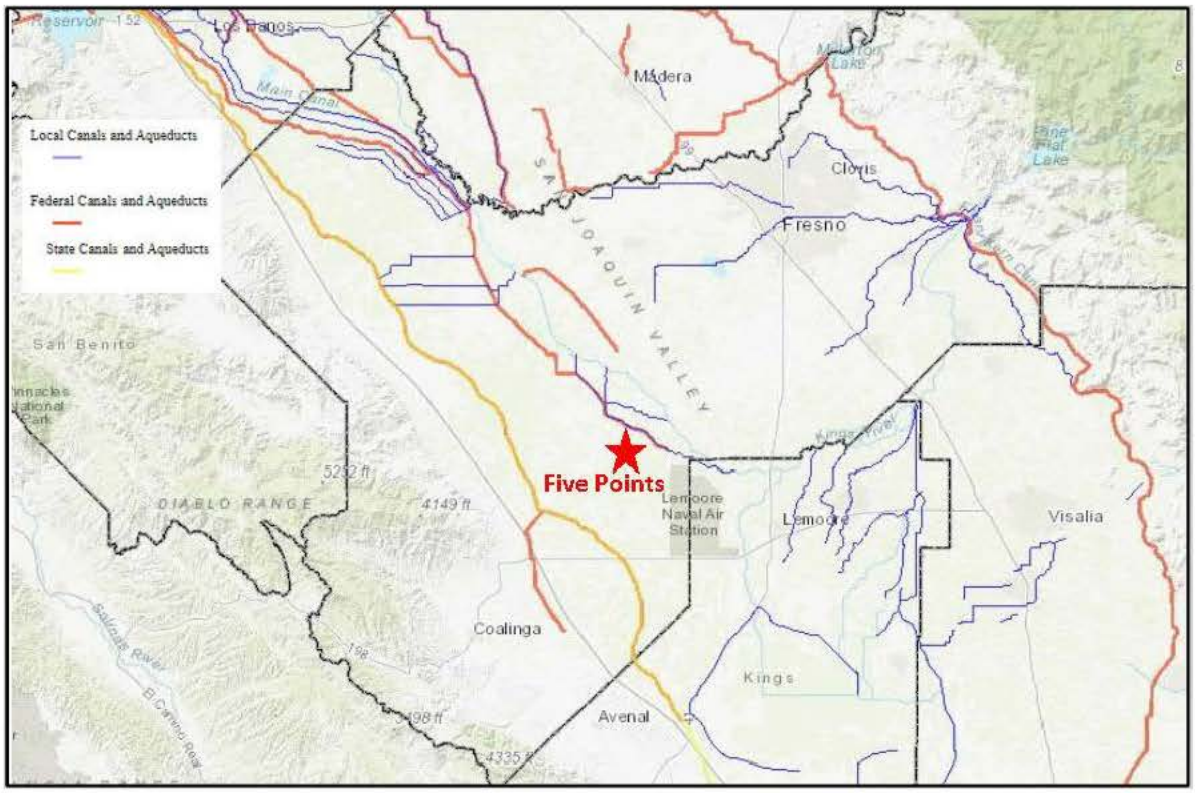

Proposed SoCalGas H2 System Water Supply Analysis

System 1 (Five Points)

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1 Introduction

This analysis of water supply feasibility has been completed for SPEC Services, Inc (SPEC) by D. Edwards, Inc. (DEI) with the assistance of Rincon Consultants, Inc. (Rincon), in support of the Proposed Southern California Gas Company (SoCalGas) Hydrogen (H2) System ("proposed project"). Five potential hydrogen production areas are being considered under the proposed project. The analysis provided herein is specific to the Five Points (System 1) proposed production area; other proposed production areas are assessed for water supply feasibility in respective reports, similar to the scope and content of this report.

1.1 Purpose

The purpose of this study is to identify and characterize existing water supply sources in the Five Points area of Northern California, and assess the potential feasibility of existing sources to meet the water demands of the proposed project at the Five Points production site.

1.2 Approach

The approach for analysis of water supply feasibility for the Five Points site uses a combined study area for this site, as defined below in Section 1.2.1. Section 2, *Water Supply Background,* first characterizes the water supply setting currently applicable to the study area. Section 3, *Water Demands and Comparison,* then considers the proposed project's potential water demand scenarios (Low, Medium, and High) against the water supply background discussion from Section 2. Reasonable assumptions have been developed where necessary to address a lack of data; the assumptions are identified in the analysis.

1.2.1 Study Area/Scope of Analysis

The geographic scope of this analysis was determined based upon the water supply sources and facilities available to the proposed production site in and around Five Points. Five Points is an unincorporated community located in Fresno County, in the southern portion of the San Joaquin Valley, near the Friant Division of the federal Central Valley Project, within the service area of the Westlands Water District (WWD), and overlying the San Joaquin Valley Groundwater Basin (San Joaquin Basin). The study area for this analysis includes the Fresno County portion of CVP facilities, the WWD, and the San Joaquin Basin. This scope of analysis is outlined below and detailed in Section 2, *Water Supply Background*.

1) **Central Valley Project (CVP).** The CVP is a federal water supply project undertaken by the U.S. Bureau of Reclamation (Reclamation), which comprises a network of dams, reservoirs, canals, hydroelectric powerplants, and other facilities to provide flood control to the Central Valley while also supplying domestic and industrial water to the San Joaquin Valley. The CVP includes facilities to the north and south of the Sacramento-San Joaquin Delta (Delta). [redacted]

2) Westlands Water District. WWD was formed in 1952 to manage water supply in western Kings and Fresno counties; prior to its formation, nearly all land within the WWD service area was farmed using locally produced groundwater, which contributed to ongoing overdraft conditions. WWD is a CVP contractor and has long-term contractual and legal entitlements with Reclamation for a firm supply of 1,191,185 acre-feet per year (AFY) of CVP water. In some years, WWD may acquire additional water pursuant to its entitlements, or other water. On April 2, 2002, WWD and landowner representatives executed the *Agreement for Distribution of Water, Allocation of Cost, and Settlement of Claims*, which resolved issues and controversies relating to and providing for the allocation of CVP water to WWD lands (WWD 2017). [redacted]

3) San Joaquin Valley Groundwater Basin. The San Joaquin Basin underlies the San Joaquin River and Tulare Lake Hydrologic Regions, and is comprised of multiple subbasins that are all hydrologically connected. Within Fresno County, the community of Five Points is located along the boundary between the Westside Subbasin and the Kings Subbasin; the Delta-Mendota Subbasin is adjacent to the north-northwest of the Westside Subbasin, and the Pleasant Valley Subbasin is adjacent to the southwest of the Westside Subbasin. [redacted]

Figure 1 provides an overview of primary water supply sources and water supply facilities throughout California, as context for the scope of analysis outlined above. As shown below, Five Points is located south of the San Joaquin River, east of the State Water Project (SWP) California Aqueduct, and west of the federal CVP's Friant-Kern Canal. Millerton Lake, which is formed by Friant Dam on the San Joaquin River, is located north of Fresno, and impounds all flows within the San Joaquin River; see Section 2.1.2, *Friant Division*, for further discussion.

