved in the CV IRCs and Article 5 Exchanges are located within Fresno, Kern, Tulare, and Kings Counties. Your request was received in our office on December 18, 2017. This response is provided under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act), and in accordance with the implementing regulations pertaining to interagency cooperation (50 CFR 402).

The Federal action on which we are consulting is the two year-renewal of CV IRCs beginning on March 1, 2018, and ending February 29, 2020, as well as potential Article 5 Exchanges involving the CV IRC districts and other CVP and non-CVP recipients. Pursuant to 50 CFR 402.12(j), you submitted a Biological Evaluation (BA) for our review and requested concurrence with the findings presented therein. These findings conclude that the proposed project may affect, and is NLAA the Buena Vista Lake ornate shrew, San Joaquin kit fox, Tipton kangaroo rat, blunt-nosed leopard lizard, Kern mallow, and San Joaquin woolly-threads.

Reclamation has requested initiation of informal consultation under the Act. In considering your request, we based our evaluation on the following information: (1) the December 13, 2017, request for consultation, (2) a BA for the CV IRCs dated December 2017, (3) Central Valley Project Habitat Mapping Program (CVPHMP) land use change maps between 2006 and 2011 for CV IRC districts and Article 5 Exchange participants provided by Reclamation's Regional Office to the Service on January 6, 2016, (4) electronic mail between Reclamation and the Service, (5) information provided

by Reclamation's South Central California Area Office for the 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, and 2016 consultations involving CV IRCs, and (6) other information available to the Service.

Reclamation has determined that the proposed project will have no effect on the federally-listed species or critical habitats identified in Appendix A and is not requesting concurrence with those determinations. These no effect determinations are predicated on the conclusion that these species are not adapted to highly disturbed conditions, would not become established on land that had been fallowed for less than three years and would not occur on land that is being cultivated or is highly disturbed. These determinations of "no effect" are also based on an environmental commitment stipulating that "no native or untilled land (fallow for three consecutive years or more) may be cultivated with this water," with proposed changes to the contract service area requiring "separate environmental documentation and approval" (land conversion commitment).

Reclamation is requesting concurrence with NLAA for those species that could occupy or colonize lands that are fallowed for less than three years within the CV IRCs and Article 5 Exchanges: the Buena Vista Lake ornate shrew, San Joaquin kit fox, Tipton kangaroo rat, blunt-nosed leopard lizard, Kern mallow, and San Joaquin woolly-threads. These species were considered able to move onto, or sprout from the seedbanks on, lands that could be fallowed less than 3 years and could potentially be affected by such fallowed lands being brought back into production. The information provided for this consultation, as well as the short duration of this project and land conversion commitment in provides the basis for the Service to concur with Reclamation's determination that the CV IRCs and Article 5 exchanges are NLAA the species listed above.

The Service's Sacramento Fish and Wildlife Office issued a biological opinion on long-term renewal of the Friant and CV CVP water service contracts (Friant BiOp) on January 19, 2001 (File No. 01-F-0027). As part of that consultation, the Friant Division and CV contractors sought and received Applicant status under the Act. Reclamation, however, has not yet executed the long term contracts for the CV contracts. Compliance with the Act for the CV IRCs is governed by the commitments made in the Friant BiOp. For the purposes of this consultation, and as outlined in the BA for this action, all conservation measures and Applicant commitments described in the Friant BiOp apply to CV IRCs for the period of March 1, 2018 through February 29, 2020, or until long-term contracts for the CV contractors are executed, whichever comes first. These measures are summarized in Appendix B. Interim contract renewals of CV water service contracts will not result in additional adverse effects to listed species beyond those analyzed in the Friant BiOp. We therefore are only considering Reclamation's concurrence request for listed species within Article 5 exchange recipient districts and on lands fallowed for less than 3 years within CV IRC.

Consultation History

The consultation history, prior to the current proposed project, was identified in detail in previous consultations on these contracts and is hereby incorporated by reference (Service Files Nos., 00-F-0056, 02-F-0070, 04-F-0360, 06-F-0070, 08-F-0944-1 and -2, 12-I-0255, 14-I-0040, and 16-I-0341).

January 6, 2016: The Service receives a memo from Reclamation transmitting CVPHMP maps and tables for CVP and non-CVP districts that can receive CVP water. The maps and tables provided compared National Land Cover Database (NLCD) data from U.S. Geological Survey for 2006 and 2011.

February 25, 2016: The Service transmits a memo concurring with Reclamation's determinations and completing informal consultation on the CV IRCs and Article 5 Exchanges for 2 years beginning on March 1, 2016.

April-June 2016: The Service and Reclamation engage in conference calls to determine the future of CVPHMP. No corrective actions were identified for implementation to address the maps and tables of habitat changes.

August 9, 2017: The Service receives via email from Reclamation, a note that the CVPHMP mapping had identified a land use change incorrectly. No further explanation of the data flaw was provided to the Service.

December 18, 2017: The Service receives a memo from Reclamation requesting informal consultation under the Act on CV IRCs and Article 5 Exchanges for March 1, 2018, to February 29, 2020. The transmittal includes a Biological Evaluation as an attachment.

Relationship of the Proposed Project to Other Reclamation Consultations

Coordinated Long-Term Operation of the CVP and State Water Project (OCAP)
The effects of water exports from the Delta on protected species are addressed separately by NMFS and Service in consultations on continued long-term operation of the CVP and State Water Project (SWP) referred to as OCAP. Biological Opinions on OCAP have been issued by NMFS (2009) and Service (December 15, 2008, Service File 08-F-1481-5) for the effects of the continued long-term operation of the CVP and SWP. However, since that time, the United States Court, Eastern District of California remanded the OCAP BiOps and Reclamation was ordered by the Court to comply with NEPA before accepting the Reasonable and Prudent Alternatives of the BiOps. Subsequently, the OCAP BiOp issued by the Service was upheld by another Court ruling[1]. Reclamation has since signed a Record of Decision for OCAP supported by the Coordinated Long-term Operation of the Central Valley Project and State Water Project Final Environmental Impact Statement. The Preferred Alternative identified in the OCAP Final EIS and the Reclamation's decision included in the ROD is to implement the No Action Alternative. The No Action Alternative contains all of the Reasonable and Prudent Alternative actions in the 2008 U.S. Fish and Wildlife Service and 2009 National Marine Fisheries Service Biological Opinions[2].

