



DRAFT

Semitropic Water Storage District

Agricultural Water Management Plan

April 2026





DRAFT Agricultural Water Management Plan

DRAFT Semitropic Water Storage District

Wasco, California

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Appendices

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Appendix C	Semitropic Water Storage District Consolidated Rules and Regulations for Distribution of Water
Appendix D	Poso IRWM Drought Contingency Plan

Standard Limitations and Disclaimer

This report was prepared exclusively for the use of Semitropic Water Storage District. The findings and conclusions, if any provided by GEI in this report, are based solely on the information reported to GEI as of the date of this report. Future investigations or additional information not provided to GEI at the time of this report may result in modification of this report. GEI's scope of work did not include verifying the completeness or accuracy of information provided by others. Accordingly, GEI shall not be liable for any damages, costs, or other consequences resulting from reliance on such information if it is later determined to be inaccurate or incomplete. GEI's professional services for this project have been performed in a manner consistent with that degree of skill and care ordinarily exercised by members of the same profession currently practicing in the same locality, performing similar services under similar conditions. GEI makes no other representations and no warranties, express or implied.

Acronyms and Abbreviations

AFY	acre feet per year
AWMP	Agricultural Water Management Plan
CDFW	California Department of Fish and Wildlife
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
County	Kern County
CVP	Central Valley Project
CWA	Clean Water Act
ESA	Endangered Species Act
GEI	GEI Consultants, Inc.
project	Leonard Avenue Conveyance Improvement Project
ROW	right-of-way
RWQCB	Regional Water Quality Control Board
SWID	Shafter-Wasco Irrigation District
SWP	State Water Project
SWSD	Semitropic Water Storage District
USACE	U.S. Army of Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

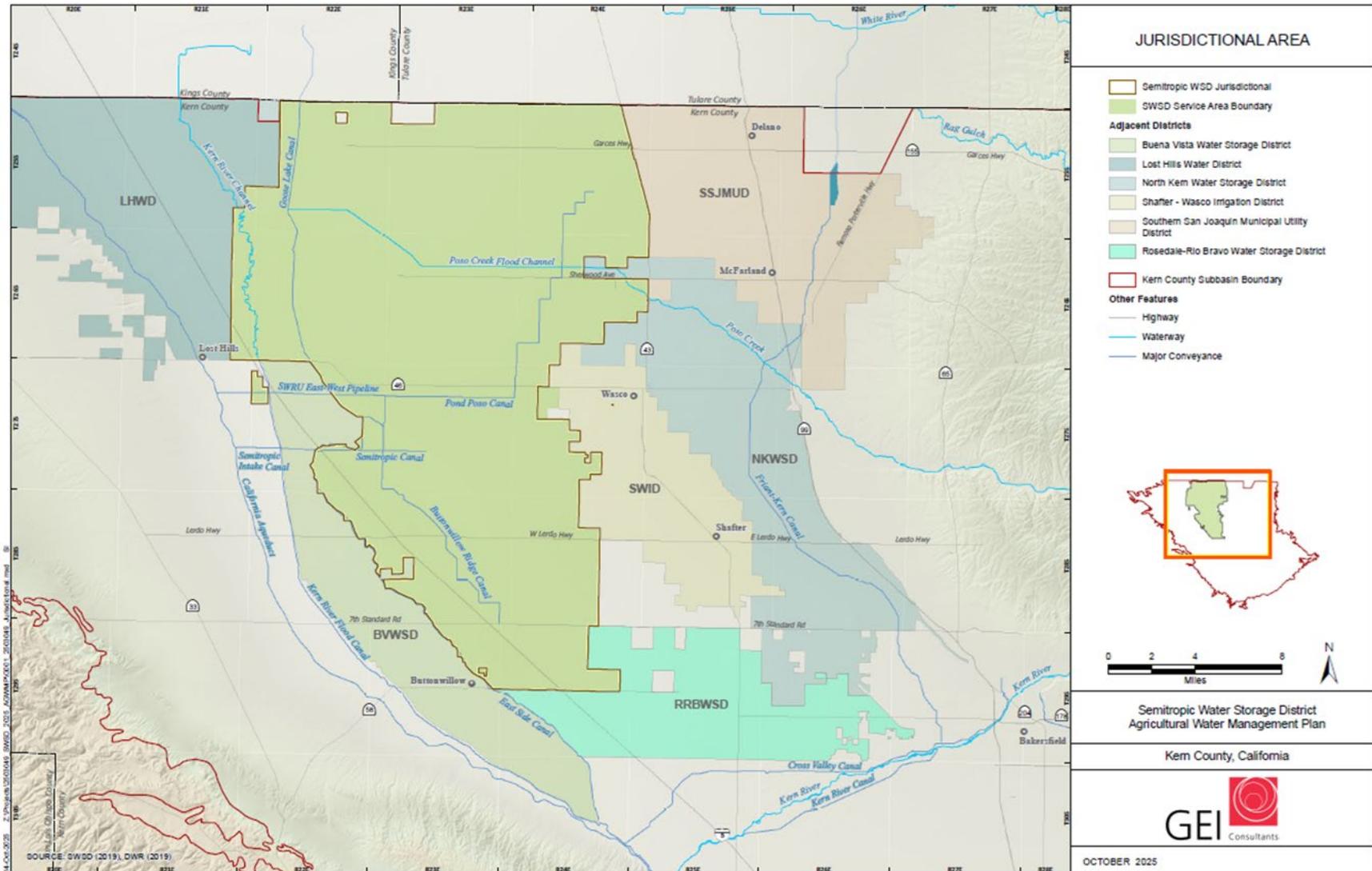
1. Introduction

Water Code §10800 – 10853 (the Agricultural Water Management Planning Act) requires agricultural water suppliers to submit to the California Department of Water Resources (DWR) an Agricultural Water Management Plan (AWMP) that addresses the elements listed in Water Code §10826. An agricultural water supplier is defined as a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding the acreage that receives recycled water.

Semitropic Water Storage District (SWSD) is a publicly owned agricultural water supplier. As of calendar year 2025, the total service area of SWSD is approximately 222,570 acres with approximately 115,760 acres of irrigated lands (including 6,500 acres of managed wetlands). The remaining 106,810 acres are undeveloped lands that include 8,960 acres associated with the Kern National Wildlife Refuge. A map of SWSD's service is shown in Figure 1-1.

In accordance with Water Code §10820, SWSD has prepared this 2025 AWMP as an update to their 2020 AWMP. This 2025 AWMP complies with current regulations, including AB 1668 (Friedman, Statute of 2018), and conforms with DWR's A Guidebook to Assist Agricultural Water Suppliers to Prepare a 2025 Agricultural Water Management Plan that was issued by DWR in September 2025.

Figure 1-1. General Location and Jurisdictional Boundaries of SWSD



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1.1. Description of Previous Water Management Activities

Water management activities by SWSD since 2015 have been significantly driven through compliance with the Sustainable Groundwater Management Act (SGMA) and implementation of SWSD's Groundwater Sustainability Plan (GSP), which is included in Appendix A, identified projects and management actions. However, SWSD continues to implement other water management activities focused on improving water supply reliability for the district and its landowners.

SGMA related water management activities include:

- Assembly Bill 453 (2016): This special legislation provided SWSD the authority to collect groundwater extraction information, required the reporting of groundwater information, and authorized SWSD to impose fees on the extraction of groundwater from the subbasin.
- New Lands Surcharge Program: Any new land developed after July 1, 2017 is charged \$500/AF of consumptive use greater than the allocated native groundwater yield. This interim program was replaced with the Landowner Water Budgets in 2022.
- SGMA Basin Sustainability Charges/Credits: A program whereby SWSD utilizes remote sensing data to determine the consumptive use (as evapotranspiration (ET)) for each parcel and the aggregate by Landowner of Record in the SWSD. The consumptive use for an irrigated parcel is compared to the average consumptive use of all irrigated fields. If the consumptive use for a single parcel is in excess of the average, then the parcel is levied a charge (the basin sustainability charge). If the consumptive use of a parcel is less than the average, then the parcel is due a credit (the basin sustainability credit). This interim program was replaced with the Landowner Water Budgets in 2022.
- The Semitropic Water Storage District Groundwater Sustainability Agency (Semitropic GSA) completed its Groundwater Sustainability Plan (Semitropic GSP) in 2025, in compliance with the Sustainable Groundwater Management Act (SGMA). The Semitropic GSP identifies Sustainable Management Criteria and Minimum Thresholds for sustainable management of the entire Kern Subbasin as well as the local Semitropic GSA portion of the subbasin. The Semitropic GSP was developed with the full cooperation of all 20 GSAs in the Kern Subbasin and responds directly to regulatory feedback from DWR and the State Water Resources Control Board (SWRCB), incorporating the latest data, technical refinements, and input from interested parties. The primary management action in the Semitropic GSP is focused on demand management, as described below. Semitropic GSA's demand management program was developed and adopted in its 2020 GSP submittal, which was then part of the Kern Groundwater Authority GSP. To ensure groundwater levels are managed at or above Measurable Objectives, Semitropic GSA's demand management program manages all lands within the GSA to specific Landowner Water Budgets that include the following water supply categories.
 - a. Contract Water: State Water Project (SWP) supplies (yield from SWP Table A entitlement).
 - b. Supplemental SWSD Supplies: includes leave behind from third party banking, Article 21 from the SWP, Section 215 from the Central Valley Project, dry year transfers and other water purchases.

- c. Native Supply: includes Native Groundwater Yield of the Kern Subbasin (estimated at 0.15 acre-feet per acre) and precipitation.
- d. Temporary Consumptive Use Allowance (TCA): The TCA is an allocation of permissible groundwater overdraft that will be driven to 0 by 2040 and was set so all irrigated lands would have an adequate supply in 2020; however, the overdraft that is represented by TCA would be reduced annually such that over time the demand would be driven down to the sustainable supply.

The SWSD also continues to engage in additional water management activities, including:

1. Develop water exchanges and/or water banking arrangements that result in a net increase of SWSD water supplies, when practicable.
2. Collaborate with neighboring water agencies to increase the importation of available surface water supplies.
3. Promote water use efficiency through financial support of the North West Kern RCD-DWR Mobile Laboratory, encouraging landowners to take advantage of this resource by requesting field irrigation evaluations, and encouraging landowners to apply for financial assistance for on-farm irrigation application efficiency improvements through existing federal and state programs.
4. Actively participate in local water resource management forums, including SWSD's Groundwater Monitoring Committee, the Poso Creek Regional Water Management Group, the Kern River Watershed Coalition Authority, and the Kern Subbasin Coordination Committee.
5. Participate in California Statewide Groundwater Elevation Monitoring (CASGEM) Program using groundwater level readings

1.2. Coordination Activities

The following coordination activities were performed by SWSD in preparing the 2025 AWMP.

1.2.1. Notification of Preparation

In compliance with Water Code §10821(a), SWSD prepared and posted a public notice of plan preparation, which is included in Appendix B. SWSD has also notified the entities in Table 1-1.

1.2.2. Plan Adoption and Submittal

The 2025 AWMP was adopted during a Public Hearing held on March 11, 2025. A copy of the SWSD Board Resolution of Adoption for this AWMP is included in Appendix B. During the Public Hearing, the public and SWSD landowners were provided with an opportunity to provide comments on the AWMP.

The 2025 AWMP, as adopted by SWSD, is available on their web site (<http://www.semitropic.com/>). This plan is available along with previous AWMPs and the Semitropic GSP for reference. The AWMP was also submitted to DWR within the 30-day of adoption, and a copy of the adopted plan will be submitted to other entities shown on Table I-1 on March 11, 2025.

Table 1-1. Summary of Coordination, Adoption and Submittal Activities

Potential Interested Parties	Notified of Plan Preparation	Assisted in Preparation	Received Draft Plan	Notified of Public Meetings	Notified of Intention to Adopt	Sent Copy of Adopted Plan
City of Wasco	x					
County of Kern	x					
City of Shafter	x					
City of Bakersfield	x					
City of Lost Hills	x					
DWR						x
Website			x			
Bakersfield Californian				x		
Bakersfield Public Library						x
California State Library						x

1.3. AWMP Implementation Schedule

The SWSD will implement the requirements of this AWMP, consistent with Water Code §10800 – 10853, according to the descriptions, schedules and operating practices of the district. Additionally, implementation of SGMA requirements for achieving sustainable groundwater management will achieve many of the requirements of this AWMP and will be coordinated accordingly.

2. Description of Service Area

The SWSD was established in 1958 as a water storage district for the purpose of securing State Water Project (SWP) water to supplement groundwater supplies and mitigate overdraft within the region. Today, SWSD is one of eight water storage districts in California and is the largest in Kern County, supplying water, predominantly for agricultural use, to nearly 300 customers. SWSD is governed by a seven-member Board of Directors. Each member represents a geographical area within the district known as a division and is elected to a 4-year term by the voters owning land within that division.

Semitropic began importing SWP water in 1973 under member unit contracts with the Kern County Water Agency (KCWA or Agency) for a Table A entitlement of 155,000 acre-feet per year. Additionally, SWSD develops surface water supplies from water transfers, the Poso Creek, and a required “10-percent leave behind” from water banked by third parties in the Semitropic Groundwater Banking Program. These supplies are developed to meet the irrigation demand on approximately 120,000 acres within the district’s boundaries. District landowners also rely on local groundwater to meet irrigation demands not met by available surface water deliveries, however with the implementation of SGMA reliance on groundwater will necessarily be reduced in accordance with demand management action identified in the Semitropic GSP. Table 2-1 provides a summary of the surface water supplies received by SWSD from 2015 to 2025.

For the 10-year period of 2015 to 2025, SWSD received an annual average of 69,800 acre-feet from the SWP (see Table 2-1). Deliveries from the SWP were reduced between 2020 and 2022 due to drought conditions and a continued increase in regulatory constraints on exports from the Sacramento-San Joaquin Delta. As a result of these regulatory constraints, the DWR 2023 Delivery Capability Report predicts that the long-term average annual delivery of SWP Table A entitlements is expected to be 54 percent of the contract amounts. Accordingly, on average, Semitropic can expect its 155,000 acre-foot SWP member unit contract to yield an average annual supply of about 83,700 acre-feet. The most recent 10-year average of SWP Table A deliveries is 27-percent lower than DWR’s reported long average.

SWP Article 21 supplies, short-term surplus water made available by the SWP, are also a critical wet year supply that can be used for groundwater recharge and storage for use in dry years to offset the overall reduction of SWP deliveries. During the 10-year period from 2015 to 2025, Semitropic received Article 21 water in 3 years, 2017, 2019, and 2023 for a total supply of approximately 74,600 acre-feet or an average of 6,780 acre-feet per year (Table 2-1).