Figure 1 Federal, State, and Local Water Supply Facilities

Source: Quinn 2020

As shown on Figure 1 and discussed above, the potential production site in Five Points is located between primary infrastructure components of both the CVP and the SWP, which conveys water supply between the Delta in the north and Southern California demand centers in the south, and the CVP. Figure 2 provides a closer view of water supply facilities in the San Joaquin Valley.

Figure 2 CVP and SWP Facilities in the San Joaquin Valley

Source: Reclamation 2009

1.2.2 Potential Demand Scenarios

In order to characterize the feasibility of water supply for the potential production site in Five Points, the scale of the project's potential water demands must be considered. At this stage of analysis, water demands of the project are based upon general assumptions. The estimates below provide an overview of the scale of the project's water demands, estimated as a factor of the total amount of hydrogen produced, and identified for three potential production scenarios (Low, Medium, High). [redacted]

Table 1 Potential Water Demand Scenarios

Production Scenario	Daily Demand (acre-feet/day)[1]	Daily Demand (million gallons/day [MGD])	Annual Demand (AFY)
Low	[redacted]		
Medium			
High			

[redacted]

The overview of scale provided above does not account for cooling water requirements, water quality treatment requirements, or system flow rates which will be quantified as project design details progress. It is possible that the water quality treatment system (most likely a combined reverse osmosis [RO] and deionization [DI] system) could require between [redacted]

2 Water Supply Background

This section provides an overview of the water supply projects, systems, and managing agencies that produce and convey water supply throughout the San Joaquin Valley, and specifically with respect to the Five Points production site. The purpose of this section is to provide sufficient information to characterize the water supply scenario that defines water supply availability and reliability in the Five Points area. [redacted]

Figure 3 State Water Project Contractors by Region

Region	Contractors
Feather River	County of Butte Plumas County FC&WCD City of Yuba City
North Bay	Napa County FC&WCD Solano County WA
South Bay	Alameda County FC&WCD Zone 7 Alameda County WD Santa Clara Valley WD
San Joaquin Valley	Oak Flat WD County of Kings Dudley Ridge WD Empire West Side ID Kern County WA Tulare Lake Basin WSD
Central Coastal	San Luis Obispo County FC&WCD Santa Barbara County FC&WCD
Southern California	Antelope Valley-East Kern WA Coachella Valley WD Crestline Lake Arrowhead WA Desert Water Agency Littlerock Creek ID Metropolitan Mojave Water Agency Palmdale Water District San Bernardino Valley MWD San Gabriel Valley MWD San Gorgonio Pass WA Santa Clarita Valley WA Ventura County WPD

Source: MWD 2019

In summary, the geographic scope of analysis for this study includes the CVP system supplies located south of the Delta in Fresno County, the WWD supplies including surface water and groundwater resources, as available, and the San Joaquin Basin subbasins within Fresno County, including the Westside Subbasin, Kings Subbasin, and Delta-Mendota Subbasin. These features are all generally contained within the Tulare Lake Hydrologic Region, which is shown in Figure 4.

Figure 4 Tulare Lake Hydrologic Region

Source: WEF 2015

As shown on Figure 4, the Tulare Lake Hydrologic Region is flanked by mountains to the west and east; this topography strongly influences water supply availability, as groundwater resources are concentrated on the valley floor, where they have also been historically over-used to support agricultural operations. In addition, the Delta, which provides the CVP water supply source and is also critical to important environmental systems, is adjacent to the north of the Tulare Lake Hydrologic Region, while water demand centers and primary users of the SWP system are adjacent to the south.

2.1 Central Valley Project

The CVP is a federal public works project, constructed and operated by Reclamation. The CVP conveys water supply from Lake Shasta in northern California to Bakersfield in the southern San Joaquin Valley. Figure 5 provides an overview of the CVP service area, as well as primary features of the SWP and CVP.

Figure 5 Central Valley Project Service Area

Source: Reclamation 2021

As shown above, the proposed production site in Five Points is located in the southern portion of the San Joaquin Valley, and is not in an area currently identified as part of the CVP service area. However, Five Points is located within the service area of WWD, which is a CVP contractor, as detailed in Section 2.2, *Westlands Water District*.

Below is an overview of the water deliveries provided by the CVP during an average year (CRS 2017):

- 5 million acre-feet of system-wide water deliveries to farms for agricultural (irrigation) uses
- 600,000 acre-feet to municipal and industrial (M&I) users
- 410,000 acre-feet to wildlife refuges (statutory requirements with agencies)
- 800,000 acre-feet for other fish and wildlife needs (statutory requirements with agencies)

The quantities above reflect deliveries for the CVP system as a whole, including for contractors located both north and south of the Delta. This is an important distinction, as major groups of CVP contractors include water rights contractors (i.e., senior water rights holders such as the Sacramento River Settlement and San Joaquin River Exchange Contractors), North and South of Delta water service contractors, and Central Valley refuge water contractors (CRS 2021). Sacramento River Settlement Contractors include the contractors (both individuals and districts) that diverted natural flows from the Sacramento River prior to the CVP's construction and executed a settlement agreement with Reclamation that provided for negotiated allocation of water rights (CRS 2021). San Joaquin River Exchange Contractors are the irrigation districts that agreed to "exchange" exercising their water rights to divert water on the San Joaquin and Kings Rivers for guaranteed water deliveries from the CVP, typically in the form of deliveries from the Delta-Mendota Canal and waters north of the Delta (CRS 2021).

2.1.1 CVP Contractors and Allocations

As mentioned above, the scope of this analysis includes those CVP water contractors located south of the Delta. Table 2 identifies all south-of-Delta CVP contractors by water supply unit, and provides the maximum CVP water delivery amount per water supply unit, as well as the amount designated for agricultural uses and non-agricultural uses, including the amount historically used for M&I uses.