Changes to County of Fresno Service Area #34
The Service has been involved in several consultations involving County of Fresno Service Area #34 (a CV IRC contractor). The Service completed a formal consultation on January 7, 2009 on the proposed Millerton New Town (MNT) Tract 4870 change in service area (File 08-F-1248). On March 21, 2014 the Service completed a reinitiated formal consultation on Millerton New Town Tract 4870 to increase the size of the action area. The Service also completed formal consultation

[1] see: http://www.fws.gov/sfbaydelta/documents/APPELLATE-315077-v1-Delta_smelt_II_--_panel_decision.pdf.

[2] The ROD and Final EIS for OCAP are available at:
http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=21883

with Reclamation on August 28, 2015 on the authorization of three long-term water transfers to Fresno County from Arvin-Edison Water Storage District and Terra Bella Irrigation District (Friant contractors) and the Lower Tule River Irrigation District (a Friant and CV IRC contractor) for a proposed development in the Millerton New Town Specific Plan Area (MNTSPA; File No. 09-F-0873). The MNTSPA considered in that consultation does not include the 88 acres that were considered in the formal consultation on Millerton New Town Tract 4870.

Project Description

This informal consultation is a reinitiation of previous consultations on IRCs that involved these CV contracts, and those consultations are included here by reference (Service File Nos., 00-F-0056, 02-F-0070, 04-F-0360, 06-F-0070, 08-F-0944-1 and -2, 2012-I-0255, and 2014-I-0040, and 2016-I-0341). This consultation on CV IRCs, detailed in Table 1, was established pursuant to Section 3404(c) of the Central Valley Project Improvement Act (CVPIA) and addresses the effects of the proposed renewal of the CV IRCs for a two-year period from March 1, 2018 to February 29, 2020. The water supplied through these contracts will be used within the CVC districts and may be exchanged to other districts, as shown in Figure 1, for agricultural, municipal, and industrial purposes, and will not exceed water allocations determined by existing CVP operations criteria. Interim CVP water contract renewals are consistent with the tiered implementation of the CVPIA, as described in the biological opinion on Implementation of the CVPIA (Service File 98-F-0124).

This consultation addresses the effects of the proposed renewal of eight IRCs in the CV Unit of the CVP, which are executed in accordance with Section 3401(c) of the CVPIA for a maximum period of 2 years. Some of the CV contractors are composed of several subcontractors. Altogether, there are fifteen water suppliers within the group known as the CV contractors. Under the IRCs, CV contractors can receive up to 128,300 acre-feet/year of CVP water. The CV contract service areas are located along the eastern side of the southern San Joaquin Valley. The water delivered for these IRCs will be used for agricultural, municipal, and industrial purposes, and will not exceed water allocations determined by existing CVP operations criteria established in the OCAP BiOps. The proposed project will continue existing IRCs for the CV contractors, with only minor administrative changes to the contract provisions to update the previous IRCs for the new contract period. No changes to CV contract service areas or water deliveries are part of the proposed project. Central Valley Project water deliveries under the CV IRCs can only be used within each designated contract service areas.

<u>Article 5 Exchanges</u>
In addition to the CV interim contracts, the proposed project includes Reclamation's approval of the CV contractors' exchange arrangements with individually proposed exchange partners for the 2018 and 2019 contract years (March 1, 2018 through February 29, 2020) for up to the full CV contractors' CVP contract supply of 128,300 acre-feet/year. Beginning in 1975, the first CV

Table 1. Cross Valley Contractors' Contract Quantities and Expiration Dates.

Contractor	Existing IRC #	Contract Quantity (AF)	Purpose of Use	Expiration Date
County of Fresno[3]	14-06-200-8292A-IR16	3,000	Agriculture and M&I	2/29/2020
County of Tulare [4]	14-06-200-8293A-IR16	5,308	Agriculture and M&I	2/29/2020
Hills Valley Irrigation District	14-06-200-8466A-IR16	3,346	Agriculture and M&I	2/29/2020
Kern-Tulare Water District (KTWD)[5]	14-06-200-8601A-IR16	40,000	Agriculture and M&I	2/29/2020
Kern-Tulare Water District (Rag Gulch Water District)[4]	14-06-200-8367A-IR16	13,300	Agriculture and M&I	2/29/2020
Lower Tule River Irrigation District	14-06-200-8237A-IR16	31,102	Agriculture and M&I	2/29/2020
Pixley Irrigation District	14-06-200-8238A-IR16	31,102	Agriculture and M&I	2/29/2020
Tri-Valley Water District	14-06-200-8565A-IR16	1,142	Agriculture and M&I	2/29/2020
Total		**128,300**		