Table 2-1. Surface Water Deliveries for Calendar Years 2015 to 2025

	Surface Water Sources (acre-feet)					
	SWP Table A	SWP Article 21	Poso Creek	Water Transfers	Banking Leave Behind	Annual Total
2015	31,000	0	0	1,960	160	33,120
2016	93,000	0	0	5,080	3,390	101,470
2017	131,750	25,470	24,420	107,760	25,450	314,850
2018	54,250	0	0	212,470	5,480	272,200
2019	116,250	21,520	3810	65,050	19,130	225,760
2020	31,000	0	0	17,400	250	48,650
2021	7,750	0	0	3,890	260	11,900
2022	7,750	0	0	3,550	200	11,500
2023	155,000	27,610	29,090	131,490	14,010	357,200
2024	62,000	0	0	1,500	8,330	71,830
2025	77,500	0	0	41,190	4,840	123,530
Period Average:	69,750	6,780	5,210	53,760	7,410	142,910

2.1. Description of the Agricultural Water Supplier and Service Area

2.1.1. Physical Characteristics

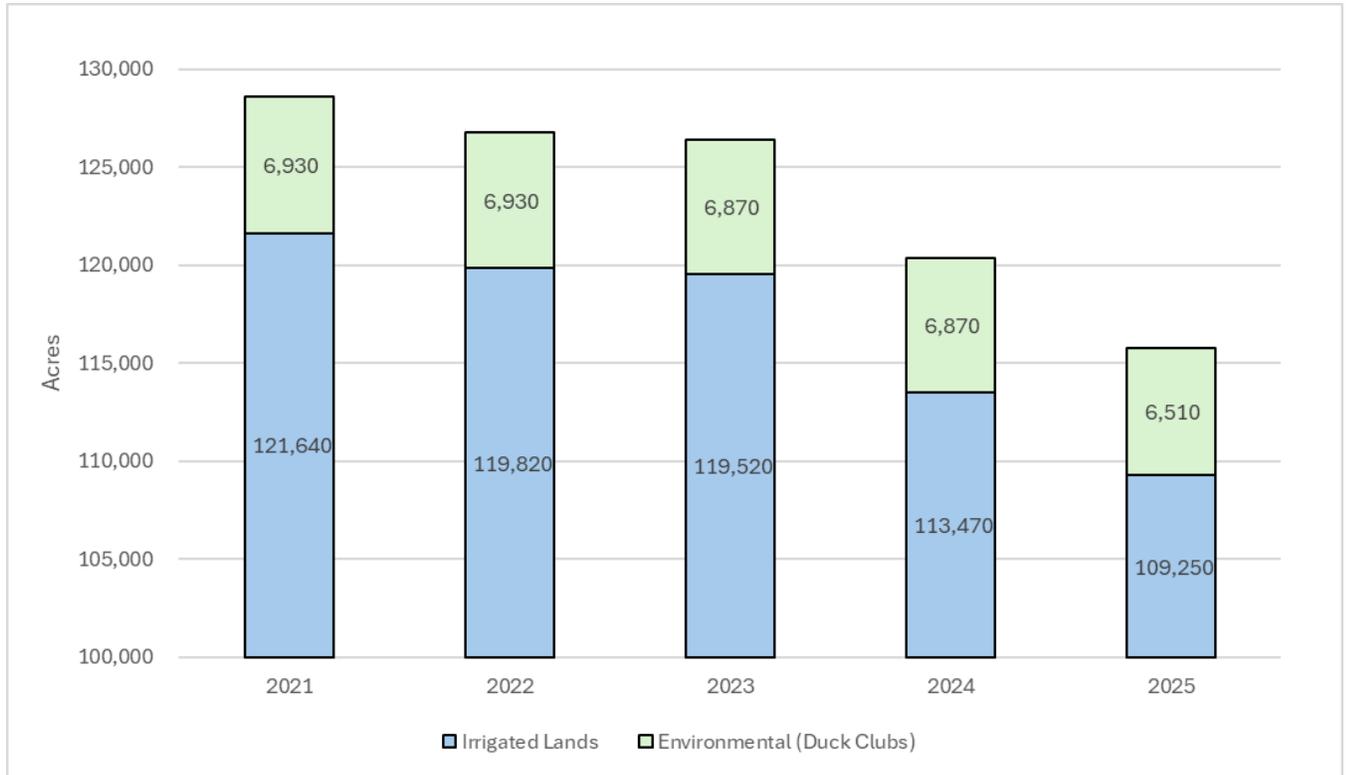
SWSD is located in the northwestern portion of Kern County in the Central Valley region of California. The district is situated between Interstate 5 on the west, U.S. Highway 43 on the east, U.S. Highway 58 on the south, and the Kern County line to the north (Figure 2-1). Neighboring water agencies include:

- Southern San Joaquin Municipal Utility District (SSJMUD), North Kern Water Storage District (NKWSD), and Shafter-Wasco Irrigation District (SWID) to the east.
- Rosedale Rio Bravo Water Storage District (RRBWSD) to the southeast.
- Buena Vista Water Storage District (BVWSD) to the west/southwest.
- Lost Hills Water District (LHWD) to the west.

2.1.2. Size of the Service Area

The district encompasses approximately 222,570 acres. The total irrigated acreage within the district fluctuates over time, primarily due to changes in land use. As shown on Figure 2-1, from 2021 to 2025 the percentage of irrigated acreage within SWSD has been declining overall at an average rate of approximately 0.97 percent per year. Currently, 109,250 (~49-percent) of SWSD’s lands are irrigated. This is approximately 12,390 acres less than the total irrigated lands within the district in 2021 (excluding environmental/duck club lands).

Figure 2-1. Irrigated Lands in the SWSD, 2021 to 2025



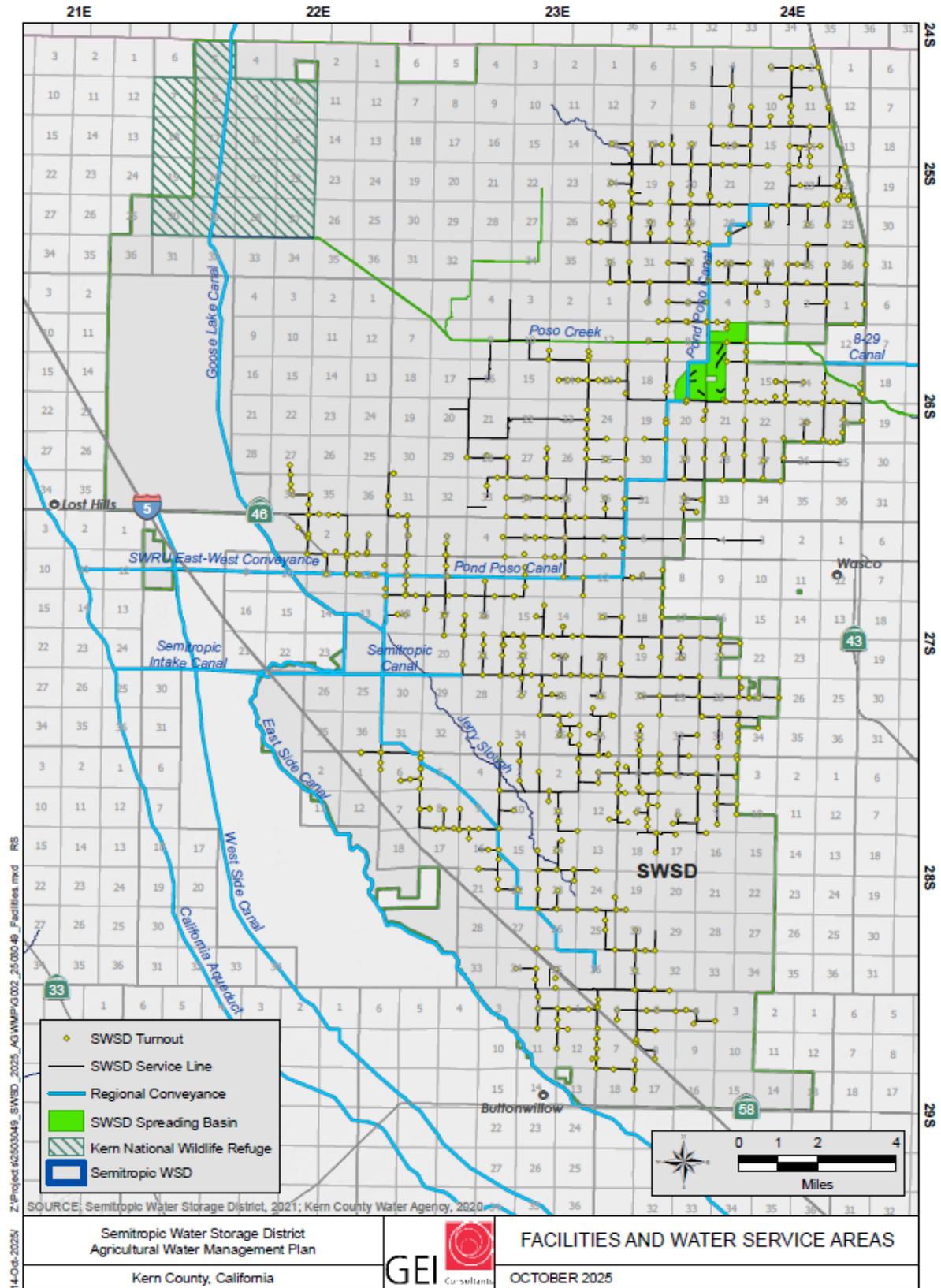
2.1.3. Water Management Facilities

SWSD owns and operates a complex system of canals, pipelines, and wells to provide a reliable water supply to its service area. An overview of the district’s distribution system including the primary conveyance canals, recharge facilities, and distribution laterals is shown in Figure 2-2.

2.1.3.1. Surface Water Turnouts

The SWSD has three turnouts connected to the California Aqueduct. Collectively, the capacity to divert SWP water to the district through these three turnouts is about 1,740 cubic feet per second (cfs) (Turnout No. 1 at 800 cfs, Turnout No. 2 at 300 cfs, and Turnout No. 3 at 640 cfs). Turnouts 1 and 2 supply water to the district’s Intake Canal. Turnout No. 3 supplies water to the Pond-Poso Canal via a 120-inch diameter pipeline and is located approximately 2.5 miles north of the Intake Canal.

Figure 2-1. Semitropic WSD Distribution Facilities



SWSD has the capability to return water to the California Aqueduct, as might be needed to return surface water previously banked in the Semitropic Groundwater Banking Program. Delivery of water into the Aqueduct requires pumping, which is accomplished at two locations: 1) the Junction Pumping Plant, which discharges into a 120-inch diameter pipeline in route to the Aqueduct; and 2) the Pump-Back Pumping Plant, which discharges into a 78-inch diameter pipeline paralleling the Intake Canal.

SWSD also operates 1,434 turnouts, which includes 1,200 farm turnouts, in addition to the supply turnouts connected to the California Aqueduct. The farm turnouts are utilized to deliver water to individual water users within the district.

2.1.3.2. Canals and Spill Basins

SWSD operates approximately 43 miles of canals and three spillway basins as part of its distribution system. Approximately 30 miles of the canals are lined with the remaining 13 miles being unlined. The spillway basins are located at the ends of the Pond-Poso and Buttonwillow Ridge Canals and along the Intake Canal. These basins are designed to capture emergency and/or operational spills and return the water to the distribution system.

2.1.3.3. Piping

The distribution laterals consist of buried pressure pipelines which are supplied from the canal system by canal-side pumping plants. In total, SWSD operates approximately 302 miles of pipelines as part of its distribution facilities.

2.1.3.4. Interties

In cooperation with the SWID, NKWSD, Buena Vista Water Storage District, and the Belridge Water Storage District, SWSD has constructed interconnection facilities for exchange of water supplies between the districts. The facilities aid participating parties in the delivery of additional supplies and the balancing of existing supplies and demands. In this regard, it is noted that SWID, as a CVP-Friant contractor, and NKWSD, utilizing Kern River supplies, rely on different watersheds for their imported water supplies. From time to time, there are differences in hydrology between the SWP, Kern River, and the CVP's Friant Unit that create opportunities for mutually beneficial exchanges based on use of the interties between districts.

2.1.3.5. Wells

SWSD owns and operates approximately 50 wells. In addition to the SWSD wells, there are approximately 900 private on-farm wells in the district service area. Agreements are in place which provide district use of several of the on-farm wells under certain conditions. Using both district-owned wells and on-farm wells, previously banked water can be recovered and returned to the Semitropic Banking Program's banking partners via exchange and/or direct delivery through the Aqueduct.

SWSD-owned wells are also used to supply water under emergency conditions, which is typically defined as a landowner well failure. From SWSD's perspective, emergency water is provided to landowners when a landowner well fails. Under this scenario, the district provides the landowner temporary access

to the district well capacity to pump the water the landowner would have pumped for himself absent a well failure.

2.1.3.6. Spreading Basins

There are approximately 1,130 acres of recharge/spreading basins in the district, nearly double that reported in the 2021 SWSD AWMP. The largest, the Pond-Poso Spreading Grounds, consists of approximately 550 net acres of spreading basins in the northeastern quadrant of the district. The Pond-Poso Spreading Grounds are split into two operable areas: the first located near the mid-point of the northern reach of the Pond-Poso Canal and the second located near the end of this same reach.

2.1.4. *Terrain and Soils*

2.1.4.1. Physiographic setting

The SWSD is located on the valley floor of the southern portion of the San Joaquin Valley, a physiographic trough. The northwest-southeast trending San Joaquin Valley is bounded by the Sierra Nevada Range to the east, the Tehachapi Mountains to the south, and the Temblor Range and Coast Range to the west. The valley floor is characterized by low alluvial plains and fans and by overflow lands and old lakebeds.

Alluvial deposits in the Kern County subbasin generally consist of sand, silt, and clay laid down in a complex sequence, principally by the Kern River, Poso Creek, Deer Creek, the White River, small drainages along the Sierra Nevada Mountains to the east, and, to a lesser extent, by streams along the Coast Range to the west. The terminus for these flows in the geologic past was Tulare Lake, located to the north of Kern County on the west side of the San Joaquin Valley.

For a more detailed description of the geology and hydrogeologic conditions underlying the Semitropic area see Section 7 Hydrogeological Conceptual Model of the Semitropic GSP.

2.1.4.2. Topography

The topography of the SWSD service area is relatively flat with a mild westerly slope, generally less than one-quarter percent.

The alluvial fan along the southeastern boundary of district is relatively flat, derived principally from materials deposited by the Kern River and Poso Creek. This is similar in character to the northern area of district, which has no abrupt changes in topographic relief. Streams, such as Poso Creek, that cross the valley typically flow intermittently during the wet season.

2.1.4.3. Groundwater

A local Upper Aquifer is observed mostly within SWSD in the northern portion of the Subbasin. Almost all groundwater production beneath the district occurs in the lower Principal Aquifer (hydraulically connected to the Primary Principal Aquifer). In spring 2023, water-level elevations ranged from about 60 to 130 feet below sea level in the lower zone which lies beneath the regional 300-foot clay layer. The deepest levels near the District's northern edge and the highest levels—exceeding 30 feet above sea

level—in the southeastern forebay area. From 2023-2025, groundwater in the lower zone continued to flow into SWSD from the east and southeast forebay.