Table 2 CVP Water Allocations – South of Delta

Water Supply Unit	CVP Contractors	Max Contract Amount	Contract Amount for Ag	Contract Amount non-Ag	M&I Historical Use
Delta-Mendota Canal	▪ Banta-Carbona Irrigation District ▪ Byron-Bethany Irrigation District 1 ▪ Del Puerto Water District ▪ Eagle Field Water District ▪ Mercy Springs Water District ▪ Oro Loma Water District ▪ Pajaro Valley WMA ▪ Patterson Irrigation District ▪ The West Side Irrigation District ▪ Tracy, City of ▪ U.S. Department of Veteran Affairs ▪ West Stanislaus Irrigation District ▪ Westlands Water District	330,100	318,396	11,704	10,986

Water Supply Unit	CVP Contractors	Max Contract Amount	Contract Amount for Ag	Contract Amount non-Ag	M&I Historical Use
Mendota Pool	▪ Coelho Family Trust ▪ Fresno Slough Water District ▪ James Irrigation District ▪ Laguna Water District ▪ Reclamation District No. 1606 ▪ Tranquility Irrigation District ▪ Westlands Water District (assigned from Oro Loma)	60,278	60,278	0	0
Cross Valley Canal	▪ Fresno, County of ▪ Hills Valley Irrigation District ▪ Kern-Tulare Water District ▪ Lower Tule River Irrigation District ▪ Pixley Irrigation District ▪ Tri-Valley Water District ▪ Tulare, County of	128,300	127,406	894	0
San Felipe	▪ San Benito County Water District ▪ Santa Clara Valley Water District	196,300	60,744	135,556	135,556
San Luis Unit	▪ Avenal, City of ▪ California, State of ▪ Coalinga, City of ▪ Huron, City of ▪ Pacheco Water District ▪ Panoche Water District ▪ San Luis Water District ▪ Westlands Water District	1,397,920	1,375,253	22,667	14,254
Total		**2,112,898**	**1,942,077**	**170,821**	**160,796**

Source: Reclamation 2016b

Table 2 shows that a total of **2,112,898 AFY** of CVP water is allocated to south-of-Delta contractors. Of this total, approximately 92 percent (1,942,077 AFY) is dedicated for agricultural uses, leaving approximately **170,821 AFY** for non-agricultural uses, of which approximately **160,796 AFY** has historically been used for M&I uses.

Similar to the SWP, the reliability of delivery of water supply allocated under the CVP is variable and depends upon factors including weather and drought conditions, health of the Sierra Nevada snowpack, and other demands on water supplies comprising the CVP system. Table 3 provides an overview of historical CVP allocations to south-of-Delta contractors. In the table, color coding is used as follows to indicate the amount of CVP water approved for delivery compared to the amount of CVP water originally allocated.

- red = CVP allocations were 0-25% of original allocation amounts
- orange = CVP allocations were 26-50% of original allocation amounts
- yellow = CVP allocations were 51-75% of original allocation amounts
- green = CVP allocations were 76-100% of original allocation amounts

Table 3 CVP South of Delta Historical Supply Allocations by Use

Year	Agriculture	Urban (M&I)	Wildlife Refuges	Settlement Contractors	Eastside Division Contractors	Friant Class 1	Friant Class 2
2021	5	55	75	75	100	20	0
2020	15	65	100	100	100	20	0
2019	35	75	100	100	100	100	100
2018	20	70	100	100	100	30	9
2017	65	90	100	100	100	100	100
2016	5	55	100	100	0	30	6
2015	0	25	75	75	0	0	0
2014	0	50	40	40	55	0	0
2013	25	75	100	100	100	65	0
2012	30	75	75	75	100	35	0
2011	50	75	100	100	100	100	20
2010	5	55	100	100	100	100	0
2009	10	60	100	100	12	77	18
2008	40	75	100	100	23	100	5
2007	50	75	100	100	29	65	0
2006	100	100	100	100	100	100	100
2005	85	100	100	100	28	100	100
2004	70	95	100	100	0	100	8
2003	75	100	100	100	0	100	5
2002	70	95	100	100	0	100	8
2001	49	77	100	100	22	100	5

Source: Reclamation 2021

Table 3 details water allocations by use, including agricultural and urban (M&I) uses, which are also addressed in the previous Table 2, as well as water uses associated with the *San Joaquin River Restoration Settlement* (Settlement), including Wildlife Refuges, Settlement Contractors, Eastside Division Contractors, Friant Class 1, and Friant Class 2. These water use classes are a direct result of the Settlement, which was reached in September 2006 by the U.S. Departments of the Interior and Commerce, the Natural Resources Defense Council, and the Friant Water Users Authority (FWUA) (SJRRP [San Joaquin River Restoration Program] 2021). The Settlement, which followed an 18-year lawsuit, received federal court approval in October 2006, and the federal San Joaquin River Restoration Settlement Act was then passed in March 2009, with 32 contractors (districts and cities) party to the Settlement (SJRRP 2021). Key takeaways from the information in Table 3 include:

- Priority rights are given to Wildlife Refuges and Settlement Contractors, while Agriculture receives the lowest priority rights (agricultural users also have access to water stored or exchanged under the groundwater banking projects authorized by the Settlement)
- Allocations to Wildlife Refuges and Settlement Contractors were reduced below 50 percent one time over the past 20 years, in 2014; this is coincident with significant drought conditions in California at the time

- For Urban (M&I) uses, 100 percent allocations were provided in three of the previous 20 years, and 75 percent or more of allocations were provided in 13 of the previous 20 years (65 percent)

At the Friant Division, detailed below in Section 2.1.2, a two-class system is used to determine water rights under the Settlement, where Class 1 water consists of the first 800,000 acre-feet developed and accessible for delivery (usually for M&I use or for districts without access to groundwater supply); and Class 2 water consists of the next 1.4 million acre-feet developed, primarily for groundwater recharge projects (WEF 2014).