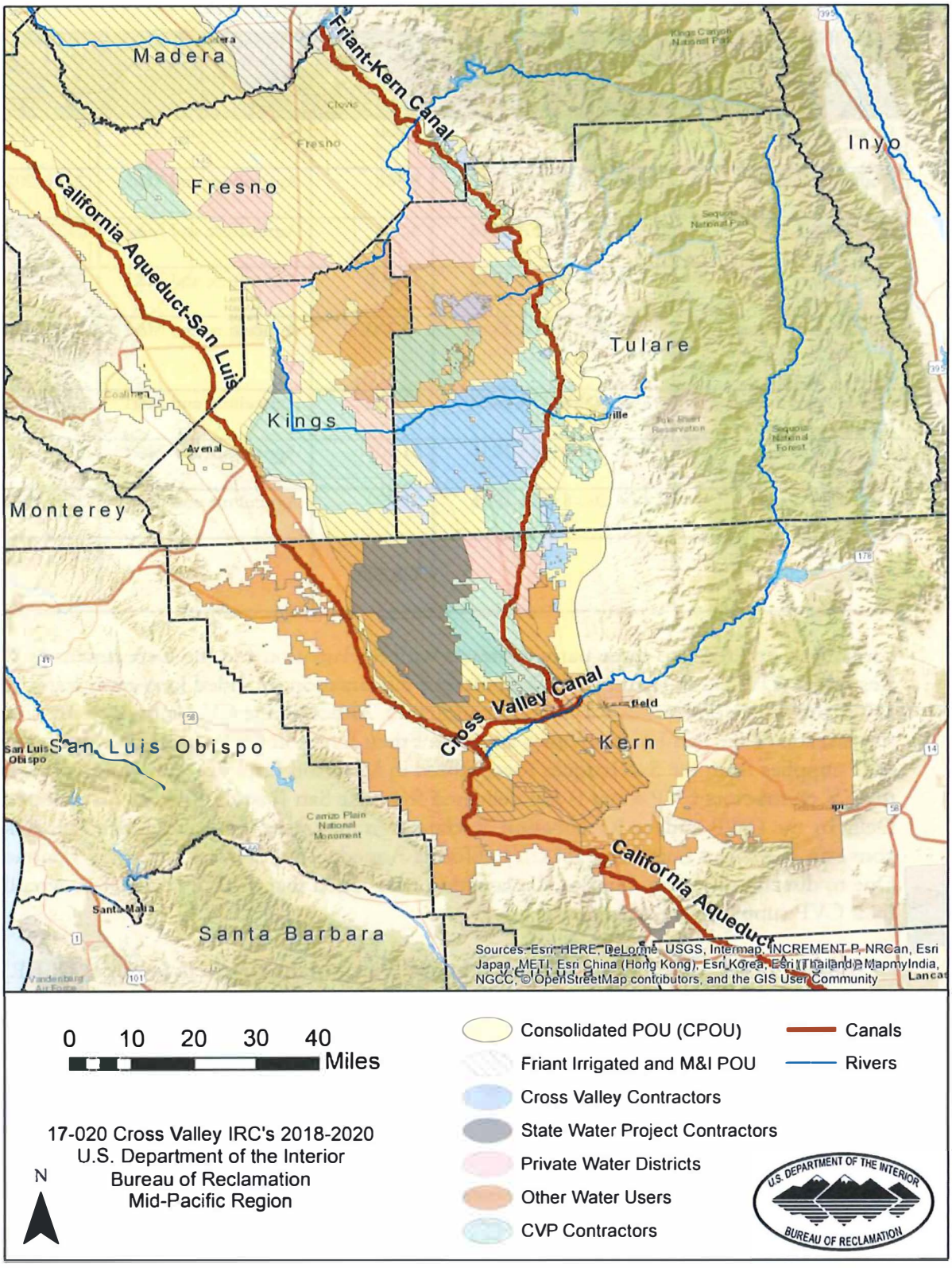
contractors entered into three-party contracts with Reclamation and the Department of Water Resources (DWR). Pursuant to these contracts, Reclamation provided long-term water service and DWR provided conveyance for the CV contractors. Although the CV contractors are situated on the eastside of the San Joaquin Valley amid the Friant Division CVP contractors (who receive their CVP supplies from the San Joaquin River stored in Millerton Lake via the Friant Kern Canal), for the CV contractors CVP water is not delivered from the San Joaquin River but is pumped from the Delta by the DWR and/or Reclamation. Reclamation may store the water in San Luis Reservoir and convey it in the San Luis Canal (SLC)/California Aqueduct for delivery to the CV contractor(s). Due to direct conveyance hurdles, Reclamation envisioned that the CV contractors would obtain their CVP supplies via exchanges.

Figure 1. CV IRC and Article 5 Exchange Participant Districts (source: USBR)

[3] County of Fresno includes County Service Area #34.

[4] County of Tulare subcontractors include Alpaugh Irrigation District, Atwell Island Water District, Hills Valley Irrigation District, Saucelito Irrigation District, Stone Corral Irrigation District, City of Lindsay, Strathmore Public Utility District, Styrotek, Inc., and the City of Visalia.

[5] KTWD and Rag Gulch Water District have consolidated their two districts into one district, under KTWD's name through a contract assignment of Rag Gulch Water District's assigned IRC (for 13,300 AF). As part of that assignment, KTWD has committed to maintain the effective separation of the two districts in terms of how much water is delivered and applied where, until the long-term water service contracts are negotiated and appropriate environmental complance is completed.


Madera
Friant-Kern Canal
Fresno
California Aqueduct-San Luis
Inyo
Tulare
Kings
Monterey
Cross Valley Canal
San Luis Obispo
Kern
California Aqueduct
Santa Barbara
Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community
0 10 20 30 40
Miles
17-020 Cross Valley IRC's 2018-2020
U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
N
Consolidated POU (CPOU)
Friant Irrigated and M&I POU
Cross Valley Contractors
State Water Project Contractors
Private Water Districts
Other Water Users
CVP Contractors
Canals
Rivers
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

The exchange arrangements are set forth in Article 5(a) of the CV contractors' interim water service contracts, which states the following:

> 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.

The proposed project would also include the continued historical exchanges between the CV contractors and Arvin Edison Water Storage District (AEWSD). A description of other CVP contractors and non-CVP contractors that are potential exchange partners can be found in Appendix C. Some of these districts have sub-entities which may include CVP and/or SWP contractors. 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.