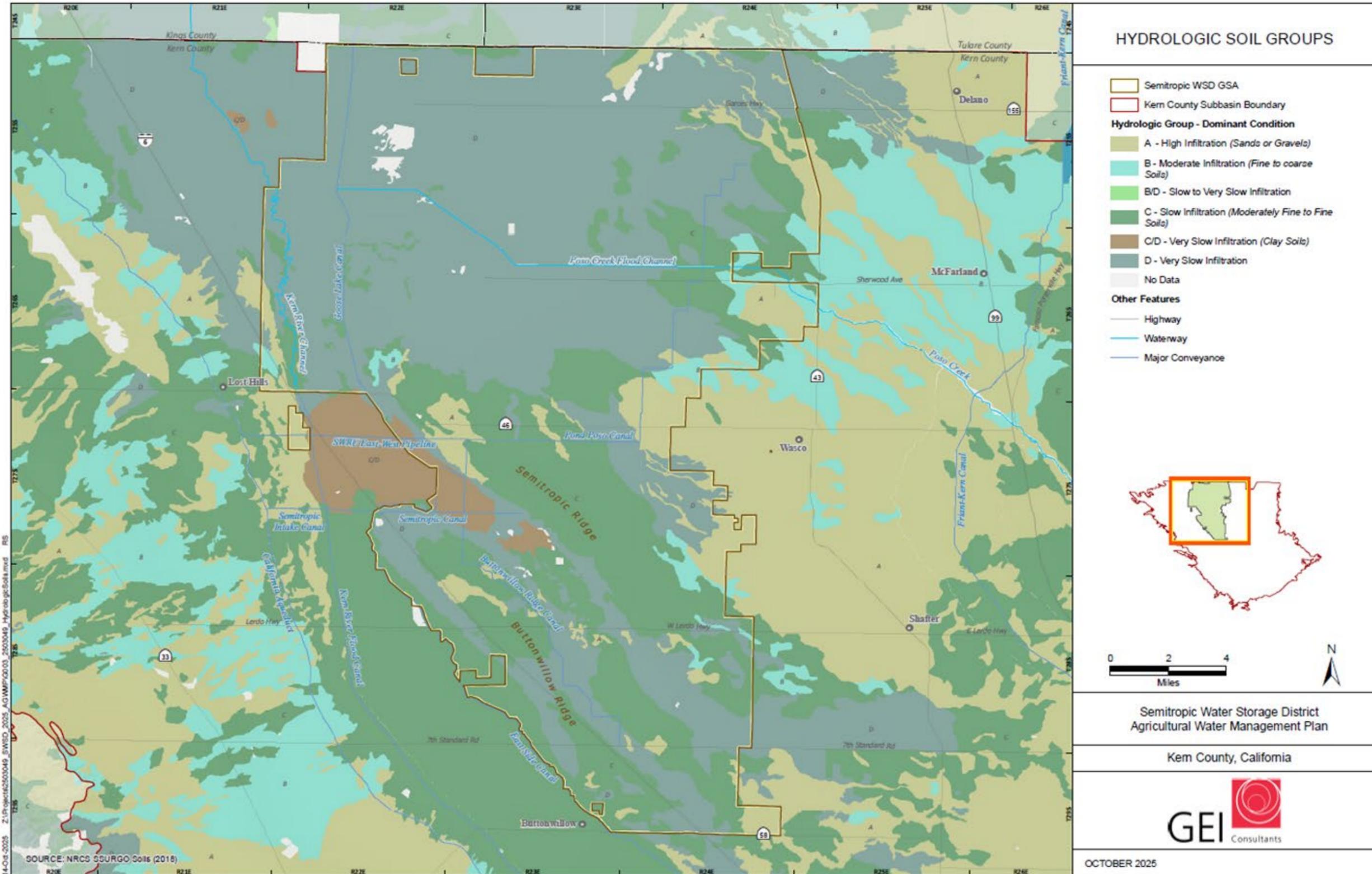
2.1.4.4. Soils

Soils in the valley floor have two general origins. The eastern alluvial fans were deposited primarily by runoff from the Sierra Nevada, Tehachapi, and Transverse mountain ranges. These soils originate from mixed igneous and metamorphic material and are typically well drained, and very low in salinity. The western alluvial fans originated from Coastal Range sedimentary marine rocks. This region tends to have more areas with fine-textured, poorly drained soils of relatively marginal quality.

A useful index of a soil's capacity to infiltrate precipitation and applied irrigation water is the National Resource Conservation Service (NRCS) Hydrologic Soils Group classification. Hydrologic Soils Groups typical of the Study area are defined below and are displayed on Figure 2-3, which was developed using data from the NRCS' Soil Survey Geographic Database (SSURGO).

- Hydrologic Group A – “Soils in this group have low runoff potential when thoroughly wet. Water transmitted freely” (NRCS, 2009). Group A soils have a high infiltration rate due to well drained sands or gravelly sands giving the group the highest potential for contributing to groundwater recharge. These soils are present predominantly along the eastern boundary of the district and as scattered pockets in the southern half of the district.
- Hydrologic Group B – “Soils in this group have moderately low runoff potential when thoroughly wet. Water transmission is unimpeded” (NRCS, 2009). Group B soils are moderately well drained due to moderately fine to coarse textures and have the second highest potential permeability and potential for contributing to groundwater recharge. These soils are limited in extent and present only along the eastern boundary of the district as isolated occurrences.
- Hydrologic Group C – “Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission is somewhat restricted” (NRCS, 2009). This group has limited potential to contribute to groundwater recharge. Group C soils have a low infiltration rate due to their fine texture or because of a layer that impedes downward movement of water. These soils are present in the southern half of the district where they are the predominant soil type.
- Hydrologic Group D – “Soils in this group have high runoff potential when thoroughly wet. Water transmission is very restricted” (NRCS, 2009). This group has a very limited capacity to contribute to groundwater recharge. These soils have a very slow infiltration rate due to the presence of clay and are the predominant soil type in the northern half of the district.

Figure 2-2. Hydrologic Soils Group in the SWSD Region



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2.1.5. Climate

The southern portion of the San Joaquin Valley is classified as a Mediterranean Sea to Desert climate. To quantify the climate in the immediate vicinity of the district, data from California Irrigation Management Information System (CIMIS) Station ID 5 (Shafter) for the period between January 2000 to December 2025 was utilized. CIMIS Station 5 is located approximately 2 miles north of the City of Shafter and 5.5 miles east of the district.

The 25-year mean monthly precipitation at CIMIS Station 5 is shown in Figure 2-4. Based on the data, in the vicinity of SWSD, December through March have typically been the wettest months with average rainfall amounts of 0.97 inches per month. The driest months are typically June through September with average rainfall amounts of less than 0.03 inches per month from the years 2000-2025. Average precipitation during the wet season (October through March) since 2000 is approximately 4.42 inches in the vicinity of the district.

Figure 2-5 shows annual and cumulative departure from mean precipitation determined from the CIMIS Station 5 data. Over the period examined, annual precipitation varied between a low of 2.4 inches in 2004 to a high of 13.05 inches in 2010 with a mean of 5.69 inches. It should be noted that 2012 and 2013 were excluded from this range as only four months of data were available for the year. From 2001 to 2020, the district experienced an overall dry period with only 2010 and 2019 having above average rainfall. Beginning in 2023, the district experienced a relatively wet period, and in 2023 and 2024 SWSD received roughly 10.35 and 7.85 inches of rain, about 4.8 and 2.3 inches more than the average annual precipitation of 5.69 inches.

Figure 2-6 shows annual peak, average, and low temperatures over time at CIMIS Station 5 since January 2000. Each series was fitted with a linear regression line to examine trends in these temperatures over time. As shown by the trendlines, gradual long-term increasing trends are observed in all three series. Over the 25-year period of record, the trendlines show that annual peak, average, and low temperatures have increased at rates of approximately 0.13, 0.12, and 0.11 degrees Fahrenheit per year, respectively. Cumulatively this has resulted in increases of approximately 1.3 degrees in annual peak temperature, 1.2 degrees in annual average temperature, and 1 degree in annual low temperature in the vicinity of the district since 2000.

Figure 2-3. Mean Monthly Precipitation at CIMIS Station 5 (Shafter) 2000 to 2025

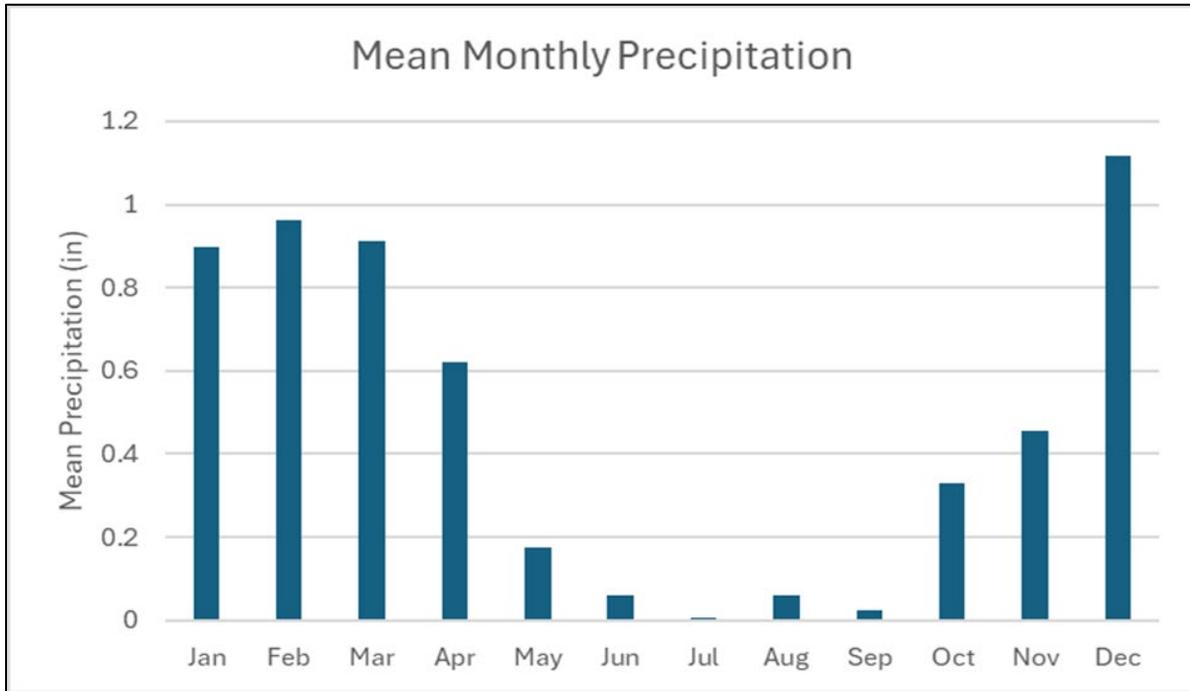


Figure 2-4. Annual Precipitation Pattern at CIMIS Station 5 (Shafter) 2000 to 2025

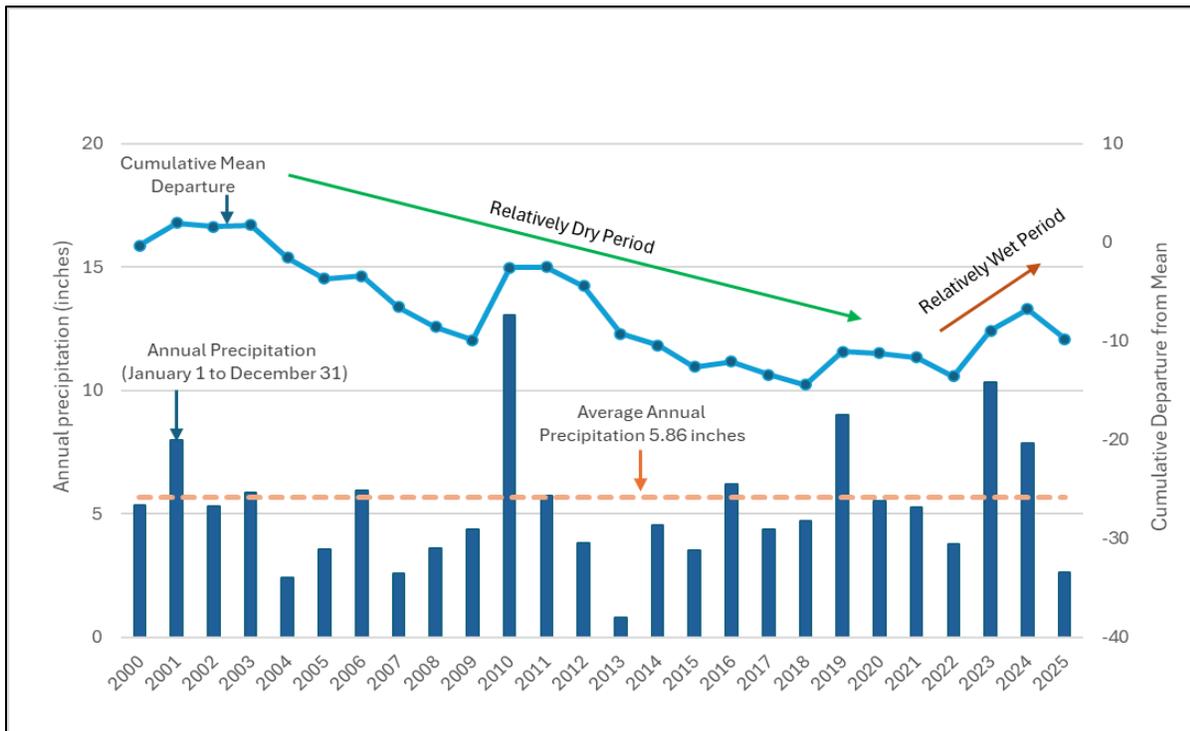
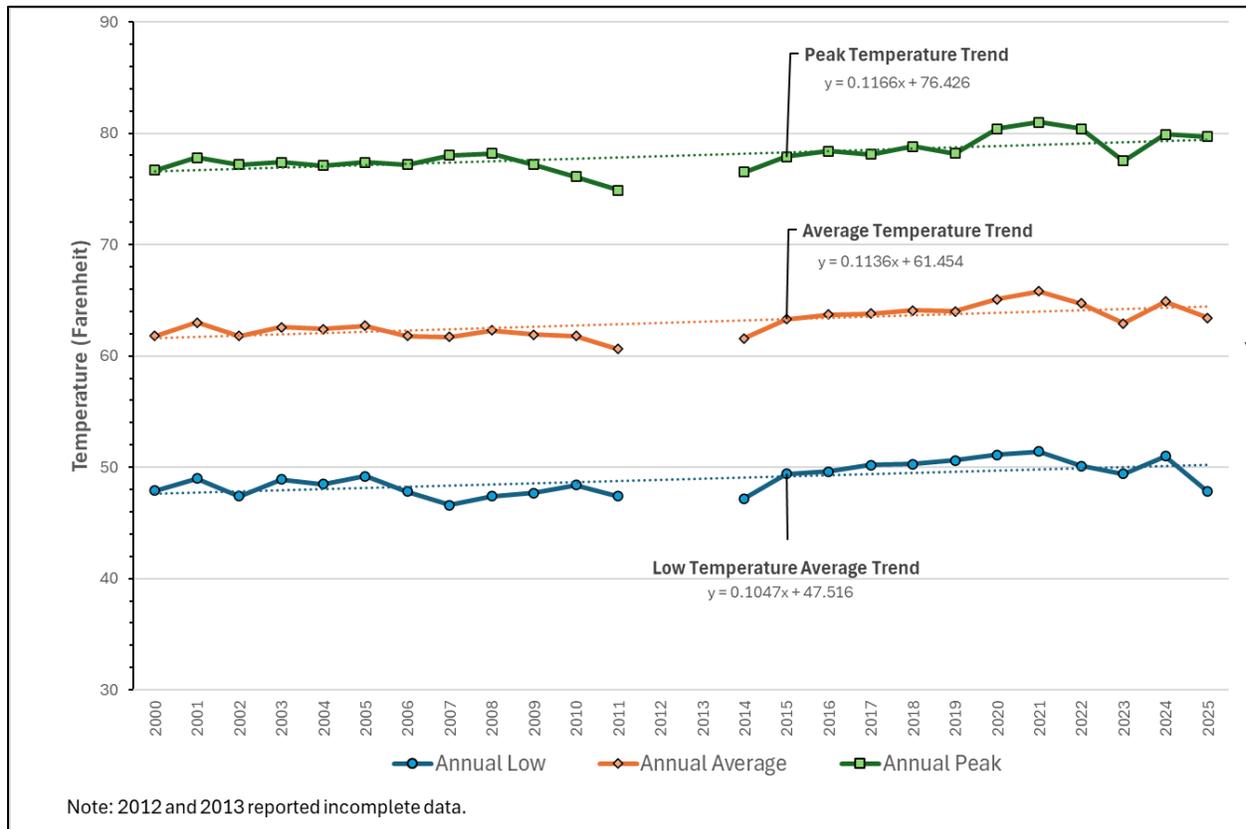


Figure 2-5. Annual Temperature Pattern at CIMIS Station 5 (Shafter) 2020 to 2025



2.2. Operational Characteristics

SWSD operations are based on the principle of efficient, flexible, and equitable use of all available water supplies to further resiliency and the goal of sustainable management according to SGMA. Over the years, SWSD has implemented various programs to promote in-lieu recharge and enhance groundwater conditions. Since the completion of the 2020 Semitropic GSP, SWSD has been implementing projects and management action designed to achieve sustainable groundwater conditions by 2040. For additional information and descriptions of projects and management actions see Section 14 Projects and Management Actions of the Semitropic GSP.