2.1.2 Friant Division

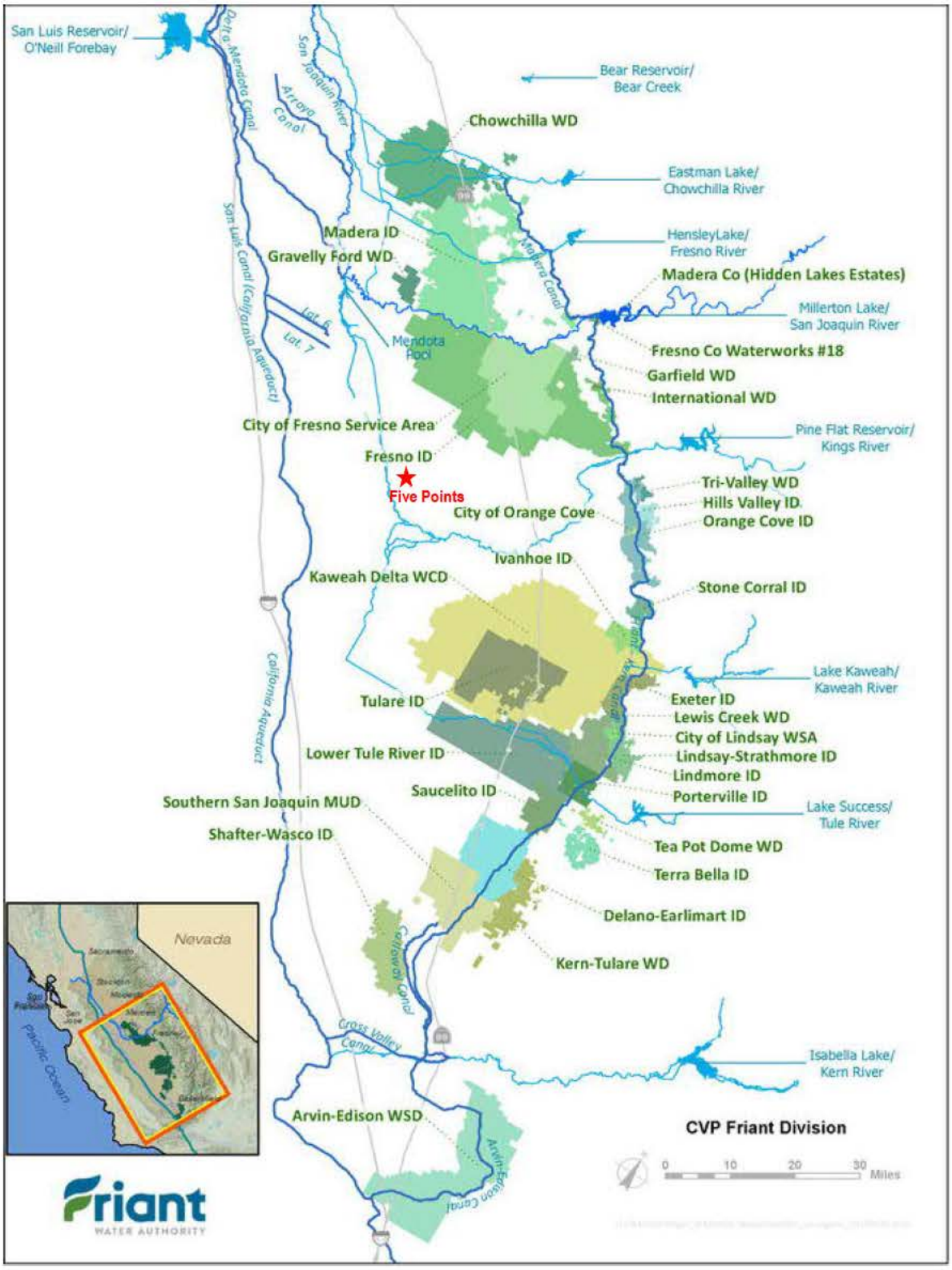
The Friant Division is the centerpiece of the CVP, and functions to supply water from some of California's wetter regions in the Delta and to the north, to agricultural areas and communities with relatively less reliable surface water supplies (FWUA 2021). The Friant Division is located on the upper San Joaquin River in the Sierra Nevada foothills, and is comprised of Friant Dam, the Friant-Kern Canal, and Madera Canal, summarized below and shown on Figure 6.

- Friant Dam forms Millerton Lake on the San Joaquin River, approximately 15 miles north of downtown Fresno. Friant Dam impounds or diverts the entire flow of the San Joaquin River, except for releases required for flood control and irrigation. Friant Dam serves multiple purposes, including:
    - Provide downstream releases to meet water delivery requirements above the Mendota Pool
    - Provide storage for flood control, conservation, and diversions into Friant-Kern Canal and Mendota Canal (both described below)
    - Convey water for irrigation to agricultural land throughout the San Joaquin Valley, including Fresno, Kern, Madera, and Tulare counties
    - Provide water releases for the San Joaquin River Restoration Program (described below)

  There is also a 25-megawatt hydroelectric power plant in front of Friant Dam, the Friant Power Plant, which produces power for the Friant Power Authority.
- Friant-Kern Canal conveys water from Millerton Lake to the south. The Friant-Kern Canal extends for approximately 152 miles to the Kern River, near Bakersfield. Water conveyed by the Friant-Kern Canal is used for supplemental supply and new irrigation in Fresno, Tulare, and Kern counties.
- Madera Canal conveys water from Millerton Lake to the north. The Madera Canal extends for roughly 36 miles to irrigation lands in Madera County, eventually terminating in the Chowchilla River, where flow in the canal is up to 623 cubic feet per second.

Figure 6 on the following page provides an overview of the Friant Division, and identifies CVP contractors that are connected to and receive supply developed by the Friant Division.

Figure 6 Friant Division and Associated Central Valley Project Contractors



Source: FWUA 2021

Under the Settlement, groundwater recharge is a primary use of water from the Friant Division. Part III of the Settlement specifically authorizes and directs implementation of additional Water Management Goal actions, including a program to provide financial assistance to local agencies within the CVP to conduct groundwater recharge or banking facilities that offset water supply impacts to Friant contractors (SJRRP 2021). Table 4 provides an overview of the groundwater banking projects that have been designed and funded to date under the Settlement.