Due to varying hydrological conditions, loss due to evaporation and/or seepage, differences in the value of water, and/or timing, imbalanced exchanges could occur. Consistent with historical practices, under the proposed project, imbalanced exchange arrangements would be permitted but limited to a ratio of 2:1. Proposed exchange arrangements exceeding this amount are not within the scope of this analysis and subsequent environmental review(s) would be required. Possible exchange scenarios and mechanisms are identified in Appendix C.

CVP water may be wheeled under Article 55 of a SWP contract as one component of the exchange. Article 55 of the SWP contracts allows for the SWP contractor to convey 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.

CVP water is tracked from its origin to its final disposition (end use) and does not lose its Federal characteristics under the California water rights permits. Water supplies will be used in compliance with the applicable water rights permits and conform to the applicable purpose and place-of-use of the associated water rights permit.

Project Area

The CV districts or sub-entities and recipient districts of Article 5 Exchanges included in the proposed project are located in the southern end of the San Joaquin Valley (SJV), in parts of Fresno, Kern, Kings, and Tulare Counties (Figure 1). The action area encompasses all the areas of the listed contractors and irrigation/water districts that are also located within either or all of the following: CVP Consolidated and Conformed Place of Use (POU), Friant Ag POU and Friant Ag & M&I POU. Each place of use is specific to the origin and use of the water, and refers to those geographic areas that can legally be served with CVP water. The action area for water districts such as the Kern County Water Agency (whose boundaries extend to the limits of Kern County) only extends to the boundary of the CVP Consolidated and Conformed POU.

The action area extends from the northern end of Fresno County along the San Joaquin River, to southern Kern County where the Tehachapi Mountains ring the southern end of the Central Valley. The eastern edge of the action area extends slightly into the Sierra Nevada foothills. Its boundary line meanders from 5 to 20 miles east of Highway 99. The western boundary extends to the foothills of the Diablo Range, and roughly follows Interstate 5 from its intersection with Highway 41 southward.

Conservation Measures

For the purposes of this consultation, and as outlined in the BA for this proposed project, the conservation measures found in Appendix B from the CVPIA BiOp apply to the CV IRCs for the period of March 1, 2018, through February 29, 2020, or until long-term contracts are executed, whichever occurs first. In addition, the following commitments are part of the proposed project:

- The exchanged water may be applied only to lands located within the appropriate Place of Use boundaries[6];
- No native or untilled land (fallow for three consecutive years or more) may be cultivated with this water;
- No new construction or modification of existing facilities is to occur in order to complete the proposed project;
- No changes in the point of diversion or places-of-use without prior approvals from the State Water Resources Control Board, Reclamation, and/or DWR as applicable;
- Transfers associated with the exchange arrangements must not alter the quality of water or the hydrological regime of natural waterways or natural watercourses such as rivers, streams, creeks, lakes, ponds, pools, or wetlands, etc., in a way that may have a detrimental effect on fish or wildlife or their habitats; and
- All exchanges must comply with all applicable Federal, state and local laws, regulations, permits and policies.

[6] There are three relevant Places of Use: the Consolidated Place of Use, the Friant, Ag only Place of Use, and the Friant Ag & M&I Place of Use. The Cross Valley contractors would get some Friant water and thus the Friant Places of Use would apply to them. However, the exchangees would receive delta water, and thus the Consolidated Place of Use would apply for those districts.

- Reclamation will review each transfer associated with the exchange proposal for compliance with the above conditions to determine that the action is consistent with the criteria described within this analysis prior to approval and execution of the action.

Any transfer with an exchange proposal will require an approval letter from the Contracting Officer. The approval letter will include requirements for compliance with all environmental commitments associated with the proposed project. An Environmental Commitment Plan (ECP) will be provided to all participants in the exchange arrangements as part of the approval process which will require annual verification during the term of the IRC.

Key Assumptions Associated with CVP Consultations

Because of the complex history as well as the complex present environmental and regulatory context of IRCs, and because this action is related to a number of other Reclamation actions, the Service has had to make a number of assumptions about likely future events and context of the interim renewal action. While not exhaustive, the following list of key assumptions has been central to our effects analysis:

1. Reclamation will continue to adhere to the conservation measures from previous IRC consultations, specifically to ensure that project water is not used in a manner that adversely affects listed, proposed or candidate species. The Service considers the scope of this conservation measure to include the assurance that project water will not be used in whole or in part to facilitate the conversion of existing natural habitat to agricultural or other purposes and this determination is essential to the conclusions made regarding the overall effects of the proposed project. If this fundamental assumption is not valid, then the effects analysis and conclusion of this consultation will need to be reviewed.

2. Reclamation will continue to implement in a timely manner relevant environmental commitments, conservation measures, and terms and conditions from other biological opinions as appropriate. These commitments include implementation of the CVPIA and Friant BiOps. Other CVP-related, non-CVPIA actions benefiting fish, wildlife, and associated habitats and related to effects of IRCs will continue, with at least current funding levels, including:
    a. the Central Valley Habitat Monitoring Program's Comprehensive Mapping;
    b. implementation of the Central Valley Habitat Monitoring Program's Land Use Monitoring and Reporting; and,
    c. CVP Conservation Program and CVPIA B(1)(other) Habitat Restoration Program.

3. The analysis for this determination is based on the assumption that CVP water contract amounts and deliveries will remain consistent with those provided and analyzed in the Final PEIS for CVPIA and the 2008 OCAP biological opinion.