2.2.1. Operating Rules and Regulations

SWSD provides surface water within its service area in accordance with the *Semitropic Water Storage District Consolidated Rules and Regulations for Distribution of Water* (Rules and Regulations) as amended May 17, 2017 and adopted by Resolution No. ST 2017-09. A copy of the rules and regulations for SWSD are in Appendix C.

2.2.2. Water Delivery Measurements and Calculations

SWSD delivers irrigation water at farm turnouts which are metered using propeller meters equipped with flow totalizers. Since all propeller meters used by the district are equipped with totalizers that track the delivered volume at each turnout, the district can equate the calibrated accuracy of the flow meter

to volumetric accuracy. According to *SBx7-7 Flow Rate Measurement Compliance for Agricultural Irrigation Districts* (prepared by the Irrigation Training & Research Center of the California Polytechnic Institute, San Luis Obispo), devices with totalizers provide measurements that are sufficiently precise (in monitoring flow duration) to assume that the flow rate accuracy is equivalent to the calibrated volumetric accuracy.

SWSD System Operators use tablet computers in the field to record meter readings. To reduce transcription errors, data is electronically uploaded into the district’s dispatch software daily. Meter readings are taken every day that a turnout is running and at the end of every month. The farm turnout propeller meters are periodically checked for maintenance requirements. SWSD’s policy is that if a meter is questioned by a water user, that meter will be sent to the meter manufacturer for calibration.

Diversions to SWSD from the California Aqueduct are measured through a flume at Turnout No. 1 or acoustic meters at Turnout Nos. 2 and 3. These devices are cleaned and calibrated several times each year by DWR personnel. Table 2-2 provides this information in tabular form, along with the typical levels of accuracy for measurement devices which are in use.

Table 2-1. Water Delivery Measurements

Measurement Device Type	Measurement Frequency	Calibration Frequency	Maintenance Frequency	Est. Level of Accuracy (%)
Propeller Meters	Daily	Minimum frequency of 120 months.	As needed	± 5%
Flume	Daily (DWR)	Monthly	Quarterly	< ± 5%
Acoustic Meters	Daily	Infrequent	As needed	± 5%

2.2.3. Water Rate Schedules and Billing

SWSD establishes water rates in accordance with Sections 5 and 6 of the *Rules and Regulations* in Appendix C. The rates are applied on a per-acre-foot basis and take into consideration costs associated with the administration and physical delivery of water, infrastructure maintenance and improvements, energy, and the price of State Project Water. The rates are established in October and adopted in either November or December prior to the affected year, but in no event later than January 15 of the affected year. SWSD’s water rates for 2025 are shown in Table 2-3.

Table 2-2. 2025 Water Rates

Contract water SWP	\$83.00 per acre-foot
Contract water Variable	\$60.00 per acre-foot
Non-contract water (winter/summer/allocated)	\$168.00/170.00/172.00 per acre-foot
In Canal Pumping Credit	Energy- (\$7.00)
In Canal Pumping Credit – O&M SID	(\$3.00)
Average Ground Water Electrical costs	\$221.28
Contract Area – Total of direct and indirect (100% allocation)	\$182.83
Indirect District Charges on Tax Bill $\$139.40/3.5 = \39.83	

Notes:

Winter is November through April

Summer is May through September

Contract water is paid for by the user in eight equal installments due on the 10th day of the months of February through September. Non-contract water is paid for by the user on the 15th of the month in which the invoice for said water is prepared.

2.3. Drought Plan and Water Shortage Allocation Policies

2.3.1. Water Shortage Allocation Policy

SWSD’s water shortage allocation policy is detailed in Section 7 of the *Rules and Regulations* in Appendix C.

2.3.2. Drought Plan

SWSD completed the Drought Contingency Plan (DCP) for the Poso Creek Integrated Regional Water Management Group (IRWM Group) in collaboration with the IRWMP Group, which includes:

- Semitropic Water Storage District,
- North Kern Water Storage District,
- Cawelo Water District,
- Shafter-Wasco Irrigation District,
- Kern-Tulare Water District,
- Delano-Earlimart Irrigation District,
- North West Kern Resource Conservation District, and
- Southern San Joaquin Municipal Utility District.

The purpose of the DCP is to identify and implement strategies that monitor short and long-term water availability, assess risks to critical resources in the case of drought, promote mitigation efforts, prioritize drought response actions, ensure administrative framework and associated responsibilities are clear and transparent, and provide for periodic evaluation and updating of the DCP. The DCP was completed in October of 2022 and is attached to this AWMP (Appendix D).

3. Description of the Quantity of Water Uses

The following section describes the quantity of water uses in SWSD, which are almost exclusively agricultural in nature. Water uses are calculated on a calendar years basis, consistent with district accounting and landowner billing practices. The water budget details are consistent with Semitropic GSP.

3.1. Agricultural Water Use

Cropping patterns have varied over the years within SWSD. In the 1970s, most of the cropped acreage was in annual crops; principally cotton, alfalfa (and pasture), and grain. Since that time, there has been a shift away from annual crops in favor of long-term or permanent crops. Today, approximately 73 percent of the cropped acreage is planted to permanent crops, whereas it was 59 percent in 2015 and less than five percent in the 1970s. As a generalization, the relatively large cotton acreage which persisted until the mid-1990s has since shifted to tree crops (nuts), primarily almonds and pistachios.

Table 3-1 illustrates notable shifts in land use and cropping patterns within the SWSD service area from 2021 through 2025. The most significant decreases occurred in nuts (-7,500 acres), alfalfa (-3,490 acres), and grapes (-1,680 acres), reflecting a broader reduction in long-term perennial crop acreage. Declines were also seen in truck crops, grasses, flowers, and nursery acreage. In contrast, cotton and deciduous fruits experienced modest increases over the same period. Overall, total irrigated acreage decreased by approximately 12,810 acres in total.

Tables 3-2 through 3-6 present acreages and estimated water needs for crops grown within SWSD's service area during each of the selected years, 2021 through 2025. Total crop acreage is based on the district's annual crop survey for each year and remote sensing measurements. The acres in the table represent net irrigated acres for a given year, which is less than the total of the gross acres shown on the district service area map (Figure 1-1). The crop ET requirements for 2021 to 2025 were developed using remote sensing data and analysis performed by SWSD's consultant Land IQ. SWSD GSA has contracted with Land IQ to provide consumptive use data as ET on a monthly basis. This data is then incorporated into SWSD's GIS database, and the SWSD GSA can analyze the ET data relative to the Kern County Assessor's Information for each parcel within the SWSD GSA boundary. SWSD also conducts crop surveys annually allowing the ET data to be analyzed by field or crop. Lastly, ET data is provided to each SWSD GSA Landowner such that the Landowner can assess their annual ET in relation to their Landowner Water Budget. The values in Tables 3-1 to 3-5 represent the total ET requirement of the crop and have not been adjusted for effective precipitation. Irrigated acreage and associated consumptive demand have steadily decreased since 2021 with 128,572 total irrigated acres to 115,757 total irrigated acres in 2025. Total ET has changed from 364,470 to 352,438 acre-feet from 2020 to 2025. The agricultural demands identified below are met with District developed surface water supplies and groundwater pumping by private landowners. The supplies used to meet these agricultural demands are detailed in Section 4 of this AWMP.

Table 3-1. 2021-2025 Land Use Change in Acres

Land Use / Crop Type	2021	2022	2023	2024	2025	Change Over Period
Alfalfa	9,420	8,040	7,270	6,450	5,930	(3,490)
Cotton	1,370	1,690	970	1,290	1,640	270
Deciduous Fruit	1,690	1,730	1,740	1,740	1,850	160
Field Crops	14,680	14,540	16,820	15,980	15,690	1,010
Flowers	490	440	410	510	360	(130)
Grapes	5,820	5,740	5,760	5,620	4,140	(1,680)
Nursery	210	210	30	80	50	(160)
Nuts	85,270	84,720	83,680	79,990	77,770	(7,500)
Grasses	690	290	420	20	300	(390)
Truck Crops	2,020	2,420	2,400	1,790	1,550	(470)
Total Irrigated Agricultural Acres	121,640	119,820	119,520	113,470	109,250	(12,390)
Managed Wetlands (Duck Clubs)	6,930	6,930	6,870	6,870	6,510	(420)
TOTAL IRRIGATED LANDS:	128,570	126,750	126,390	120,340	115,760	(12,810)

Table 3-2. 2021 Land Use and Corp Evapotranspiration Summary

Land Use / Crop Type	Acres	Total ET (acre-feet)	Total ET (acre-feet/acre)
Alfalfa	9,420	32,590	3.5
Cotton	1,370	3,470	2.5
Deciduous Fruit	1,690	3,020	1.8
Field Crops	14,680	38,530	2.6
Flowers	490	910	1.8
Grapes	5,820	17,170	3.0
Nursery	210	590	2.8
Nuts	85,270	257,990	3.0
Grasses	690	1,820	2.7
Truck Crops	2,020	4,030	2.0
Total Irrigated Agricultural Acres	121,650	360,110	3.0
Managed Wetlands (Duck Clubs)	6,930	7,410	1.1
TOTAL IRRIGATED LANDS:	128,580	367,520	2.9

Table 3-3. 2022 Land Use and Corp Evapotranspiration Summary

Land Use / Crop Type	Acres	Total ET (acre-feet)	Total ET (acre-feet/acre)
Alfalfa	8,040	27,750	3.5
Cotton	1,690	4,160	2.5
Deciduous Fruit	1,730	4,410	2.5
Field Crops	14,540	35,020	2.4
Flowers	440	910	2.0
Grapes	5,740	16,730	2.9
Nursery	210	470	2.3
Nuts	84,720	260,950	3.1
Grasses	290	760	2.7
Truck Crops	2,420	4,350	1.8
Total Irrigated Agricultural Acres	119,820	355,500	3.0
Managed Wetlands (Duck Clubs)	6,930	5,940	0.9
TOTAL IRRIGATED LANDS:	126,750	361,440	2.9

Table 3-4. 2023 Land Use and Corp Evapotranspiration Summary

Land Use / Crop Type	Acres	Total ET (acre-feet)	Total ET (acre-feet/acre)
Alfalfa	7,270	23,350	3.2
Cotton	970	2,790	2.9
Deciduous Fruit	1,740	4,340	2.5
Field Crops	16,820	41,160	2.4
Flowers	410	1,000	2.4
Grapes	5,760	17,980	3.1
Nursery	30	60	2.4
Nuts	83,680	260,510	3.1
Grasses	420	1,080	2.5
Truck Crops	2,400	5,360	2.2
Total Irrigated Agricultural Acres	119,520	357,610	3.0
Managed Wetlands (Duck Clubs)	6,870	11,850	1.7
TOTAL IRRIGATED LANDS:	126,390	369,460	2.9

Table 3-5. 2024 Land Use and Corp Evapotranspiration Summary

Land Use / Crop Type	Acres	Total ET (acre-feet)	Total ET (acre-feet/acre)
Alfalfa	6,450	21,620	3.4
Cotton	1,290	3,490	2.7
Deciduous Fruit	1,740	4,650	2.7
Field Crops	15,980	37,130	2.3
Flowers	510	1,170	2.3
Grapes	5,620	15,850	2.8
Nursery	80	110	1.5
Nuts	79,990	275,150	3.4
Grasses	20	60	3.3
Truck Crops	1,790	3,730	2.1
Total Irrigated Agricultural Acres	113,470	362,960	3.2
Managed Wetlands (Duck Clubs)	6,870	8,690	1.3
TOTAL IRRIGATED LANDS:	120,340	371,650	3.1

Table 3-6. 2025 Land Use and Corp Evapotranspiration Summary

Land Use / Crop Type	Acres	Total ET (acre-feet)	Total ET (acre-feet/acre)
Alfalfa	5,930	20,260	3.4
Cotton	1,640	4,100	2.5
Deciduous Fruit	1,850	4,560	2.5
Field Crops	15,690	36,370	2.3
Flowers	360	1,010	2.8
Grapes	4,140	11,050	2.7
Nursery	50	60	1.2
Nuts	77,770	264,240	3.4
Grasses	300	580	1.9
Truck Crops	1,550	3,410	2.2
Total Irrigated Agricultural Acres	109,250	345,640	3.2
Managed Wetlands (Duck Clubs)	6,510	6,800	1.0
TOTAL IRRIGATED LANDS:	115,760	352,440	3.0

3.2. Environmental and Recreational Water Use

Within the SWSD service area, there are approximately 6,510 (2025) acres of managed wetlands (private Duck Clubs), which receive surface water for fish and wildlife preservation and enhancement and recreation. Duck Clubs rely on groundwater but occasionally receive surface water from SWSD during wetter conditions. The Kern National Wildlife Refuge is also located with the boundaries of SWSD and the district facilitates delivery of federal Central Valley Project surface water to the refuge.

3.3. Municipal and Industrial Water Use

All municipal and industrial (M&I) water use in the vicinity of the SWSD service area is supplied by groundwater. Although no small communities are located within the district, supply wells for an adjacent community of Lost Hills are located within the district; a state prison relies on groundwater; and rural residences and businesses pump groundwater for domestic and commercial uses. The district's importation of surface water reduces reliance on the underlying groundwater, thereby supporting all users of groundwater. In other words, the same groundwater system supplies both agricultural and M&I uses and provides storage for groundwater banking.

3.4. Groundwater Recharge and Banking Programs

The SWSD engages in groundwater recharge for conjunctive use purposes and recharge for groundwater banking purposes. Groundwater recharge for conjunctive uses involves the use of SWSD surface water supplies recharged to the local aquifer for the benefit of the district and local landowners. Groundwater recharge for groundwater banking involves the recharge of banking partner's surface water supplies to the local aquifer for later recovery and delivery to that banking partner. SWSD operates the Semitropic Groundwater Banking Program within the district for the benefit of banking partners and also participates in groundwater banking programs within Kern County, as a banking partner, to manage SWSD supplies.

3.4.1. Groundwater Recharge for Conjunctive Use

Conjunctive use recharge is considered the recharge of SWSD owned surface water for the use and benefit of the district and local landowners. The surface water that is recharged is not specifically recovered by the district but rather is recovered over time by local groundwater users within the SWSD service area.

Conjunctive use recharge typically occurs when the district has surface water supplies in excess of local demands. The preponderance of conjunctive use recharge is facilitated through surface spreading and percolation of surface water in basins or ponds or in subsurface recharge projects.

3.4.2. Groundwater Recharge for SWSD Banking Benefit

To the extent that the SWSD is unable to divert and use all available surface water supplies, the district makes use of out-of-district water banking projects located on the Kern River Fan, which are briefly described below.