Table 4 San Joaquin River Restoration Settlement Program – Groundwater Banking

Project	Sponsor	Supply Benefit (acre-feet)	Status of Construction
Pixley / Delano-Earlimary Joint Ground Water Bank	Pixley Irrigation District	97,218	pending
Cordeniz Basin Ground Water Storage Project – Conjunctive Exchange Program	Tulare Irrigation District	129,000	pending
Porterville In-Lieu Project Service Areas 1 & 2	Porterville Irrigation District	26,933	complete
Kimberlina Road Ground Water Recharge and Banking	Shafter-Wasco Irrigation District	153,000	complete
Total		**406,151**	

Source: SJRRP 2021

The table above shows that approximately 406,151 acre-feet of water is currently planned for diversion to groundwater banking projects; of this total, approximately **179,933 acre-feet** (44 percent) is associated with banking projects that have been fully constructed, while approximately **226,218 acre-feet** (56 percent) is under development. [redacted]

2.1.3 CVP Water Transfer Program

Water transfers and exchanges are an integral part of CVP water operations, particularly in drought years, and are authorized under the Central Valley Project Improvement Act (CVPIA) of 1992. CVP water transfers are subject to the conditions prescribed in the CVPIA §3405(a), *Interim Guidelines for Implementation of Water Transfers* (1993), and the *Final CVPIA Administrative Proposal on Water Transfers* (1998). Water transfer provisions of the CVPIA do not apply to the following:

- Permanent contract assignments under which a CVP contractor relinquishes its contractual right to CVP water;
- Water banking and recharge actions outside of the contractor's boundaries;
- Water for water exchanges;
- Forbearance actions whereby CVP contractors are paid not to exercise their right to water; and
- Transfers of base supply water under settlement contracts which are carried out in accordance with State law (Reclamation 2015).

Long-term transfer of CVP allocations must be approved by Reclamation and other agencies, and are accomplished through programmatic environmental documentation, with annual approvals of physical water transfers (Reclamation 2015). Transfers between CVP contractors are also recognized by Reclamation, in the form of Accelerated Water Transfer Programs, which allow water transfer and/or exchange agreements between CVP contractors that essentially reallocate CVP contract supply within a given basin. Reclamation currently has environmental documentation in place for the transfer and exchange of up to 500,000 AFY of water for the Friant Division contractors and South of Delta CVP contractors, which allow Friant Division contractors to transfer to Cross Valley contractors, when able (Reclamation 2015).

Water transfers are intended to facilitate meeting existing water demands, and are not intended or approved to support new demands in the buyers' service areas (Reclamation and San Luis & Delta-Mendota Water Agency [SLDMWA] 2019). Eligible transfers may be made through several means, as summarized below (Reclamation and SLDMWA 2019):

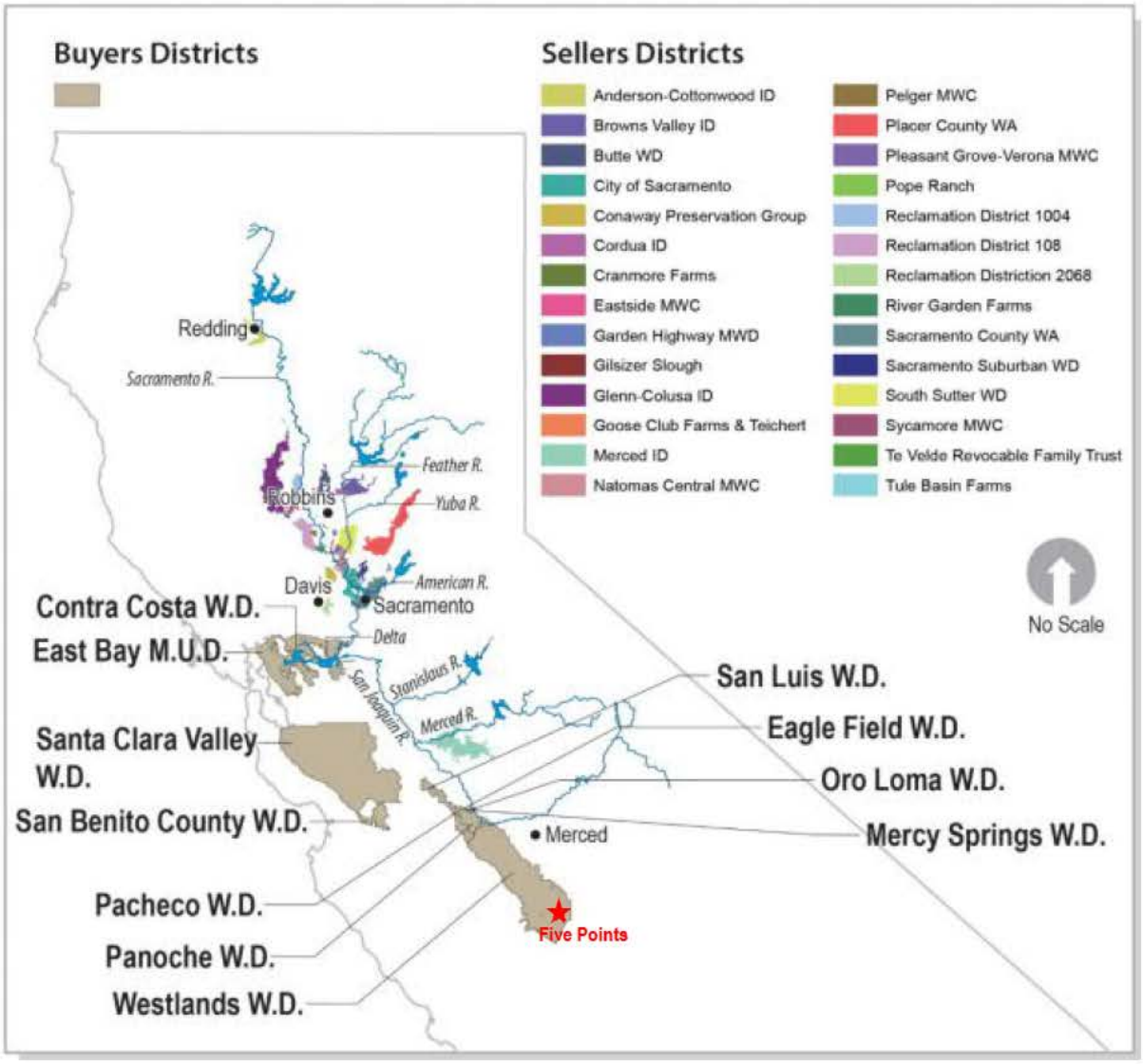
- Groundwater Substitution – sellers choose to pump groundwater in lieu of diverting surface water supplies, thereby making the surface water available for transfer
- Reservoir Release – buyers could acquire water by purchasing surface water stored in reservoirs owned by non-Project entities, meaning entities that do not participate in the State's SWP or the federal CVP, and must replace that water with flows that would have otherwise continued downstream unused
- Cropland Idling – water is made available for transfer by removing it from use for irrigation purposes, thereby making it available for other beneficial uses
- Crop Shifting – water is made available for transfer by farmers shifting from growing a higher water use crop to a lower water use crop, such that the difference is made available for other beneficial uses
- Conservation – water losses are reduced through the implementation of conservation measures on the water district and individual user scale

Source: Reclamation and SLDMWA 2019

As shown above, a maximum total of [redacted] is potentially available for purchase from the eligible sellers listed above. [redacted]

Figure 7 shows the potential sellers listed above and potential buyers, including WWD, which is also discussed in detail in Section 2.2.