CVPHMP Mapping

The CV IRCs remain subject to the conservation measures, Applicant Commitments, and non-discretionary terms and conditions, as applicable, in the CVPIA and Friant BiOps. The CV IRCs also remain subject to conservation measures, Applicant Commitments, and non-discretionary terms and conditions from the formal consultation and reinitiated consultation on the Millerton new Town Tract 4870 Change in Service Area for the Water Service Contract for the County of Fresno, Service Area No. 34 (File No. 08-F-1248) and the formal consultation on Long Term Water Transfers for Millerton New Town Specific Plan Area (File No. 08-F-0873), as County of Fresno is one of the CV contractors included in this consultation.

We note that Reclamation's determinations are based on Reclamation's conclusion that CVP IRC deliveries do not result in land use changes that would adversely affect federally-listed species or critical habitat. The Service's most current information, based on the 2006-2011 mapping data and the December 2017, BA analysis, indicates that land conversion occurred within the CV service area between 2006-2011 and 2010-2017 as an indirect effect of CVP water deliveries, conveyance, storage, and exchanges. However, it is the Service's understanding that the commitments included in the proposed project, and summarized in Appendix B, will be implemented and no further land conversion will occur as a result. Due to Reclamation's commitments and the short-term nature of the proposed project, the Service concurs with Reclamation's effects determination for the species considered in this consultation. To facilitate future consultations and increase the reliability of this mapping to evaluate conditions on the ground, we ask that prior to the next CV IRCs or long-term contract renewals, whichever comes first, that Reclamation work collaboratively with the Service to interpret, evaluate and update the CVPHMP to examine sensitive land use changes revealed by said mapping. This commitment is made to comply, in part, with the CVPIA BiOp, pages 2-62 through 2-64, to monitor trends in the environmental baseline for listed species, and to validate the assumption in the BA for these IRCs that "*no losses of native lands or lands fallowed and untilled for three or more years*" have occurred.

Determination

Given the time constraints to complete this consultation prior to the expiration of the current IRCs at the end of February 2018, we concur with Reclamation's NLAA determinations for the Buena Vista Lake shrew, San Joaquin kit fox, Tipton kangaroo rat, blunt-nosed leopard lizard, Kern mallow, and San Joaquin woolly-threads or critical habitat designated for these species. Our concurrence is based on the short-term nature of the federal action and the assumption that environmental commitments in the proposed project will be implemented.

Our concurrence with your NLAA determination concludes consultation for this action. Therefore, unless new information reveals effects of the proposed project that may affect listed species in a manner or to an extent not considered, no further action pursuant to the Act is necessary. If you have questions or concerns regarding this action, please contact Patricia Cole, San Joaquin Valley Division Chief, at the letterhead address or at (916) 414-6544.

Attachments

cc:
Jennifer Phillips, U.S. Bureau of Reclamation, Fresno, CA
Charyce Hatler, Environmental Scientist, Dept. of Water Resources, Fresno, CA

Appendix A.

Federally threatened and endangered species and/or critical habitat potentially within the action area that Reclamation has determined would not be affected by the proposed project.

Common Name	Scientific Name	Federal Status	Critical Habitat
Arroyo toad	*Anaxyrus californicus*	Endangered	Designated
Bakersfield cactus	*Opuntia treleasei* (= *Opuntia basilaris treleasei*)	Endangered	None
California clapper rail	*Rallus longirostris obsoletus*	Endangered	None
California condor	*Gymnogyps californianus*	Endangered	Designated
California jewelflower	*Caulanthus californicus*	Endangered	None
California red-legged frog	*Rana aurora draytonii*	Threatened	Designated
California tiger salamander	*Ambystoma californiense*	Threatened	Designated
Coastal California gnatcatcher	*Polioptila californica californica*	Threatened	Designated
Conservancy fairy shrimp	*Branchinecta conservatio*	Endangered	Designated
Delta smelt	*Hypomesus transpacificus*	Threatened	Designated
Desert tortoise	*Gopherus agassizii*	Threatened	Designated
Fresno kangaroo rat	*Dipodomys nitratoides exilis*	Endangered	Designated
Giant garter snake	*Thamnophis gigas*	Threatened	None
Giant kangaroo rat	*Dipodomys ingens*	Endangered	None
Greene's tuctoria	*Tuctoria greenei*	Endangered	Designated
Hairy Orcutt grass	*Orcuttia pilosa*	Endangered	Designated
Hartweg's golden sunburst	*Pseudobahia bahiifolia*	Endangered	None
Hoover's spurge	*Chamaesyce hooveri*	Threatened	Designated
Keck's checker-mallow (=checkerbloom)	*Sidalcea keckii*	Endangered	Designated
Kern mallow	*Eremalche kernensis*	Endangered	None
Kern primrose sphinx moth	*Euproserpinus euterpe*	Threatened	None
Lahontan cutthroat trout	*Oncorhynchus clarki henshawi*	Threatened	None
Least Bell's vireo	*Vireo bellii pusillus*	Endangered	Designated
Little Kern golden trout	*Oncorhynchus mykiss* (=*aguabonita*) *whitei*	Threatened	Designated