3.4.2.1. Kern Water Bank Authority

After implementation of the Monterey Amendment in 1996 between DWR and the State Water Contractors, including Kern County Water Agency, the Kern Water Bank Authority acquired land in the Kern Fan southwest of the City of Bakersfield, upon which it developed and constructed the Kern Water Bank. In exchange for permanent relinquishment of a portion of its SWP entitlement, Semitropic obtained a 6.67 percent share of the Kern Water Bank Authority, a Joint Powers Authority, and rights to use firm capacity in Kern Water Bank facilities for storage and recovery of water. With a gross area of about 20,000 acres, the Kern Water Bank is located south of the district, astride the Kern River. It is a direct recharge-based project, with about 7,000 acres of spreading basins. To reach these facilities, water is diverted from the Aqueduct into the Kern Water Bank Canal. To the extent there has been unused recharge or recovery capacity, Semitropic has at times exercised considerably more than its share of the available capacity.

3.4.2.2. Pioneer Project

The Pioneer Project is operated by the Kern County Water Agency as a direct recharge-based water banking project, located on the Kern River fan, adjacent to the Kern Water Bank. There are “recharge participants” and “recovery participants”; the former have a first priority right to use of the recharge facilities, and the latter have a first priority right to the use of the recovery facilities. Semitropic is a “recovery participant” with a 14 percent share of the Project’s recovery capacity, thus the district’s right to use recharge capacity is second in priority to the “recharge participants”. Water is delivered to this facility by diverting water from the Aqueduct into the Cross Valley Canal.

3.4.3. *Groundwater Recharge for the Semitropic Groundwater Banking Program*

The Semitropic Groundwater Banking Program (Semitropic Groundwater Bank) incorporates both in-lieu (indirect) and direct recharge and storage of imported surface water supplies in the groundwater basin. The Semitropic Groundwater Bank began operation in the early 1990’s and is one of the largest groundwater banks in operation, with an approved storage capacity of approximately 1.65 million acre-feet. The goal of the bank has been to provide long-term underground storage of surplus SWP water and other supplies to stabilize declining groundwater levels and to improve water supply resiliency for SWSD’s landowners and banking partners. Semitropic Groundwater Bank banking partners include: Metropolitan Water District of Southern California; Santa Clara Valley Water District; Zone 7 Water Agency; Alameda County Water District; Newhall Land and Farming Company; San Diego County Water Authority; the City of Tracy; Santa Clarita Valley Water Agency (formerly Castaic Lake Water Agency); Homer, LLC; Poso Creek Water Company, LLC; Montecito Water District; and Harris Ranch..

Water is traditionally stored in the Semitropic Groundwater Bank when the banking partners make their allocated SWP supplies, or other surplus water supplies available to SWSD for banking. These surface supplies are delivered to landowners (farmers) in SWSD’s service area in-lieu of their groundwater pumping (in lieu recharge) or directly spread in groundwater recharge facilities (direct recharge). There are two mechanisms available to return water to banking partners during recovery years. The first is through SWP entitlement water exchanges (entitlement exchange), where SWSD recovers stored surface water for delivery to landowners in exchange for their respective share of surface water

available from the California Aqueduct. This allows for the surface water in the California Aqueduct that would have been delivered to SWSD to be re-directed to banking partners. The second method occurs in particularly dry years when not enough SWP supplies are allocated to SWSD to meet SWSD’s contractual commitment to return water to the banking partners. Under this condition, SWSD extracts stored surface water and physically delivers it through pump-back facilities to the California Aqueduct (pump-back) for delivery to banking partners.

Existing infrastructure associated with the Semitropic Groundwater Bank includes dedicated SWSD owned recovery wells, access to landowner wells for the recovery of previously stored water, conveyance pipelines, regulating basins and pump stations, and other ancillary facilities. All of these existing facilities are within the SWSD service area.

With regard to SGMA planning, the SWSD GSA does not account for the water recharged on behalf of a banking partner as a district supply which can be used to augment the surface water supplies of SWSD. It should also be noted that banking water is only provided to those landowners within SWSD that have demonstrated that their lands have been historically developed with a reliance upon groundwater for at least 5 years and SWSD confirms that the water quality from the landowner’s well is acceptable for return to the California Aqueduct. This is required before SWSD invests in the capital facilities necessary to connect the landowner to SWSD’s In-Lieu Banking Program, which includes meters on the service connections between the landowner and SWSD facilities to meter all flows related to banking operations.

Table 3-6 provides the volumes of surface water recharged by SWSD from 2021 through 2025, either within district for in-district conjunctive use, SWSD out of district banking, and for the Semitropic Groundwater Bank.

Table 3-7. Annual District Groundwater Recharge and Banking Volumes (acre-feet)

	2021	2022	2023	2024	2025	Total for Period
In-District Conjunctive Use	40	70	86,850	420	280	90,660
SWSD Out of District Recharge/Banking	6,070	0	9,550	3,960	0	19,580
Semitropic Groundwater Bank Recharge	2,350	1,810	126,050	74,970	43,530	248,710

3.4.4. Deep Percolation of Applied Water

The district also receives groundwater recharge from the deep percolation of applied water. Most of the irrigation systems in the district are highly efficient micro drip systems. Surveys of landowner irrigations systems have historically shown that on-farm irrigation efficiencies range from 85 to 95 percent. Deep percolation of applied irrigation water provides a source of local groundwater recharge. The district’s estimates of deep percolation for the 2021 to 2025 calendar years are provided in Table 3-7. Deep percolation is calculated based on an overall irrigation efficiency of 85 percent for the applied water requirement in the district.

Table 3-8. Estimated Annual Deep Percolation Volumes

	2021	2022	2023	2024	2025	Total for Period
Groundwater Recharge (acre-feet)	19,690	17,830	273,500	141,600	94,440	547,060

3.5. Projected Water Use

Projections of future water use within SWSD are closely linked to the availability of surface water supplies and SGMA requirements to achieve sustainable groundwater conditions. Accordingly, existing and future groundwater banking, transfers, and exchange programs are intended to provide additional surface water to SWSD to help offset reductions in historically available supplies and support sustainable groundwater management.

4. Description of Quantity and Quality of Water Resources

4.1. Water Supply Quantity

The following section describes the quantity and quality of water available to SWSD to meet irrigation demands and for groundwater recharge. Water supplies are presented on a calendar years basis, consistent with district accounting and landowner billing practices.

4.1.1. Surface Water Supply

SWSD began importing SWP water in 1973 under a Member Unit Contract with the KCWA for a Table A entitlement of 155,000 acre-feet per year. This supply is distributed to SWSD landowners with existing contracts with the SWSD for SWP Table A water and is referred to herein as “Contract Water.” The quantity of Contract Water allocated to each parcel is determined in the contracts for agricultural water service between the SWSD’s improvement districts and the landowner. SWSD has two improvement districts, the Shafter Wasco Improvement District and the Buttonwillow Improvement District. The stated average long-term reliability of the SWP is 54% (DWR, Delivery Capacity Report and Studies, 2023); therefore, SWSD can expect to receive an average annual delivery of SWP Table A water of 83,700 AF. The average long-term reliability of the SWP is subject to periodic updates by the DWR.

Additionally, the district has developed supplemental surface water supplies from water transfers, the Poso Creek, and a required “10-percent leave behind” from water banked by third parties in the Semitropic Groundwater Bank. As of 2025, the SWSD has estimated the average annual supplemental water acquisitions to be 53,190 acre-feet per year, which includes supplies from Article 21, Poso Creek, water transfers and acquisitions, and banking leave behind. SWSD landowners also rely on local groundwater resources to meet irrigation demands not met by district developed surface water supplies. Table 4-1 provides a summary of the surface water and groundwater supplies utilized by the district and its landowners to meet demands for calendar years 2021 through 2025.

For the 5-year period of 2021 to 2025, SWSD received an annual average of 62,000 acre-feet from the SWP (see Table 4-1). Deliveries from the SWP increased during this period due to wet years in 2023 and 2024.

SWP Article 21 supplies, short-term surplus water made available by the SWP during surplus conditions, is a critical supply the district relies on for groundwater recharge and banking. These surplus supplies offset the overall reduction of SWP deliveries during non-wet years and especially during dry years. During the 5-year period from 2021 to 2025, Semitropic received Article 21 supplies in one year, 2023, for a total supply of approximately 27,610 acre-feet or an average of 5,520 acre-feet per year (Table 4-1).

SWSD participates in voluntary water transfers from various sellers in the San Joaquin Valley, Sacramento Valley and neighboring water districts within Kern County. These water transfers provide an

additional source of water to meet the district's demands, but like Article 21 water, they are also a critical supply during wet years that can be banked for use in future years.

Poso Creek in the north portion of SWSD, provides an intermittent source of water, typically during "wet" seasons; however, no significant water bodies (e.g. continuously flowing rivers or creeks) extend through the district service area. During wet period when Poso Creek sustains continuous flows through the district it provides a source of groundwater recharge either from the creek bed or diversion of flows into district recharge basins. During the 2021 to 2025 period Poso Creek provided an estimated 29,090 acre-feet of recharge in 2023, the only year in which Poso Creek experienced sustained flows through the district.

SWSD manages the Semitropic Groundwater Bank, covered in Section 3.4.3 of this plan. Surface water delivered into SWSD on behalf of banking partners is recharged into the aquifer underlying the district. Ten percent of the water that is "banked" for the banking partners is left behind as a water supply benefit to SWSD. Since operation of the Semitropic Groundwater Bank, the district has banked more than 2 million acre-feet on behalf of banking partners. These deliveries have served to mitigate declining groundwater levels and provided more than 200,000 acre-feet of supply for the district. Banking partners typically put more recharge water into the bank during wetter conditions when SWP allocations are higher. During the 2021 to 2025 period, groundwater banking occurred each year.

Table 4-1. Surface Water Deliveries (2021 to 2025)

	Surface Water Sources (acre-feet)					
	2021	2022	2023	2024	2025	Period Average
Water Year Type ¹	Critical	Critical	Wet	Above Normal	Above Normal	
SWP Table A	7,750	7,750	155,000	62,000	77,500	62,000
SWP Article 21	0	0	27,610	0	0	5,520
Poso Creek	0	0	29,090	0	0	5,820
Water Transfers	3,890	3,550	131,490	1,500	41,190	36,320
Banking Leave Behind	260	200	14,010	8,330	4,840	5,530
Annual Total	11,900	11,500	357,200	71,830	123,530	115,190

Notes:

¹ Based on San Joaquin Valley Index retrieved at [https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST]

4.1.2. Groundwater Supply

As described previously, SWSD completed and submitted its GSP in Fall 2025. Section 6.0 Basin Setting of the Semitropic GSP provides a detailed description of Kern Subbasin groundwater basin and Section 8.0 Current and Historical groundwater Conditions of the GSP provides a detailed description of the condition of the groundwater basin. Maps of the basin’s boundaries and the locations and density of wells can be found in Section 5.0 of the Semitropic GSP, Description of the Plan Area.

SWSD landowners rely on groundwater to meet crop demands beyond the volume of surface water available from the district. The amount of surface water available to landowners varies based on their contractual arrangement with SWSD for surface water supplies and, therefore, each landowner’s reliance on groundwater varies.

During the 2021- 2025 period, district landowners pumped an average of 170,530 acre-feet to meet the applied water demand detailed in Section 3. Groundwater pumping is estimated as that volume of ETAW not met with surface water deliveries or effective precipitation. Table 4-2 provides an estimate of the annual landowner groundwater pumping needed to meet the applied water demand.

Table 4-2. Estimated Landowner Groundwater Pumping (2021 to 2025)

	Estimated Landowner Groundwater Pumping (acre-feet)					
	2021	2022	2023	2024	2025	Period Average
Groundwater Pumping	201,130	175,820	24,650	217,190	233,860	170,530

4.1.3. Other Water Supplies - Effective Precipitation

Effective precipitation in SWSD’s service area is calculated as the total rainfall over the developed or irrigated acres of the district. It assumes that all precipitation is effective precipitation and available to meet crop consumptive use due to several local conditions: 1) precipitation is rarely significant enough to cause runoff from developed fields; 2) the volume of precipitation is assumed to remain in the shallow vadose zone and, therefore, is available for uptake by crops, and 3) ET is measured on a monthly basis and captures ET that results from precipitation events or that contributes to weed growth on developed fields.

Table 4-3 provides the annual rainfall totals as measured at the Shafter- San Joaquin Station (Station 5) for 2021 - 2025.

Table 4-3. Effective Precipitation (2021 to 2025)

	2021	2022	2023	2024	2025	Period Average
Effective Precipitation (inches)	5.3	3.8	10.4	7.9	7.6	7.02

2021-2025 rainfall measured at CIMIS Shafter – San Joaquin Station (Station 5)

4.1.4. Future Water Supplies

The SWSD will continue to support and request maximum allocation of its SWP contract entitlement to meet in-district demands. However, the future of the district’s SWP supply will likely be driven by regulatory restrictions in the Delta, any state-wide changes in hydrology (e.g. volume, nature, and timing of precipitation), and future modifications to SWP conveyance and/or conservation facilities. The availability of groundwater resources in the Kern Subbasin and the district will be governed by the implementation of SGMA, which (absent augmentation) will severely limit the amount of groundwater pumping that can occur in order to reach sustainability by 2040. As described in the Blue Pages Section of the Semitropic GSP, the district is implementing demand management actions that will ensure that the SWSD GSA reaches sustainability at or before 2040. These demand management actions target the elimination of the SWSD GSA’s portion of the projected Kern Subbasin 2030 climate change scenario groundwater deficit of 162,940 acre-feet per year before the January 2040 GSP Implementation deadline. Within the SWSD GSA, this represents the potential fallowing of between 42,880 to 58,190

acres of irrigated lands by 2040 assuming no additional water supplies can be developed to augment the SWSD GSA's existing surface water supplies to offset this deficit. Future impacts to surface water supplies are also detailed in the Semitropic GSP, with the greatest level of impact expected to be on SWP deliveries. DWR's 2019 Delivery Capacity Report predicted a future average annual allocation of 58 percent. DWR recently updated the Delivery Capacity Report in 2023 and now predicts the future average annual allocation to be 54 percent of the contract amounts. Accordingly, on average, Semitropic can expect its 155,000 acre-foot SWP contract to yield an average annual supply of about 83,700 acre-feet.

SWSD will distribute this average supply of Contract Water to contract landowners, according to their Contract Water allocation, each year relative to their annual consumptive use regardless of whether SWP deliveries are higher or lower than the long-term average. SWSD will be responsible for managing the overall Contract Water supply. The average long-term reliability of the SWP is subject to periodic update by the DWR.

Additional details on SWSD's future water supply reliability can be found in the Semitropic GSP, which includes analysis of DWR provided climate change scenarios.

4.2. Water Supply Quality

The quality of water delivered to SWSD from the SWP is relatively good and suitable for irrigation. This water is pumped from the Sacramento-San Joaquin River Delta and conveyed in the California Aqueduct to the district's turnouts. The total dissolved solids (TDS) concentration has averaged 259.8 mg/L over the five-year period extending from 2021 through 2025. (DWR Bulletin 132). Measurements representing the quality of the California Aqueduct water are taken at Kettleman City (Station C21, KA017226), which is located upstream of the turnouts used for deliveries to SWSD.

SWSD's groundwater quality is generally good to excellent; however, constituents of concern for agriculture are primarily related to salinity (includes chloride), while other constituents including arsenic and nitrates are constituents of concern in certain areas with regard to drinking water supplies. In general, groundwater in the west has higher TDS content relative to the eastern part of the district. A thorough and detailed description of groundwater quality conditions is provided in Section 8.4 Groundwater Quality of the Semitropic GSP.