Figure 7 Location of Potential Buyers and Sellers for Long-Term CVP Water Transfers



Source: Reclamation and SLDMWA 2019

Figure 7 shows that all potential sellers of CVP transfer or exchange water are located north of the Delta, while all potential buyers are located south of the Delta, including WWD. This separation does not prohibit WWD from acquiring transfer or exchange water from north-of-Delta contractors; however, transfer and exchange water is often available seasonally, and as the distance between seller and buyer increases, the complexity of conveying and storing (if necessary) the transfer or exchange water also increases.

Reclamation has reviewed the following transfer and exchange projects for compliance with environmental laws and regulations, and approved them for implementation (Reclamation 2015):

- Transfer and/or exchange of up to **150,000 AFY** of substitute water from the Exchange Contractors in non-critical years to several potential users over a 25-year time frame (water service years 2014–2038), with distribution of this water depending on the CVP's annual water supply allocation, and with more water going to west side SLDMWA contractors in lower allocation years.

- Transfer of up to **50,000 AFY** of additional water from the San Joaquin River Exchange Contractors (SJREC) to SLDMWA contractors and the wildlife refuges; however, this water would be made available through crop idling by the SJREC.
- Transfer of up to **20,000 AFY** available by groundwater pumping, water conservation, and fallowing to SLDMWA contractors (discussed further in Section 2.2, *Westlands Water District*).
- Transfer via groundwater substitution for **20,500 AFY** to the Central California Irrigation District and **5,000 AFY** to the Firebaugh Canal Water District.

[redacted]

2.2 Westlands Water District

As mentioned previously, the proposed production site in Five Points is within the WWD service area. WWD was established in the 1950s to provide irrigation water to farmers in the San Joaquin Valley and relieve significant stress on the San Joaquin Basin. WWD entered into a long-term contract (initially 40 years) with the federal government (Reclamation) to provide conveyance and delivery of surface water through state (SWP) and federal (CVP) facilities (WWD 2021).

Water delivered to WWD is pumped from the Delta during the winter months when there is an abundance of water in the system; it is then pumped 70 miles through the Delta-Mendota Canal to the San Luis Reservoir. During the dry spring and summer months, water is released from San Luis Reservoir and delivered to WWD growers through the San Luis Canal and the Coalinga Canal. WWD contracts with Reclamation to deliver up to **1,195,000 AFY** of CVP water to its more than 700 family-owned farms; this amount is still 205,000 AFY short of the 1.4 million AFY required to water WWD's entire irrigable area (WWD 2021). To make up for this deficiency, WWD also develops approximately 135,000 to 200,000 AFY of groundwater from the local confined aquifer, as well as plans and funds water exchange programs to bolster the available supply.

Table 4 provides an overview of WWD's CVP allocations over the past 20 years, where "allocation" refers to the amount of CVP water that was physically available for delivery to WWD for the respective year. WWD's full CVP allocation is 1,195,000 AFY, as noted above.

Table 6 Westlands Water District – 20-Year Water Supply Summary

Water Year	% of CVP Allocation[1]	Net CVP AF Received	Groundwater Produced[2] (AF)	Acquired by User[3] (AF)	Additional Supply[4] (AF)	Total Supply (AF)	Fallowed[5] (Acres)
2020	20	203,138	400,000	80,000	119,000	802,138	160,000
2019	75	827,317	89,000	37,985	53,433	1,007,735	158,103
2018	50	580,050	328,000	42,338	55,872	1,006,260	148,320
2017	100	911,307	54,000	-50,009	174,490	1,089,788	146,275
2016	5	9,204	612,000	72,154	174,374	867,732	179,784
2015	0	82,429	660,000	51,134	34,600	828,163	218,112
2014	0	98,573	655,000	59,714	26,382	839,669	220,053
2013	20	188,448	638,000	101,413	143,962	1,071,823	131,848
2012	40	405,451	355,000	111,154	123,636	995,241	112,755

Water Year	% of CVP Allocation[1]	Net CVP AF Received	Groundwater Produced[2] (AF)	Acquired by User[3] (AF)	Additional Supply[4] (AF)	Total Supply (AF)	Fallowed[5] (Acres)
2011	80	876,910	45,000	60,380	191,686	1,173,976	59,514
2010	45	590,059	140,000	71,296	79,242	880,597	131,339
2009	10	202,991	480,000	68,070	70,149	821,210	156,239
2008	40	347,222	460,000	85,421	102,862	995,505	99,663
2007	50	647,864	310,000	87,554	61,466	1,106,884	96,409
2006	100	1,076,461	25,000	45,936	38,079	1,185,476	54,944
2005	85	996,147	75,000	20,776	98,347	1,190,270	66,804
2004	70	800,704	210,000	96,872	44,407	1,151,983	70,367
2003	75	863,150	160,000	107,958	32,518	1,163,626	76,654
2002	70	776,526	205,000	106,043	64,040	1,151,609	94,557
2001	49	611,267	215,000	75,592	135,039	1,036,898	73,802

Notes:

1. WWD's full allocation of CVP water is 1,195,000 AFY; this column shows the percentage of the total allocation that is allocated for each year depending on physical availability of water
2. Total groundwater pumped by WWD for the given year
3. "Acquired by User" water supplies are those obtained through water transfers between private landowners
4. "Additional Supply" includes all water obtained by WWD through surplus, supplemental supplies, and other adjustments (WWD 2021)
5. "Fallowed acres" are areas of active irrigation land that are left unused (i.e., fallowed) to create water supply that would otherwise be used for irrigation

Source: WWD 2020

The data in Table 6 indicate that as the total water supply available to WWD decreases, the area of fallowed agricultural land increases. This is because the total area of irrigable land within WWD's service area requires approximately 1,400,000 AFY for irrigation purposes; in comparison, and as shown above, the total water supply available to WWD has not been sufficient to meet these total irrigation demands in any of the previous 20 years. Therefore, irrigated land is fallowed (i.e., not watered) to decrease the area's overall water demands for consistency with water supply availability. Another water supply source available to WWD is exchange or transfer of allocated supplies (WWD 2021), as summarized below.