Common Name	Scientific Name	Federal Status	Critical Habitat
Longhorn fairy shrimp	*Branchinecta longiantenna*	Endangered	Designated
Mariposa pussy-paws	*Calyptridium pulchellum*	Threatened	None
Marsh sandwort	*Arenaria paludicola*	Endangered	None
Mohave tui chub	*Gila bicolor* ssp. *mohavensis*	Endangered	None
Mountain yellow-legged frog	*Rana muscosa*	Endangered	Proposed
North American wolverine	*Gulo gulo luscus*	Proposed threatened	None
Owens pupfish	*Cyprinodon radiosus*	Endangered	None
Owens tui chub	*Gila bicolor snyderi*	Endangered	None
Paiute cutthroat trout	*Oncorhynchus clarki seleniris*	Threatened	None
Palmate-bracted bird's-beak	*Cordylanthus palmatus*	Endangered	None
Riparian brush rabbit	*Sylvilagus bachmani riparius*	Endangered	None
Riparian woodrat (San Joaquin Valley woodrat)	*Neotoma fuscipes riparia*	Endangered	None
San Benito evening-primrose	*Camissonia benitensis*	Threatened	None
San Joaquin adobe sunburst	*Pseudobahia peirsonii*	Threatened	None
San Joaquin Valley Orcutt grass	*Orcuttia inaequalis*	Endangered	Designated
San Mateo thornmint	*Acanthomintha obovata* ssp. *duttonii*	Endangered	None
Sierra Nevada bighorn sheep	*Ovis canadensis californiana*	Endangered	Designated
Sierra Nevada yellow-legged frog	*Rana sierra*	Endangered	Proposed
Southwestern willow flycatcher	*Empidonax trailli extimus*	Endangered	Designated
Springville clarkia	*Clarkia springvillensis*	Threatened	None
Succulent owl's-clover	*Castilleja campestris* ssp. *succulenta*	Threatened	Designated
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	Threatened	Designated
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	Designated

Common Name	**Scientific Name**	**Federal Status**	**Critical Habitat**
Vernal pool tadpole shrimp	*Lepidurus packardi*	Endangered	Designated
Western snowy plover	*Charadrius alexandrinus nivosus*	Threatened	Designated
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Proposed	None
Yosemite toad	*Bufo canorus*	Threatened	Proposed

Appendix B.

Summarized Environmental Commitments from the 2001 Friant Cross Valley Long Term Water Service Contract Renewals Biological Opinion (01-F-0027) and the CVPIA Biological Opinion (98-F-0124) that are relevant to the CV IRCs and associated Article 5 Exchanges [Note: numbering is preserved from the source documents].

Summarized Environmental Commitments from the 2001 Friant Cross Valley Long Term Water Service Contract Renewals Biological Opinion (01-F-0027) and the CVPIA Biological Opinion (98-F-0124) that are relevant to the CV IRCs and associated Article 5 Exchanges [Note: numbering is preserved from the source documents].

2001 Friant/Cross Valley BiOp

5. Identify and map endangered species habitat in CVP contractor service areas and provide to contractors.

Phase I - A 1993 landcover database or basemap will be developed using the best available existing landcover data and satellite imagery.

Phase II - will determine areas of habitat change by comparing 1993 image data to year 2000 image data. Based on available GIS datasets and spectral change analysis, a preliminary change map will be created to guide sampling and remapping efforts in phase III.

Phase III - will create an updated landcover database representative of landcover and habitat conditions for year 2000. This process may include:

- Field sampling to determine the cause of change and identification of habitat types in change areas.
- Acquisition of large scale, orthorectified digital aerial photography for verification and remapping purposes.
- Additional mapping efforts in areas where existing datasets from 1993 are not adequate to meet the needs of this project.
- GIS analysis for habitat change monitoring.

Additionally, Reclamation and the Service commit to revisit and update the land cover database for year 2000 every 5 years for monitoring and trends analysis purposes.

6. Monitor land use change and ongoing activities within Districts receiving CVP water.

a. Monitor land use changes and ongoing activities in the Districts to ensure that project water is not used in a manner that adversely affects listed, proposed, and candidate species.

7. Landowners obtain Service/Reclamation approval prior to taking actions on endangered species habitat with no Federal involvement.

8. Ensure section 7 consultation on future actions impacting endangered species where there is Federal involvement. The Friant Division and Cross Valley Unit CVP water contractors, whose contracts are currently up for renewal, have also made "Applicant Commitments" that they will not deliver CVPIA Project Water for the purpose of converting any native lands to agricultural or M&I uses unless and until appropriate ESA compliance has determined that such conversion will not likely affect protected species or appropriate mitigation has been provided.

18. Identify and analyze impacts of all water assignments executed since 1991 for Friant and 1995 for Interim contractors, and coordination on future assignments to ensure ESA compliance.
19. Reclamation will apply applicable criteria to all water transfers.
22. Curtail deliveries associated with discovery of conversion of native lands without consideration of ESA[7]
24. Reclamation shall consult with the Service on any deliveries of water using Friant facilities beyond that addressed in this biological opinion

2000 CVPIA BiOp

B. Commitments Associated with Long-term Renewal[8] of CVP Water Service Contracts

1. Long-term contracts will be renewed, and Reclamation will complete tiered site specific consultations with the Service. No CVP water will be delivered or applied outside current contract service areas until either formal or informal consultation, as appropriate, is complete. Once formal site specific consultation has occurred that is in compliance with this opinion, it is assumed that changes in land-use practices, and impacts to listed and proposed species, in the districts have been addressed.
4. Reclamation and the Service will write a joint letter to the water districts, any member agencies, Planning Departments of cities or counties within the districts using CVP water, and other responsible parties regarding requirements under the ESA. The letter will include: (1) a discussion of Reclamation's need to ensure that CVP water is not used in a manner which could jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated *critical habitat*, and (2) an explanation of the prohibitions described under Section 9 of the ESA in regard to *take*. The letter will discuss the appropriate protection measures as described here and in subsequent contract renewal consultation and will be completed within 60 days of execution of long-term contracts.[9]
5. Conservation strategies will be in place for the districts or areas receiving CVP water. The types of strategies that could be accepted are: *Habitat Conservation Planning* as described in section 10(a) of the ESA; programmatic land management actions that include protection of listed and proposed species; requirements resulting from site specific Section 7 consultation; or an expansion of the existing CVP Conservation Program that adequately compensates for the direct and indirect effects of increased water delivery to an area.[10]
6. Reclamation will, subsequent to a determination of *may affect* to listed species and/or adverse modification to designated *critical habitat* in consultation with the Service's SFWO Endangered Species Division, consult on all Federal actions that result in changes in purpose of use for CVP

---

[7] Reclamation and the Service have in practice been using this definition of "native lands": lands never tilled or lands fallowed and untilled for three or more years.