SWSD is also a member of the Kern River Watershed Coalition Authority (KRWCA), and, in that capacity, participates in, and contributes financially to, a Regional Water Quality Control Board Irrigated Lands Regulatory Program to monitor and improve surface water and groundwater quality associated with agricultural activities.

4.2.1. Surface Water Quality

SWSD has coordinated with and relied on other agencies for the purpose of characterizing the quality of surface water received, especially since its main surface water supply consists of imported SWP water. Water is diverted from the California Aqueduct through three turnouts and is conveyed into the district using two conveyance routes; the district's Intake Canal and the 120-inch pipeline. The quality of water in the California Aqueduct is regularly monitored by DWR at several locations, including Check 21, which

is located at Kettleman City (Station C21, KA017226), upstream of the district’s turnouts. Table 4-4 presents average concentrations of selected parameters based on DWR sampling at Check 21 over the five-year period extending from 2021 through 2025.

Table 4-4. Surface Water Supply Quality (SWP)

Analyte	Units	Concentration
Dissolved Ca	mg/L	19.9
Dissolved Mg	mg/L	12.0
Dissolved Sodium	mg/L	50.3
Total Alkalinity	mg/L (as CaCO ₃)	77.0
Dissolved Chloride	mg/L	64.7
Dissolved Sulfate	mg/L	33.5
Boron	mg/L	0.17
TDS	mg/L	259.8
Dissolved Hardness	mg/L (as CaCO ₃)	99.6
Specific Conductance	uS/cm @25 °C	461.0

Source: DWR The Water Data Library

4.2.2. Groundwater Quality

The main production zones beneath SWSD are of good water quality; however, three areas of potentially poor quality are found within the district and the groundwater basin; shallow groundwater, deep groundwater, and west-side groundwater. The high salinity shallow groundwater is only characteristic where there is perched water; however, the transition zone and saline water below the production zone are typical of the entire district. The prevention of migration from the poor quality areas to the high quality areas is a critical management goal of the district.

Groundwater of poor quality, typically a sodium chloride or sodium chloride-sulfate type with high concentrations of dissolved solids and chlorides, can be found extensively along the west side of the San Joaquin Valley. “Stabilization” of groundwater levels beneath most of the district has served to limit migration of poor quality groundwater into the District from the west.

Groundwater of poor quality also can be found in the unconfined aquifer, particularly with perched water. Some areas of the unconfined aquifer are significantly saline, others brackish, due to “spills” from the perched zone, leakage through domestic well borings, and deep percolation of irrigation water. The E-clay largely prevents this water from entering the main aquifer or production zone. Accurate identification of the E-clay, proper and sufficient length of annular seals through the E-clay, and proper materials and methods of well construction are critical to maintaining good water quality in the main aquifer.

Some groundwater of poor quality can be found in the main aquifer, principally in the deeper zones of the Tulare Formation. The depth to the base of fresh water varies significantly across the district. Pockets of connate saline water may also be trapped in shallower zones under the Buttonwillow and Semitropic ridges. The district has reviewed extensive geologic data and District wells are intentionally constructed sufficiently above the saline boundary to maintain water quality.

Additional details of groundwater quality can be found in the Semitropic GSP, Section 8.4 Groundwater Quality.

4.2.3. Source Water Quality Monitoring Practices

As previously stated, DWR regularly monitors the quality of surface water in the California Aqueduct. Water samples are collected at several locations, including Check Structure C21 (KA017226), which is located approximately 20 to 30 miles northwest of the district's service area. In addition, SWSD will periodically monitor the incoming water in its two main conveyances from the Aqueduct (the Intake Canal and the 120-inch pipeline).

Under SWSD's current program, water samples are also collected annually from a representative network of wells located throughout the irrigated areas to monitor groundwater quality. For in-district use of groundwater, water quality testing has historically involved parameters relevant to an irrigation water analysis. However, when previously banked groundwater is recovered and delivered into the Aqueduct, testing is more extensive, both in terms of the number of tests and the constituents that are included in the tests.

A detailed description of the district's groundwater monitoring practices can be found in Section 15.5.4 Groundwater Quality Monitoring Network Evaluation and Section 13.3 Degraded Water Quality of the Semitropic GSP.

5. Overall Water Budget

5.1. Quantifying the Inflows

SWSD’s water budget components have been described in previous sections of this plan. Inflow elements of the water budget include the surface water elements described in Section 4.1.1 and the groundwater elements described in Section 4.1.2. The district’s water budget inflow components are provided in Table 5-1 for the period 2021 to 2025.

Table 5-1. Water Budget Inflow Components – SWSD, Kern County Subbasin

Inflow Component	AWMP Location for Supporting Calculations	Uncertainty	How Quantified?	Calendar Year				
				2021	2022	2023	2024	2025
Units	Page number or Section	Percent	Acre-feet per year					
Effective Precipitation	Section 4.1.3	10%	Measured	56,700	39,800	109,000	78,700	73,400
Water Supplier surface water diversions	Section 4.1.1	15%	Measured	20,280	18,370	284,350	131,380	97,290
Water Supplier groundwater pumping		0%	Calculated	(144,880.00)	(184,750.00)	(8,350.00)	0	0
Private groundwater pumping	Section 4.1.2	15%	Calculated	201,130	175,820	24,650	217,190	233,860
Total				133,230	49,250	409,650	427,270	404,540

Notes:

All data provided on a calendar year basis, consistent with District and landowner water budget accounting.

5.2. Quantifying the Outflows

The SWSD water budget components have been described in previous sections of this plan. Outflow elements of the water budget include the surface water elements described in Section 4.1.1 and the groundwater elements described in Section 4.1.2. SWSD’s water budget outflow components are provided in Table 5-2 for the period 2021-2025.

Table 5-2. Water Budget Outflow Components – SWSD, Kern County Subbasin

Inflow Component	AWMP Location for Supporting Calculations	Uncertainty	How Quantified?	Calendar Year				
				2021	2022	2023	2024	2025
	Page number or Section	Percent		Acre-feet per year				
Crop Consumptive use	Section 3.1	15%	Measured	367,520	361,440	369,510	371,700	352,440
Surface Outflows	Section 3.1	0	Observed	0	0	0	0	0
Deep Percolation	Section 3.4.4	15%	Calculated	19,690	17,830	273,500	141,600	94,440
Total				387,210	379,270	643,010	513,300	446,880

Notes:

All data provided on a calendar year basis, consistent with District and landowner water budget accounting.

6. Water Management Objectives

In the development of the Semitropic GSP, the SWSD GSA identified projects and management actions that are designed to improve management of the SWSD's water resources by directly improving water use efficiency, through facility improvement projects, and by incentivizing more efficient water use by District landowner, through management actions such as establishing water budgets and pricing structures. The projects and management actions identified in the GSP provide the mechanisms needed to efficiently, reliably, and sustainably manage water resources within the District. The projects and management actions identified in the GSP provide the mechanisms needed to efficiently, reliably, and sustainably manage water resources within the District. In combination with EWMPs, identified in section 9 of this AWMP, these water management objectives will promote water use efficiency improvements in the district and contribute to sustainable management of surface water and groundwater resources.

Table 6-1 provides the list of projects and management actions developed in the Semitropic GSP and adopted here as water management objectives. P/MAs are numbered with the acronym of the GSA (example SWSD-1) if the P/MA is specific to the SWSD GSA. P/MAs are numbered with "KSB-#" if the P/MA is Subbasin wide in nature. Note that "KSB" P/MAs have either full Subbasin participation or nearly all GSAs participating. Many of the remaining projects and management actions identified in Table 6-1 are designed to increase the GSA's supplemental water supplies to support the economic viability of agriculture and to maintain the sustainability of water supplies for non-agricultural beneficial users, primarily domestic users. To the extent that the SWSD GSA successfully augments its supplemental water supply, the Landowner Water Budgets will be adjusted accordingly.

Table 6-1. Water Management Objectives

P/MA Number	P/MA Name	Summary Description	Relevant Sustainability Indicators Affected			Overdraft Correction Description Category	Circumstances for Implementation	Public Noticing Process	Permitting and Regulatory Process Requirements	Status	Timetable / Circumstances for Initiation	Timetable for Completion	Timetable for Accrual of Expected Benefits	Expected Benefits							Source(s) of Water, If applicable	Legal Authority Required	Estimated Costs		
			Groundwater Levels & Storage	Groundwater Quality	Land Subsidence									Primary (AFY)		Secondary							One-time Costs	Ongoing Costs (per year)	Potential Funding Source(s)
														Water Supply Augmentation	Demand Reduction	Water Quality Improvement	Flood Control	Water Management Flexibility / Efficiency	Mitigation Programs	Data Gap Filling / Monitoring					
Projects		Implemented	Functional	In-Process	As-Needed								Implemented	Functional	In-Process	As-Needed									
SWSD-13	Evaluation and Assessment of GDEs within the Semitropic Area	Conduct additional analysis to verify the presence and extend of GDE's in the Semitropic and, if present, develop appropriate monitoring protocols.	✓				As needed	Semitropic GSA Board Meetings & Website	TBD	As needed	Current	2030	2030-	0	0					✓	District authorities	\$50,000	bank	District	
SWSD-14	Brackish Water Desalination	Development of a brackish water treatment facility to treat locally sourced brackish water for District use.	✓			New Local Supply	Upon completion of environmental and regulatory requirements As needed	Semitropic GSA Board Meetings & Website	CEQA	As needed	Current	2040	2040-	1,800	0	✓		✓			District authorities	\$0	\$900,000	District	
SWSD-15	In-District Water Markets and Transfers	District will allow for the development of market for in-district transfers.	✓			Exercise of Rights Supplemental Water Use	As needed	Semitropic GSA Board Meetings & Website	TBD	As needed	As needed	2040	2040-	TBD	0			✓		District / SGMA authorities	TBD	\$25,000	District		
Management Actions		Implemented	Functional	In-Process	As-Needed								Implemented	Functional	In-Process	As-Needed									
SWSD-16	Landowner Water Budgets	Establish individual water budgets for landowners by landowner classes. Implemented to reduce District's demand to	✓	✓	✓	Demand Reduction	Establish water budgets by landowner	Semitropic GSA Board Meetings & Website	CEQA	Implemented	Complete	Complete	2017	0	132,000			✓	✓		District / SGMA authorities	\$0	\$250,000	District	
KSB-2	Coordination with Groundwater Regulatory Programs	Coordination with various water quality regulatory programs by local, state, and federal agencies. Some of these programs include the Irrigated Lands Regulatory Program, Central Valley Salinity Alternatives for Long-term Sustainability (CV-SALTS), as well as local Groundwater Banking MOUs.	✓	✓			When domestic or small community wells require assistance maintaining access to safe and reliable water supplies.	Refer to Subbasin Outreach and Engagement Plan	NA	Implemented	NA	2020	2020-	0	0	✓			✓		NA	\$0	\$25,000	District	
KSB-3	Exceedance Policy	Subbasin-wide policy to outline what measures are taken if an MT is exceeded (levels, quality, or subsidence). This policy involves the implementation of action plans and notifications to beneficial users.	✓	✓	✓		When an MT exceedance occurs for any sustainability indicator.	NA	NA	Implemented	NA	2024	2024-	0	0				✓	✓		\$0	\$25,000	District	
KSB-5	Well Mitigation Program	Implementation of a well mitigation program to address water level and quality impacts on drinking water. The program provides emergency bottled water, well assessments, hauled water, and well improvements or replacements.	✓				When groundwater management activities impact domestic wells.	Refer to Subbasin Outreach and Engagement Plan	NA	With the adoption of the GSP in December, the Well Mitigation Plan will be adopted and implemented beginning on January 1, 2025.	NA	2025	2025-	0	0				✓		NA	\$0	\$45,000	Cawelo Water District (Assessments) CGSA Landowners	
KSB-4	Coordination with Basin Study	Coordination with local GSA's to gain a better understanding of the Kern Subbasin and how best to manage for sustainability, native yield, subsurface flow, and evapotranspiration. The further development of the data management system to improve data access and transparency.	✓	✓	✓		Supporting data collection, reviewing and validating results with GSA-specific data.	NA	NA	Ongoing	NA	2025	2025-	0	0				✓		NA	\$25,000	\$0	District	

Table 6-1. Water Management Objectives

P/MA Number	P/MA Name	Summary Description	Relevant Sustainability Indicators Affected			Overdraft Correction Description Category	Circumstances for Implementation	Public Noticing Process	Permitting and Regulatory Process Requirements	Status	Timetable / Circumstances for Initiation	Timetable for Completion	Timetable for Accrual of Expected Benefits	Expected Benefits							Source(s) of Water, if applicable	Legal Authority Required	Estimated Costs				
			Groundwater Levels & Storage	Groundwater Quality	Land Subsidence									Primary (AFY)		Secondary							One-time Costs	Ongoing Costs (per year)	Potential Funding Source(s)		
														Water Supply Augmentation	Demand Reduction	Water Quality Improvement	Flood Control	Water Management Flexibility / EIS Agency	Mitigation Programs	Data Gap Filling/Monitoring							
Management Actions		Implemented	Functional	In-Process	As-Needed								Implemented	Functional	In-Process	As-Needed											
SWSD-17	Tiered Pricing for Groundwater Pumping	Develop pricing structure to incentivize groundwater users to manage groundwater extractions to SWSD-16 landowner budgets.	✓	✓	✓	Demand Reduction	Implementation of SWSD-16	Semitropic GSA Board Meetings & Website	218 Process	Ongoing	Current	2025	2025-	0	33,000			✓	✓		NA	District / SGMA authorities	\$100,000	\$25,000	District		
KSB-7	Well Registry	An ongoing effort to update and maintain the Subbasin well inventory and translate it into a well registry. Information will be updated and housed within the Subbasin data management system.	✓	✓	✓			Refer to Subbasin Outreach and Engagement Plan	NA	Ongoing	NA	2024-	2024-	0	0				✓	✓		NA	NA	\$0	\$25,000	District	
KSB-8	Consumptive-Use Study	Maintain and improve existing Subbasin consumptive-use study (ITRC Metric/LandIQ) for accurate estimates of water use by parcel within GSA's.	✓	✓	✓			Refer to Subbasin Outreach and Engagement Plan	NA	Ongoing	NA	2020-	2020-	0	0					✓	✓		NA	NA	\$0	\$25,000	District
KSB-9	California Aqueduct Subsidence Action Plan	Subbasin has developed an Action Plan for Subsidence Interim Milestone (IM) & Minimum Threshold (MT) Exceedances which requires GSAs to evaluate and initiate targeted P/MAs to reduce GSA-related subsidence. As part of this P/MA, GSAs located within or proximate to the CASP 5-mile wide Monitoring Corridor to the California Aqueduct may initiate targeted P/MAs should future observed subsidence rates exceed IMs and MTs.	✓		✓		When an subsidence IM/ MT exceedance occurs.	NA	NA	Ongoing	In-process	Ongoing															
KSB-10	RMW Data Gaps	An assessment of level and quality data gaps identified RMN data gaps for water levels and quality. Identified data gaps will be evaluated and addressed by the end of 2026 as specified in Section 15.	✓	✓	✓	NA	NA	NA	Permitting will be required if new wells need to be drilled	Ongoing	NA	2026	2026-	0	0						✓		NA	NA	Unknown at this time	Unknown at this time	Unknown at this time
SWSD-18	District Following Program	Support land following as a District action and by individual landowners or groups of landowners.	✓	✓	✓	Demand Reduction	Implementation of SWSD-16	Semitropic GSA and District Board CEQA compliant process	CEQA	As needed	Current	2040	2040-	0	TBD			✓	✓			District authorities	TDB	\$0	District		

7. Quantify the Efficiency of Agricultural Water Use

7.1. Total Water Use Fraction

The efficiency of agricultural water use within SWSD was quantified using the Total Water Use Fraction method as detailed in “A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use” (DWR, 2012). The evapotranspiration of applied water (ETAW) was first calculated using evapotranspiration (ET) and agricultural irrigated acreage data obtained from Land IQ and precipitation data from CIMIS Station 5 for 2021-2025 and in-district measurements for 2025 using the following equation:

$$ETAW = ET_{Total} - P_e$$

Where:

ET_{total} = total crop evapotranspiration of all agricultural irrigated land uses within SWSD

P_e = effective precipitation on all agricultural irrigated lands within the SWSD

Due to the limited amount of rainfall recorded in the area, the relatively flat topography, and relatively permeable soil types in SWSD, all precipitation was considered effective precipitation. Therefore, P_e was calculated as the measured total annual rainfall multiplied by the total acreage of agricultural irrigated lands. ET, P_e , and the calculated ETAW for each plan year are shown in Table 6-1. Within the district, the irrigated lands represent those lands actively irrigated within a calendar year, which differs from the district’s developed agricultural lands, which are those lands that pay the General Project Service Charge. Differences result from changes in cropping practices, temporary land fallowing, and other landowner management decisions.