- **Transfers with Other CVP Contractors.** [redacted]

- **Exchanges with State Contractors.** The Monterey Agreement of 1994 allows for SWP contractors to store excess flows during wet years in groundwater banks and surface reservoirs, for use later during dry periods, or for environmental benefit on the Delta. Under the Monterey Agreement, non-SWP contractors may obtain SWP water through an in-kind exchange of water supplies with SWP contractor(s), with the water returned in full within 10 years. As such, if WWD were to obtain SWP water through exchange, an equal amount of CVP water would need

to be conveyed by WWD to the exchanging SWP contractor within 10 years. [redacted]

- **Flood Flows.** Flood flows from both the San Joaquin River and Kings River flow into the Mendota Pool on a seasonal basis and, depending on the size of flood flows, surplus flows are available to WWD through the 7-1 Pumping Plant. [redacted]

[redacted]

Reclamation and WWD are currently teamed for a water exchange program called the Mendota Pool Group 20-year Exchange Program, which would allow Mendota Pool Group farmers to deliver groundwater of suitable quality to the Mendota Pool in exchange for CVP water delivered via the San Luis Canal for use on approximately 42,316 acres of historically irrigated Mendota Pool Group lands within WWD's service area (WWD 2021). Key aspects of this exchange program are identified below (Reclamation and WWD 2019):

- Reclamation would issue a series of exchange agreements over a period of 20 years
- Exchange agreements would allow up to 25,000 AFY to be exchanged and/or conveyed and stored within federal facilities
- Exchanges would allow the delivery of CVP water to farmlands within WWD's service area, that would otherwise be delivered to the Mendota Pool via the Delta-Mendota Canal
- The CVP water to be exchanged would be conveyed via the San Luis Canal to the receiving farmlands (Mendota Pool Group members) within WWD
- In exchange for receiving CVP water from the San Luis Canal, the receiving farmers (of the Mendota Pool Group) would provide an equivalent amount of groundwater to the Mendota Pool by not pumping that amount of water from the groundwater underlying their property
- Reclamation would use the increased supply in the Mendota Pool resulting from decreased groundwater use on the subject farmlands to fulfill CVP contractual demands

In total, the Mendota Pool Group 20-Year Exchange Program would make available up to **25,000 AFY** of water for irrigation use in the San Joaquin Valley through exchange and conveyance/storage efforts. This is not surplus supply, but rather is a management approach designed to maximize availability of irrigation water to existing farmers in the valley.

2.3 San Joaquin Valley Groundwater Basin

[redacted] Within the San Joaquin Valley, the community of Five Points is located in the Tulare Lake Hydrologic Region, adjacent to the south of the San Joaquin River Hydrologic Region. Figure 8 shows that the subbasins underlying and surrounding the proposed production site in Five Points are identified as critically overdrafted, and therefore high priority. Prioritization is a technical process conducted by the California Department

of Water Resources (DWR) to classify California's 515 groundwater basins into one of four prioritization categories, including high-, medium-, low-, or very low-priority (DWR 2021a). The technical process is based on eight components that are identified in the California Water Code Section 10933(b).

Each basin's priority determines which provisions of the Sustainable Groundwater Management Act (SGMA) of 2014 apply. SGMA requires medium- and high-priority basins to identify or form groundwater sustainability agencies (GSAs) and implement groundwater sustainability plans (GSPs) to manage groundwater for long-term sustainability (DWR 2021a) [redacted] As defined by SGMA (2014), "A basin is subject to critical overdraft when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts."

As required by SGMA, GSAs have been identified or formed for critically overdrafted basins, with GSP's drafted and submitted to DWR in accordance with the SGMA timeline. The GSPs identify groundwater management actions and projects to improve groundwater supply conditions towards the goal of achieving and maintaining sustainability. [redacted] In accordance with SGMA, all critically overdrafted basins are required to be addressed in a GSP implemented by a GSA. In total, the San Joaquin Basin has regional overdraft of approximately **1,800,000 AFY** (PPIC [Public Policy Institute of California] 2020).