[8] These apply to CV IRCs as well.

[9] Letters were already sent to CVCs and Friant Contractors, but an Environmental Commitment Program form would be used for the interim contract renewal that would inform districts of the required commitments.

[10] This would take the form of "requirements resulting from site specific Section 7 consultation" in this case.

water contracts, including changes from Agriculture to Agriculture/Municipal and Industrial purposes.

7. The Service and Reclamation will work together to convey information to the water districts, and individual water users (as appropriate), on listed species needs. Reclamation will establish an outreach and education program, in collaboration with the Service, to help water users integrate implementation of the CVPIA and requirements of the contract renewal process as it relates to the ESA [Act][11].

8. Interior will work closely with the water users, providing them maps of listed species habitats within their service-areas and guiding them through the consultation process to address site specific effects. Reclamation may encourage CVP contractors to complete HCPs encompassing the affected areas.

10. Reclamation and CVP contractors will comply with all applicable opinions related to the CVP. Flow standards that form the environmental baseline of the 1995 OCAP biological opinion will be met, and Reclamation will take no discretionary actions (e.g. new contracts, contract amendments, facility construction) that would incrementally increase diversions and alter hydrologic and environmental conditions in the Delta until any required consultation is reinitiated and completed.

11. Contractors are required to conform with any applicable provisions of any biological opinions addressing contract renewal so as to prohibit the use of CVP water that results in unauthorized *take* or conversion of wildland habitat determined to have the potential to be occupied by listed species, or violation of any terms of the contracts pertaining to the conservation of listed species. All contracts (or related biological opinions) will also stipulate Reclamation will not undertake any discretionary action allowing the delivery of CVP water to native habitat for listed species depicted on the maps attached to the 18-month notices unless clearance pursuant to the ESA has been obtained from the Service.

13. Reclamation will make certain that applicable measures to ensure ESA compliance for the renewal of CVP water service contracts are provided within the text of new and/or amended long-term water contracts and related actions.

14. Reclamation will provide information related to proposed new water assignments of Project water to the Service's SFWO Endangered Species Division prior to execution of the assignment.

F. Commitments Associated with Conservation Programs

Comprehensive Mapping and *Land Use Monitoring and Reporting Program*

- Monitoring will be used to assess the condition and impacts of Reclamation actions on listed species. Reclamation and the Service are actively developing a monitoring strategy based on the comprehensive mapping program. The land cover database for year 2000, described in Phase III, will be revisited every 5 years for monitoring purposes.

- The Comprehensive Mapping Program will be implemented immediately to test and track, for the purpose of validating over the life of the project, the assumptions made in this biological opinion that the baselines of the species in Appendix A are stable or increasing.

[11] Addressed by the Environmental Commitment Program form.

- For any species affected by the CVP that are continuing to decline, the Service and Reclamation will immediately assess critical needs for the species and determine whether it is appropriate to expand the Conservation Program or implement other *conservation measures*. Any native habitat converted to agricultural or municipal/industrial use within the water service area without prior biological surveys, as required by Reclamation prior to the delivery of Reclamation water, will be evaluated to determine what mitigation measures will be required.

I. Service and Reclamation Strategy Statement to Ensure Compliance with the Endangered Species Act

7. CVP or CVPIA actions or parts of actions, which *may affect* listed species or for which there is not enough information available to estimate *take* or make a *not likely to adversely affect* determination, will receive future tiered analysis and consultation. Reclamation or the Service will provide to the Service's SFWO Endangered Species Division, dependent on lead agency status, clear descriptions of proposed CVP or CVPIA actions, specific areas that may be affected directly or indirectly by these actions, the manner in which the actions *may affect* any listed species or designated *critical habitat*, and other relevant reports and information. Reclamation and the Service will also identify any and all interrelated and interdependent actions and measures related to the proposed CVP or CVPIA action. In those situations where the lead agency, or the Service's SFWO Endangered Species Division, determines that an action *may affect* listed species or may adversely modify designated *critical habitat*, Reclamation and/or the Service will initiate informal or formal consultation as appropriate.

8. Reclamation and the Service will work together to develop means to more effectively facilitate ESA compliance through the coordination of activities and commitments discussed in this Project Description. This coordination will include establishment of a process within 3 months of this biological opinion that will provide necessary information to the Service's SFWO Endangered Species Division in situations where a determination of *no affect* has been made, sufficiently in advance, to enable the Service's review.

13. Reclamation will establish a tracking program to assure conditions necessary for compliance with ESA are met within areas affected by the delivery of CVP water. Where Reclamation and/or the Service believe there are *adverse affects* on listed species, a conservation strategy will be required to be in place for the district or area to receive the contract water. The types of strategies that could be accepted are: *Habitat Conservation Planning*, as described in Section 10(a) of the ESA; requirements resulting from a Section 7 consultation, programmatic land management actions that include protection of listed and proposed species, implementation of site specific *conservation measures*, or an expansion of the existing CVP Conservation Program that adequately compensates for the direct and indirect effects of increased water delivery to an area. Other actions that include components of the above strategies could also be accepted.

Appendix C.