Table 7-1. Evapotranspiration of Applied Water for Agricultural Lands

Plan Year	Total ET	Effective Precipitation (af)	ETAW
	(af)		(af)
2021	367,523	56,786	310,737
2022	361,436	40,137	321,299
2023	369,462	109,535	259,927
2024	371,651	79,225	292,426
2025	352,438	73,313	279,125

The total water use fraction (TWUF) was then calculated using the following equation:

$$TWUF = (ETAW + AU + EU)/AW$$

Where:

ETAW = the calculated evapotranspiration of applied water

AU = the portion of applied water directed for salinity management, climate control, seed germination, etc.

EU = the portion of applied water directed to environmental purposes (i.e. Duck clubs in SWSD)

AW = the total quantity of water that was applied within the SWSD service area

As there is no significant agronomic use within the district, this value was set to zero. The ETAW, AU, EU, AW and calculated TWUF for each plan year are in Table 6-2.

Table 7-2. Total Water Use Fraction

Plan Year	ETAW	Agronomic Use (af)	Environmental Use (af)	Applied Water (af)	Total Water Use Fraction
	(af)				
2021	310,737	0	4,349	364,806	0.86
2022	321,299	0	3,743	377,338	0.86
2023	259,927	0	5,897	304,756	0.87
2024	292,426	0	4,171	343,294	0.86
2025	279,125	0	2,678	327,909	0.86

8. Climate Change

8.1. Effects of Climate Change on Water Demand and Supply

SWSD heavily relies on imported surface water, groundwater pumping, and groundwater banking, all of which are sensitive to climate-driven changes. The impacts of climate change on water supplies used in the district are assessed using datasets developed by DWR to assist local agencies to develop groundwater sustainability plans under the SGMA program. The datasets were generated from an ensemble of 20 global climate models selected by the DWR Climate Change Technical Advisory Group (CCTAG) as the most appropriate projections for California water resources evaluation and planning (DWR CCTAG, 2015). The datasets are provided at a spatial resolution of 1/16th degree (approximately 3.75-mile grid cells) over California for each calendar month from January 1915 through December 2011. The Variable Infiltration Capacity (VIC) hydrologic model has been used with the climate projection datasets to simulate future changes in streamflow at the outlet of subbasins defined by each 8-digit Hydrologic Unit Code (HUC) in California. The flows are also entered into the CalSim II model to simulate operations of SWP and the CVP.

In the scenarios analyzed in the Semitropic GSP, the anticipated effects of climate change are projected to reduce the reliability of State Water Project (SWP) and Central Valley Project (CVP) deliveries, resulting in a decline in available water volumes. The 2023 SWP Delivery Capability Report further indicates that average SWP deliveries are projected to decrease by about 10 percent by 2043, with deliveries during dry and critically dry years declining by roughly 20 percent over the same period.

Table 7-1 shows projected changes in major Semitropics water supply sources under 2030 and 2070 conditions. The 2030 and 2070 projections are obtained from the Model and Water Budget Documentation Appendix of the 2025 Kern County Subbasin GSP.

Table 8--1. Projected Changes in Major Water Supply Sources Under 2030 and 2070 Conditions

Water Supply Source	Projected Availability (AF/Year)		
	Current Conditions	2030 Conditions	2070 Conditions
State Water Project – Table A	83,700	93,000	85,572
State Water Project – Article 21	6,780	3,300	3,395
Imports, transfers & exchanges	53,760	21,400	20,197

SWSD’s current water supply source conditions are 83,700 AFY of SWP Table A water, 6,780 AFY of Article 21 supplies, and 53,760 AFY from imports, transfers, and exchanges. Article 21 and supplemental (transfer and exchange) supplies are inherently variable; therefore, their values under current conditions are based on a 10-year average of district activities.

Under projected climate impacts—including reduced snowpack, earlier runoff, and Delta export constraints—SWP Table A deliveries are expected to gradually decline to about 93,000 AFY by 2030 and 85,572 AFY by 2070.

In addition to Table A supplies, SWSD relies on a diverse set of Supplemental Supplies, which include Article 21 water, Section 215 water, transfers, exchanges, and leave-behind water from banking partners. These supplemental sources averaged approximately 71,830 AFY as of 2024 and remain an essential component of the district’s conjunctive-use and groundwater banking operations.

Collectively, these trends indicate that SWSD's long-term sustainability will increasingly rely on its ability to manage declining SWP reliability, secure imported supplies, and maintain recharge and banking operations in the fight against climate-related reductions.

These predictions reinforce the ongoing need for SWSD's approach to water management—with surface-water imports, groundwater banking, demand reduction programs, and implementation of SGMA-compliant water budgets. As SWP reliability decreases under future climate conditions, SWSD’s ability to secure supplemental sources, utilize its groundwater bank, and implement targeted demand-management actions will remain important to achieving and maintaining long-term groundwater sustainability across the district.

8.2. Response to Effects of Climate Change

Semitropic Water Storage District continues to track emerging climate trends that influence both regional water availability and on-farm growing conditions. The district’s priority is to make the most effective use of its surface-water allocations, supplemental imported supplies, and groundwater resources in order to reliably serve agricultural water users.

Semitropic’s long-standing strength is its approach to surface-water management and groundwater banking. The district continues expanding recharge operations, improving conveyance, and enhancing return-capacity infrastructure—all of which allow the district to store greater volumes of water during wetter periods. In addition to SWP Table A deliveries, Semitropic relies on a few supplemental supplies—including transfers, exchanges, Article 21, and water from banking partners. These help stabilize water supply in dry water years, when surface-water imports decline. These supplemental sources have become an increasingly important component of the district’s strategy for maintaining water reliability under climate-driven variability.

Research efforts across the region are focused on developing crop varieties and management tools that can help farmers adapt to long-term temperature increases and declining chill hours. Semitropic’s water-management framework is designed to provide flexibility so that growers can make these adjustments while staying within the district’s SGMA-compliant water-use requirements.

Through participation in the Poso Creek Integrated Regional Water Management Group, Semitropic works alongside neighboring agencies to implement regional solutions that improve resilience to climate change. Strategies emphasized by the RWMG include:

- Expanding opportunities for in-lieu recharge by delivering more surface water to areas reliant on groundwater
- Promoting urban and agricultural water-use efficiency

- Increasing recharge and banking capacity to capture high-flow events
- Supporting crop shifts toward climate-tolerant varieties

These efforts are essential not only as a climate-adaptation strategy but also as a response to the significant surface-water shortages that already challenge the district.

Shifts in climate directly affect the district's water-supply reliability because the district depends on a mix of imported water, supplemental supplies, recharge opportunities, and groundwater pumping . Semitropic will continue to rely on flexible, adaptive management practices as climate conditions evolve, ensuring that the district remains capable of responding to increasingly variable water-supply conditions in the years ahead.

9. Efficient Water Management Practices

9.1. EWMP Implementation and Reporting

Table 9-1 describes the Efficient Water Management Practices (EWMPs) implemented in SWSD and identifies the EWMPs planned. Each EWMP is sequenced with the same number referenced from the DWR publication A Guidebook to Assist Agricultural Water Suppliers.

Table 9-2 of this report provides an estimate of efficiency improvements that have occurred since the last AWMP. Table 9-3 identifies an implementation schedule, finance plan, and budget allotment for EWMPs implemented by SWSD. Although the district does not explicitly budget for each EWMP, it does maintain an annual budget for capital improvements and general operations. The district has identified the type of district Staff that is responsible for implementing each EWMP and has also identified the type of funding that supports implementing the EWMP.

Table 9-1. Report of EWMPs Implemented/Planned

EWMP No.*	Description	EWMP Implemented	EWMP Planned
Critical EWMPs			
1	<p><i>Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2) of the legislation.</i></p> <p>Description: All deliveries to growers are metered at the farm turnout. Typical farm turnouts serve 160 acres although some serve areas as small as 20 acres. Water usage is reported to growers in their monthly invoices. In this regard, the district has implemented a water accounting system (Water Information Management System) that enhances the district's ability to provide detailed and timely data on water usage.</p> <p>The district is committed to comply with the requirements of SBx7-7 by verifying the accuracy of measurement of irrigation water deliveries using the methodology described in Section 10 of this report.</p>	X	
2	<p><i>Adopt a pricing structure for water customers based at least in part on quantity delivered.</i></p> <p>Description: The district charges water users based on the volume of water delivered.</p>	X	

Table 9-1. Report of EWMPs Implemented/Planned

EWMP No.*	Description	EWMP Implemented	EWMP Planned
Conditional EWMPs			
1	<p><i>Facilitate alternative land use for lands with exceptionally high water duties or whose irrigation contributes to significant problems, including drainage.</i></p> <p>Description: The district will continue to support voluntary land retirement as a means of reducing local demands upon the groundwater basin. Since 2015 the nearly 20,000 irrigated acres have been fallowed.</p>	X	
3	<p><i>Facilitate financing of capital improvements for on-farm irrigation systems.</i></p> <p>Description: The district provides financial support to the local Resource Conservation District (RCD), which conducts on-farm testing regarding irrigation management practices. These services are available upon request to the Resource Conservation District, subject to their staffing capabilities. In addition, the district has received additional funding through the NRCS for conversion of on-farm irrigation systems to drip; \$1M in 2011 and approximately \$1M in 2015. Regarding conjunctive use improvements, the district has facilitated the construction of pipelines connecting landowner wells to the district's distribution/conveyance system. Typically, this has been done to allow district use of the well for conjunctive use and banking purposes when not needed for landowner purposes. district use is governed by an agreement with the given landowner.</p>	X	

Table 9-1. Report of EWMPs Implemented/Planned

EWMP No.*	Description	EWMP Implemented	EWMP Planned
4	<p><i>Implement an incentive pricing structure that promotes one or more of the following goals: (A) more efficient water use at the farm level; (B) conjunctive use of groundwater; (C) appropriate increase of groundwater recharge, (D) reduction in problem drainage; (E) improve management of environmental resources; (F) effective management of all water sources throughout the year by adjusting seasonal pricing structures based on current conditions.</i></p> <p>Description: Historically, the district sets the price of water such that it is competitive with the cost to produce groundwater, i.e., the district encourages the use of imported surface water supplies when they are available, so as to reduce groundwater pumping (which amounts to in-lieu recharge).</p> <p>The Semitropic Water Storage District GSA has also adopted and begun implementation of the Landowner Water Budgets Management Action under SGMA. This management action allocates the water supply of the district, including the Native Supply (including native groundwater supplies defined under SGMA [see attached Semitropic GSP), to each landowner based on their landowner class. The water budgets derived for landowners within this management action will define the required reduction in consumptive water demand and associated groundwater extractions as necessary to meet consumptive water demand within the district.</p>	X	

Table 9-1. Report of EWMPs Implemented/Planned

EWMP No.*	Description	EWMP Implemented	EWMP Planned
5	<p><i>Expand line or pipe distribution system, and construct regulatory reservoirs to increase distribution system flexibility and capacity, decrease maintenance and reduce seepage.</i></p> <p>Description: When originally constructed, the district's main conveyance facilities, all open canals, were unlined. However, over the years, the district has gradually installed concrete lining. Recently the district completed lining of the Pond Poso Canal, eliminating canal seepage when utilizing district groundwater wells for groundwater recovery operations. The district completed additional in-lieu distribution systems and canal conveyance improvements since the initial AWMP.</p>	X	
6	<p><i>Increase flexibility in water ordering by, and delivery to, water customers within operational limits.</i></p> <p>Description: The district's ability to operate on an on-demand basis is limited, in as much as the district's source of surface water, the State Water Project, does not provide flexibility to the district in the water that it orders and receives. In addition, the district has limited capacity in its distribution system to regulate mismatches in supply and demand. Nevertheless, during the off-peak period the district has sufficient control of water levels in its canals to provide some flexibility in water deliveries.</p>	X	
7	<p><i>Construct and operate supplier operational outflows and tailwater recovery systems.</i></p> <p>Description: The district operates three spillway basins, two located at the ends of canals to capture emergency spills and return this water to the distribution system and one on the intake canal that can be pumped back into the canal. As a result, there is no uncontrolled spillage into Poso Creek. Farm tailwater is handled by individual growers through their own on-farm tailwater recovery systems.</p>	X	

Table 9-1. Report of EWMPs Implemented/Planned

EWMP No.*	Description	EWMP Implemented	EWMP Planned
8	<p><i>Increase planned conjunctive use of surface water and groundwater within the supplier service area.</i></p> <p>Description: The district was originally based on conjunctive use of surface water and groundwater. Over the years, these conjunctive use practices have greatly expanded and now include providing water banking service to other agencies. The district continues to expand its conjunctive use practices by supporting installation of landowner subsurface recharge infrastructure, which allows the landowner to recharge groundwater without impacting surface farming operations.</p>	X	
9	<p><i>Automate canal control structures.</i></p> <p>Description: The district has upgraded its SCADA facilities to provide better measurement and control of water. The resulting increased reliability of water delivery will help the district and growers to reduce the use of pumps. Given the complex and variable nature of their operations, full automation would not be effective; however, at this time water level control in District canals is adequate to provide operational flexibility during off-peak periods.</p> <p>In 2020 the district completed installation of a bi-directional meter at the 120-inch line (ST3) where it enters the stored water recovery unit. This allows the district to verify the integrity of the ST3 deliveries from the California Aqueduct.</p>	X	
10	<p><i>Facilitate or promote customer pump testing and evaluation.</i></p> <p>Description: The district has installed water flow meters on all district-owned pumps, but does not allocate a portion of budget or capital for on-farm improvements. The district promotes testing of meters by external entities and provides some minor services (e.g. video inspection) for wells.</p>	X	