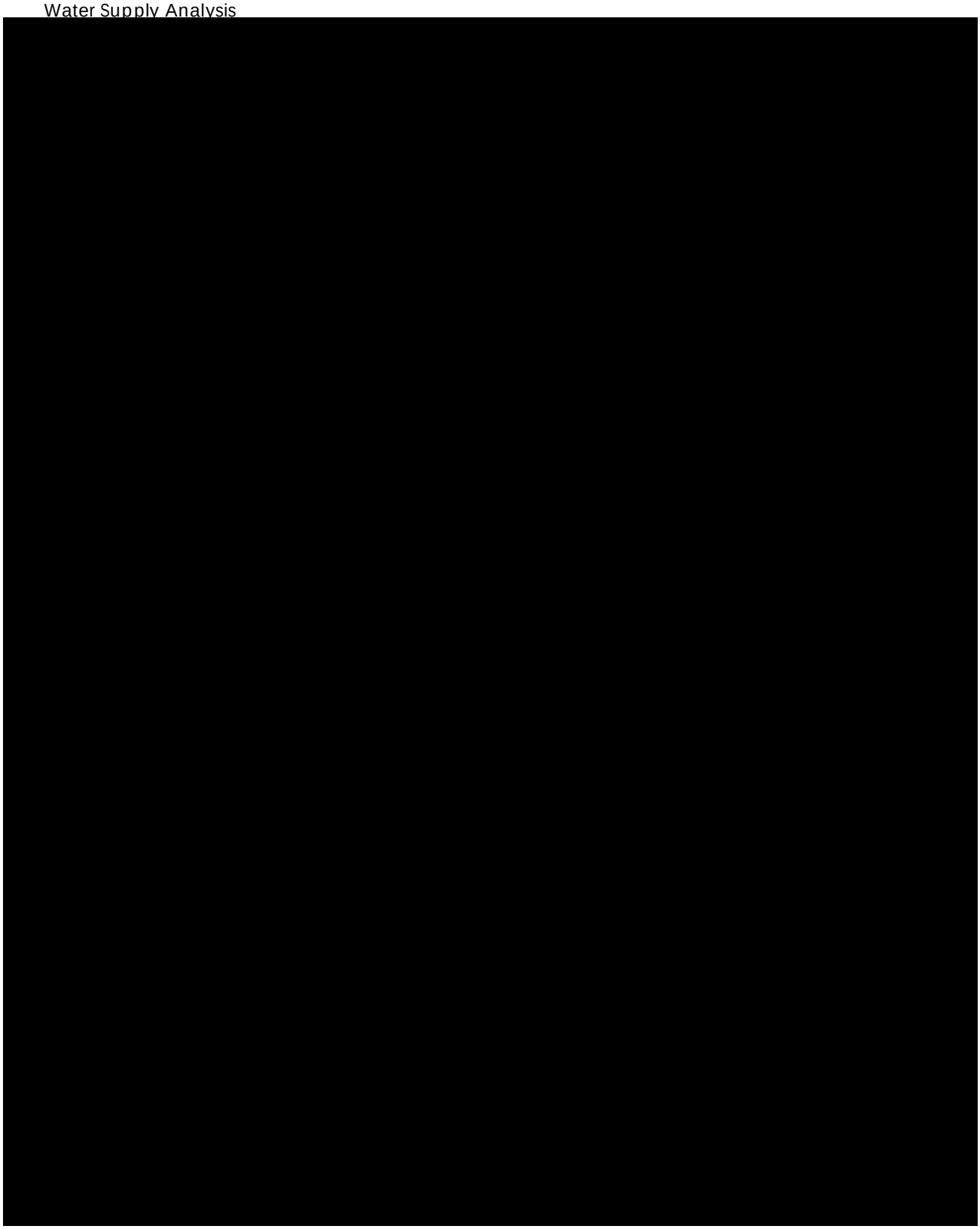
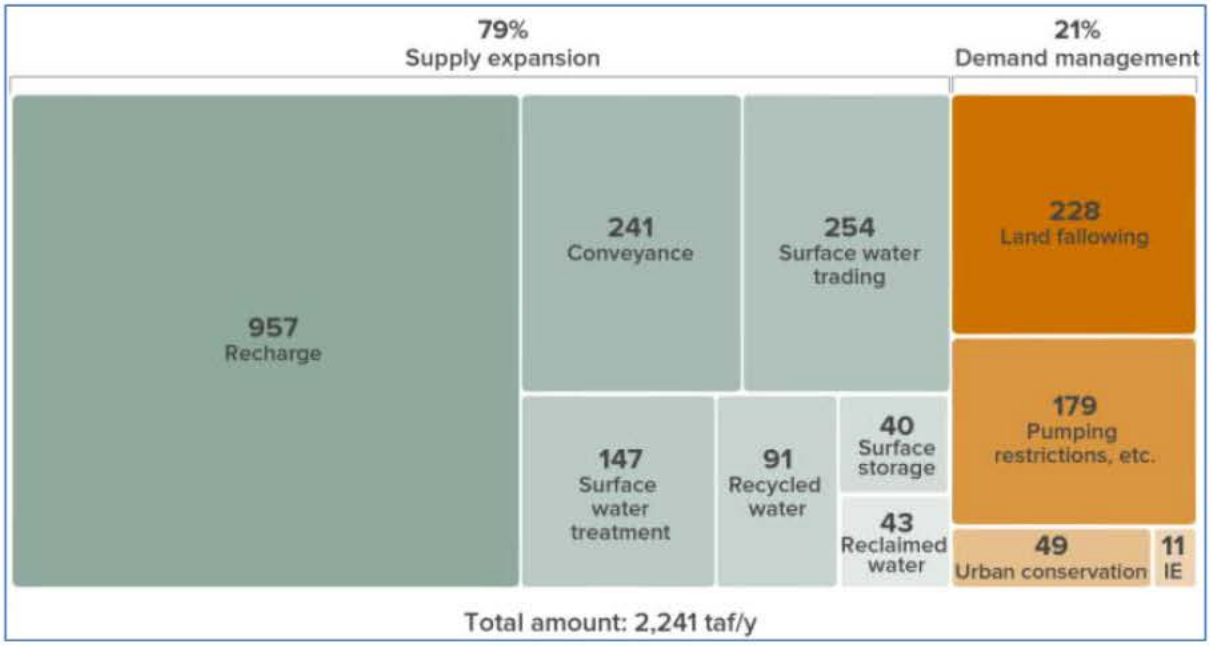


Figure 9 Proposals to Address San Joaquin Basin Overdraft



Notes: The amounts are shown in thousand acre-feet per year. IE is irrigation efficiency. The pumping restrictions category also includes groundwater allocations, water metering, pricing incentives, and groundwater trading. Reclaimed water includes desalinated brackish groundwater and water produced by oil extraction.

Source: PPIC 2020

As shown above, the GSPs for San Joaquin Basin subbasins consider both supply and demand projects and assume that new water supplies will account for more than three-quarters of existing overdraft, while demand management will make up for less than one-quarter of existing overdraft.

[redacted]

3 Water Demands and Comparison

This section provides comparison of the proposed project's water demands for each production scenario (Low, Medium, High) to selected pieces of data from the analysis provided in preceding sections, as shown in Table 7.

Table 7 Comparison of Production Scenario Water Demands

Metric of Comparison	Low	Medium	High
[redacted]			

The metrics of comparison identified below were selected purely to demonstrate the scale of the proposed project's water demands, and do not reflect water supply availability. Two metrics of comparison are provided for each production scenario; again, this is purely to demonstrate scale of the project's water demands.

4 Cost Analysis

This section identifies known or projected costs for water, as a basis for considering the potential scale of developing or purchasing water supply for the proposed Five Points production site. This section does not assess the actual cost to acquire water supply.

Due to the scale of the proposed project's water demands under any production scenario, it is anticipated that multiple agencies would be involved in securing and providing sufficient water supply for the project. In addition, due to the scale of the project's water demands, the actual cost of water may be scaled or implemented differently than is done for normal water rates. The calculations below are provided purely to convey context and scale of the project's water demands and potential costs. Table 8 characterizes potential costs of purchasing water supply for each of the project's proposed production scenarios, based on WWD's current rate for M&I "acquired supply (WWD 2021c).

Table 8 WWD M&I Acquired Supply Rates

Water Rates	Low	Medium	High
$663.21 / acre-foot			

Source: WWD 2021c

As calculated based upon WWD's 2021-2021 water rate for M&I acquired supply, the cost to purchase water for the project could range from roughly **$25.4 million** to **$152.5 million** per year. The actual cost of water for the proposed project will be determined by the water provider(s).

4.1 Desalinated Water Potential

The proposed project medium production scenario requires approximately gallons per day of treated water, or raw water. The Poseidon Carlsbad desalination plant and the proposed Huntington Beach desalination plant each are sized to produce 50 million gallons per day, needed by the project's medium production scenario. Based on news articles only, the Carlsbad plant apparently provides water at $2,250 per acre-foot, or $0.0069 per gallon of water.

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