Potential Exchangees for CV IRC Article 5 Exchanges

Table 1 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	11,100	19,000	0	*	Yokohl Creek
Fresno Irrigation District	0	75,000	Kings River 800,000	*	Yes
Garfield Water District	3,500	0	0	*	Unknown
Hills Valley Irrigation District	1,250	0	0	*	Unknown
Ivanhoe Irrigation District	6,500	500	Wutchumna Water Company Stock 3,950 ST Johns River Cotton Creek	*	ST Johns River and Cotton Creek
Kaweah Delta Water Conservation District	1,200	7,400	Kaweah River Cottonwood Creek Cross Creek Kings River Tule River	*	Cross Creek, Recharge basins
Kern Tulare Water District	0	5,000	Kern River	*	Unknown
Lewis Creek Water District	1,200	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
Porterville Irrigation District	15,000	30,000	Tule River 12,900 Average, Porter Slough	0	No
Saucelito Irrigation District	21,500	32,800	0	*	Deer Creek only when CVP water is diverted from FKC
Shafter-Wasco Irrigation District	50,000	39,600	0	*	0

FRIANT CVP CONTRACTORS	Class 1 AF/y	Class 2 AF/y	Other Surface Supply	Groundwater Safe Yield	Groundwater Recharge
Southern San Joaquin Municipal Utility District	97,000	45,000	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	7,200	0	0	0	0
Terra Bella Irrigation District	29,000	0	0	0	Deer Creek
Tri-Valley Water District	400	0	0	0	0
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 one AF of water for every acre of land.

Others

Below is a list of non-CVP potential exchangees:

Buena Vista Water Storage District

Cawelo Water District

Consolidated Irrigation District

Corcoran Irrigation District

Deer Creek & Tule River Authority

Kaweah Delta Water Conservation District

Kern County Water Agency

Kern Delta Water District

Tulare Lake Basin Water Storage District

Kings County Water District

Kings River Conservation District

Lakeside Irrigation District

Liberty Water District

North Kern Water Storage District

Kern Water Bank Authority

Semitropic Water Storage District

Rosedale-Rio Bravo Water Storage District

Some of these districts have sub-entities which may include CVP and/or SWP contractors. A complete narrative description of CVP contractors and non-CVP contractors that are potential exchangees is found in Appendix D.

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 2. 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 Class 1 238,000 Class 2	31,102	Tule River 70,000	*	Unknown
Pixley Irrigation District		31,102	Deer Creek	*	Via Deer Creek
Porterville Irrigation District	15,000 Class 1 30,000 Class 2	0	Tule River 12,900 Average, Porter Slough	0	Yes
Saucelito Irrigation District	21,500 Class 1 32,800 Class 2	100 CVC Supply	3,200	*	Deer Creek only when CVP water is diverted from FKC
Stone Corral Irrigation District	10,000 Class 1	0	950 AF/y via exchanges with other CVP Contractors	3,200	Unknown
Terra Bella Irrigation District	29,000 Class 1	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. 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	0.3 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	0.3 ac/ft	Limited Poso Creek, Recharge basins
Henry Miller Water District[1]	Y	SWP Kern River	0.3 ac/ft	Limited

Kern County Water Agency	CVP[2]	Other Surface Supply	Ground-water Safe Yield	Ground-water Recharge
Kern County Water Agency Improvement District #4	Y	Kern River SWP	0.3 ac/ft	Yes
Kern Delta Water District	Y	Kings River Kaweah River	0.3 ac/ft	Yes
Lost Hills Water District[1]	N	SWP	n/a	None
North Kern Water Storage District	Y	SWP Kern	0.3 ac/ft	Yes
Rosedale-Rio Bravo Water Storage District	Y	SWP Kern River	0.3 ac/ft	Yes
Semitropic Water Storage District	Y	SWP Poso Creek Metropolitan Water District	0.3 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 one AF of water for every acre of land.

Table 4. 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 one AF of water for every acre of land.

Table 5. 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	*	*
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	*	*

Kings River Conservation District	CVP	Other Surface Supply	Ground-water Safe Yield	Ground-water Recharge
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	*	*
Stratford Irrigation District	N	Kings River	*	*
Tranquility Irrigation District	2, 3	CVP via exchange for Kings River	*	*
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 one AF of water for every acre of land.

Table 6. 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 one AF of water for every acre of land.

Appendix D.

Annual acre-foot (AF) of Cross Valley CVP water supplies delivered 2010-2017.

Cross Valley Contractors	2017	2016	2015	2014	2013	2012	2011	2010
Kern-Tulare Water District	-	-	-	-			-	
Transfer for IRC exchange to Kern County Water Agency					4,000	21,000		
AWTP transfer to Westlands Water District					4,000	1,000		
Transfer for IRC exchange to Rosedale Rio Bravo Waster Storage District								23,985
County of Fresno	-	-		-	-		-	
Transfer for IRC exchange to Arvin-Edison Water Storage District			120			1,200		1,350
Hills Valley Irrigation District							641	
Transfer for IRC exchange to Arvin-Edison Water Storage District					630	1,338		1,506
Pixley Irrigation District	-	-	-				-	
AWTP transfer to Del Puerto Water District				1,097	5,123			
AWTP transfer to Westlands Water District						12,441		7,350
Transfer for IRC exchange to Tulare Lake Basin Water Storage District								4,528
Lower Tule River Irrigation District								
Transfer out to Del Puerto Water District				1,097	5,123			
Transfer to Westlands Water District						12,441	7,350	
Transfer for IRC exchange to Tulare Lake Basin Water Storage District								4,528
Tri-Valley Water District	300	-	-	-	-		-	
Transfer for IRC exchange to Arvin-Edison Water Storage District						457		
Transfer to San Luis Water District								514
County of Tulare		-		-	-	-	-	-
Transfer for IRC exchange to Arvin-Edison Water Storage District			1,062					
Delivery to subcontractor: Alpaugh Irrigation District	100							
Delivery to subcontractor: Atwell Island Water District	50							
Delivery to subcontractor: Strathmore Public Utility District	300							
Delivery to subcontractor: Styro-Tek, Inc.	45							
Delivery to subcontractor: City of Visalia	300							
Annual Total (AF)	**1,095**	**0**	**1,182**	**2,194**	**18,876**	**49,877**	**641**	**51,111**