Table 9-1. Report of EWMPs Implemented/Planned

EWMP No.*	Description	EWMP Implemented	EWMP Planned
11	<p><i>Designate a water conservation coordinator who will develop and implement the water management plan and prepare progress reports.</i></p> <p>Description: The function of Water Conservation Coordinator is performed by the district Engineer.</p>	X	
12	<p><i>Provide for the availability of water management services to water users.</i></p> <p>Description: Since 2017, the district has provided detailed ET data by month and by parcel for each landowner within the district along with ET data by specific crop.</p> <p>The district provides water management services to customers that include maintaining a district website, maintaining an engineering and operations staff, and providing funding support for a mobile irrigation evaluation laboratory.</p>	X	
13	<p><i>Evaluate the policies of agencies that provide the supplier with water to identify the potential for institutional changes to allow more flexible water deliveries and storage.</i></p> <p>Description: The district receives surface water from the SWP, contracted with KCWA, and is party to turn-in agreements and point-of-delivery agreements with DWR. The district occasionally receives "215 water" from Reclamation; however, the Friant San Joaquin River Settlement has affected the availability of this supply. The district has completed an environmental document that allows for banking, transfer, and exchange of available water supplies with neighboring districts with federal and state water contracts.</p>	X	
14	<p><i>Evaluate and improve the efficiencies of the supplier's pumps.</i></p> <p>Description: The district is investigating opportunities to replace the PG&E pump testing program that was previously terminated. The district owns and operates a well drilling rig and a well service rig.</p>	X	

OTHER Optional EWMPs

Table 9-1. Report of EWMPs Implemented/Planned

EWMP No.*	Description	EWMP Implemented	EWMP Planned
1999 AWMC MOU B-4	<p><i>Facilitate voluntary water transfers.</i></p> <p>Description: The district has supported the transfer of a landowner's SWP water from another district into the Semitropic; given they are a landowner in both districts, i.e., the water would be moved from the landowner's land in another district to the landowner's holdings in Semitropic. These transfers have been on a case-by-case and year-by-year basis and also require approval of KCWA. Semitropic has also allowed landowners to move their SWP water around within the district; however, this involves the same landowner moving water from one of his parcels in SWSD to another. Semitropic also allows landowners to use the district's conveyance system to wheel water within the district in the same manner.</p>	X	

Table 9-1. Report of EWMPs Efficiency Improvements

Corresponding EWMP No.*	EWMP	Estimated Water Use Efficiency Improvements That Occurred Since Last Report (December, 2013)	Estimated Water Use Efficiency Improvements 5 and 10 years in Future
1	Alternate Land Use	Prior to the 2013 Plan, the district converted 800 acres of irrigated land to spreading basins for use as a direct recharge and recovery facility. Since 2013, the district has retired 1,148 irrigated acres. Since early 2000's, district has retired over 11,377 irrigated acres.	District owns 960 acres of irrigated land that can be converted to spreading basins to add capacity to their direct recharge and recovery facility. The district is considering additional purchases of irrigated land to remove from production (i.e. retire irrigated lands) to reduce demand.
2	Recycled Water Use	In the past, limited opportunities existed for recycled water use within the district.	The district will continue to evaluate the feasibility of projects to reclaim and reuse naturally impaired groundwater. The district also plans to look into different technologies to "treat" water from bad WQ wells in the district, which may lead to a recycled water project.
3	On-Farm Irrigation Capital Improvements	In 2015, the district obtained over \$1M for Growers to convert on-farm irrigation systems to drip through the NRCS EQIP program.	District will apply for grants to obtain funding for Growers to convert on-farm irrigation systems to drip through the NRCS EQIP program.
4	Implement an incentive pricing structure	Consistent with SGMA requirements the district implemented the Landowner Water Budget management action.	Charges for groundwater use in excess of the District-wide average will increase the efficient use of surface and groundwater supplies in the district.

Table 9-1. Report of EWMPs Efficiency Improvements

Corresponding EWMP No.*	EWMP	Estimated Water Use Efficiency Improvements That Occurred Since Last Report (December, 2013)	Estimated Water Use Efficiency Improvements 5 and 10 years in Future
5	Infrastructure Improvements	District completed equipping existing wells to increase return capacity and added additional pumps, motors, and VFDs at strategic locations to reduce bottlenecks in conveyance.	District will continue to equip existing wells and add additional pumps, motors, and VFDs at strategic locations to reduce bottlenecks in conveyance. The district added 1 MW solar facility in 2020; implemented a well telemetry project to be completed in 2021; added second point of service with PGE (Pond Rd Substation) in 2018/19; initiated construction of the Cox Canal Pump Station in 2020 to improve interconnection with neighboring Buena Vista Water Storage District (BVWSD) and completed interconnection with BVWSD at the 120-inch line in 2017.
6	Order/Delivery Flexibility	Nothing to report.	Nothing to report.
7	Supplier Operational Outflow and Tailwater Systems	Nothing to report.	Nothing to report.
8	Conjunctive Use	Prior to the 2013 update, the district added two in-lieu distribution systems in area that were served by groundwater only.	District completed construction of several additional in-lieu systems of System X, Y, and Z.
9	Automated Canal Controls	District continues to complete improvements to SCADA system and link operations to water ordering.	District will continue to implement automated canal controls that allow staff to monitor operations and multi-task.

Table 9-1. Report of EWMPs Efficiency Improvements

Corresponding EWMP No.*	EWMP	Estimated Water Use Efficiency Improvements That Occurred Since Last Report (December, 2013)	Estimated Water Use Efficiency Improvements 5 and 10 years in Future
10	Customer Pump Test/Evaluation	N/A	N/A
11	Water Conservation Coordinator	District Staff assignment.	District will continue to support by assigning this responsibility to a District Staff person.
12	Water Management Services to Customers	District has maintained and improved communication with Growers during the drought.	District to consider additional water purchases and develop water supply projects to improve long-term water balance in-district.
13	Identify Institutional Changes	District utilized a recently completed environmental document with neighboring SWP, CVP, and Kern River Contractors that allows the districts to bank, transfer, and exchange surface water supplies for 25 years.	District to participate in developing regional groundwater management plans with neighboring districts in accordance with the State of California, Sustainable Groundwater Management Act.

Table 9-2. Schedule to Implement EWMPs

EWMP No.¹	Description	Implementation Schedule	Finance Plan	Budget Allotment²
<i>Critical EWMPs</i>				
1	Water Measurement	On-going service	Operations	District Staff Time
2	Volume-Based Pricing	On-going service	Operations	Management
1	Alternate Land Use	On-going service	Capital Improvement	Board Approved Opportunities
2	Recycled Water Use	To be considered	Capital Improvement	District Staff / Planning Funds
3	On-Farm Irrigation Capital Improvements	On-going service	Private or NRCS Funding	Grant Funded Opportunities
4	Incentive Pricing Structure	On-going service	Operations	District Staff
5	Infrastructure Improvements	Already Implemented and On-going service	Capital Improvement	District Staff and Grant Funded Opportunities
6	Order/Delivery Flexibility	Already Implemented	Operations	District Staff and SCADA Improvements
7	Supplier Operational Outflow and Tailwater Systems	Already Implemented	Operations	District Staff
8	Conjunctive Use	On-going service	Capital Improvement	District Staff and Grant Funding
9	Automated Canal Controls	Already Implemented	Operations	District Staff and SCADSA Improvements
10	Customer Pump Test/Evaluation	On-going service	Operations	District Staff
11	Water Conservation Coordinator	On-going service	Operations	District Staff
12	Water Management Services to Customers	On-going service	Operations	District Staff
13	Identify Institutional Changes	On-going service	Operations	Management
14	Supplier Pump Improved Efficiency	On-going service	Operations	District Staff
NA	Improve Communication Among Suppliers	On-going service	Operations	N/A

Table 9-2. Schedule to Implement EWMPs

EWMP No.¹	Description	Implementation Schedule	Finance Plan	Budget Allotment²
NA	Facilitate Voluntary Water Transfers	On-going service	Operations	N/A

¹ EWMP numbers correspond to Water Code §10608.48(c).

² The district has allocated a percentage of the annual budget to cover implementation of the EWMPs under the operations and capital improvements projects.

10. Water Measurement Documentation

10.1. Description of Water Measurement Best Professional Practices

Section 10608.48(b) of the California Water Code requires that agricultural water suppliers governed by this section of the code, “Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10” of the legislation. Further, Section 531.10(a) requires that, “An agricultural water supplier shall submit an annual report to the department (DWR) that summarizes aggregated farm-gate delivery data, on a monthly or bi-monthly basis, using best professional practices.”

Semitropic’s ability to comply with these requirements rests on the fact that all irrigation deliveries made by SWSD are measured to support the district’s volumetric water pricing to its customers. All district deliveries are made through piped turnouts, with the diameters of the pipes ranging between 6 and 14 inches.

Deliveries at farm turnouts are measured with propeller flowmeters manufactured by Water Specialties. The propeller meters are mounted within the turnout piping following accepted engineering practices and measure flow rates and also record the total volume of water delivered.

Data on volumes of delivered water recorded by SWSD are updated daily. System operators enter water delivery readings into the district’s water management software by selecting the appropriate turnout on their tablet and entering the reading from the water meter. The information is uploaded into the district’s water management software daily and reviewed by a supervisor as a quality control procedure. Irrigated acreage is determined based upon an annual crop survey conducted each spring. These crop reports include information obtained directly from water users that identify the crop type, irrigation method and acreage. The irrigated acreage values are verified by checking the acreage identified in the Semitropic Assessor’s Parcel Number database and are field confirmed by Semitropic field staff. As all turnouts at Semitropic deliver water to grouped acres, potentially more than one field, there is a direct correspondence to the size of a turnout and the number of acres served by that turnout.

Water delivery data are made available to water users whenever it is requested throughout the season, which enables irrigators to monitor their water usage. SWSD’s billing system uses the pricing structure adopted by Semitropic’s Board of Directors and the flowmeter readings at a given farm turnout to determine the water bill associated with district deliveries through that turnout.

10.2. Engineer Certification and Apportionment Requirement for Water Measurement

The methodology used to determine the individual device accuracy values found in Section 597.3(a) will be verified by a Professional Engineer using industry accepted standards. These methods will take into account the differential in water levels and/or fluctuations in the flow rate or velocity during the delivery event and the type, size and characteristics of the measuring device being verified.

Flow meters at each farm turnout measure SWSD deliveries to each irrigator's place of use. The flow meter indicates the cumulative total of water delivered with the instantaneous flow rate calculated by an on-board "totalizer" device. In practice, meters are only repaired or replaced when a meter is observed to be malfunctioning or when a water user questions a meter's accuracy. In the latter case, if the questioned flow meter is tested and found to be within an acceptable accuracy then the water user must pay for the testing process. Conversely, the district will fund the process to repair or replace the flow meter if the flow meter is not within an acceptable accuracy range.

Semitropic has adopted a methodology for testing existing flow meters in a District Testing Facility and presents a report approved by a California-registered Professional Engineer as the basis for ongoing compliance with SBx7-7. The methodology is presented later in this section.

10.3. Documentation of Water Measurement Conversion to Volume

SBx7-7 requires an annual volumetric accuracy of within ± 12 percent on existing devices. Since flow measurement devices at Semitropic include totalizers (which directly record cumulative flow volume), the devices' accuracy in measuring flow rates is representative of their ability to measure volumetric deliveries. Therefore, the discussion presented later in this section that relates testing the accuracy of measurement of flow rates applies equally to determination of the accuracy of measurement of volumes of delivered water.

10.4. Legal Certification and Apportionment Required for Water Measurement Lack of Legal Access to the Farm-gate

Semitropic staff has legal access to install, measure, maintain, operate and monitor measurement devices at all farm delivery points, also referred to as "farm gates" within the district. Therefore there are no institutional or legal impediments that restrict access to turnouts or measurement of water and, for the purposes of satisfying SBx7-7, there is no need to measure water upstream of points of delivery to individual customers.

10.5. Device Corrective Action Plan Required for Water Measurement

Semitropic has approved \$20,000 per year in its Water Operations Budget program for this activity, including the budget allocation of \$242,000 for construction of a Meter Testing Facility to assess and improve the accuracy of SWSD's flow meters and measurement devices. Semitropic will monitor this activity on an ongoing basis to determine whether this level of effort is sufficient and effective, and will adjust, as needed, to meet the compliance schedule. The time frame for compliance allowed in the regulation can be met with staff resources and the grant funding received to finish construction of the Meter Testing Facility.

Devices identified to have measurement accuracies that departed by more than ± 12 percent from flows measured by the Testing Facility will be sent to the district shop for assessment. If the meter is older (i.e. installed over 20 years prior to test date) it will be replaced, otherwise the shop will make an attempt at repairing the meter. If the shop cannot correct the inaccuracy in flow measurement, the device will be

replaced. After installation in the field, the accuracy of repaired meters will be verified using a calibrated device, and an affidavit will be submitted by a California-registered Professional Engineer certifying the accuracy of each repaired meter to be within ± 10 percent by volume. New replacement meters will be laboratory certified by their manufacturer prior to installation to have an accuracy measurement within ± 6 percent by volume. Repair or replacement of these flow meters will be completed within three years of approval of this testing program by the DWR. If approved, the meter testing program is being scheduled to be completed along with other programs and projects that Semitropic is engaged in that are high priority such as distribution system maintenance, expansion of the Groundwater Banking Program, and other planned capital improvements.

10.6. Farm Gate Measurement and Device Accuracy Compliance

SBx7-7 requires that agricultural water suppliers measure the volume of water delivered to customers with sufficient accuracy to comply with certain standards described in the legislation. These standards are described below:

10.6.1. Measurement Options at the Delivery Point or Farm-gate of a Single Customer

An agricultural water supplier shall measure the volume of water delivered at the delivery point or farm-gate of a single customer. If a device measures a value other than volume, for example, flow rate, velocity or water elevation, the accuracy certification must incorporate the measurements or calculations required to convert the measured value to volume. An existing measurement device shall be certified to be accurate to within ± 12 percent by volume.

10.6.2. Initial Certification of Device Accuracy

For existing measurement devices, the device accuracy shall be initially certified and documented by either:

- a. Field-testing that is completed on a random and statistically representative sample of the existing measurement devices. Field-testing shall be performed by individuals trained in the use of field-testing equipment and documented in a report approved by an engineer.*
- b. Field-inspections and analysis completed for every existing measurement device. Field-inspections and analysis shall be performed by trained individuals in the use of field inspection and analysis, and documented in a report approved by an engineer.*

10.6.3. Protocols for Field Testing

Field-testing shall be performed for a sample of existing measurement devices according to manufacturer's recommendations or design specifications and following best professional practices. It is recommended that the sample size be no less than 10 percent of existing devices, with a minimum of 5,

and not to exceed 100 individual devices for any particular device type. Alternatively, the supplier may develop its own sampling plan using an accepted statistical methodology.

If during the field-testing of existing measurement devices, more than one quarter of the samples for any particular device type do not meet the relevant accuracy criteria, the agricultural water supplier shall provide in its Agricultural Water Management Plan a plan to test an additional 10 percent of its existing devices, with a minimum of 5, but not to exceed an additional 100 individual devices for the particular device type. This second round of field-testing and corrective actions shall be completed within three years of the initial field-testing.

Field-inspections and analysis protocols shall be performed and the results shall be approved by an engineer for every existing measurement device to demonstrate that the design and installation standards used for the installation of existing measurement devices meet the relevant accuracy standards and that operation and maintenance protocols meet best professional practices.

10.6.4. Semitropic WSD Program for Compliance with Water Measurement Requirements

SBx7-7 offers the water supplier the opportunity to “develop its own sampling plan using an accepted statistical methodology”. Following completion of the meter testing facility described above, Semitropic plans to test all flow meters on a regular basis with the testing cycle initially focusing on the oldest meters active in SWSD and those delivering the largest volumes of water. Before adopting this testing program, the district will confirm with DWR that the program satisfies the requirements of SBx7-7.

The testing approach proposed by SWSD responds to the condition that of the 1,200 total number of meters in the district, approximately 19 percent of them are over 20 years old. Due to their age, these meters are assumed to contain the flow meters most likely to be outside the acceptable ± 12 percent accuracy limit imposed by SBx7-7. Therefore, rather than relying on a random selection of measurement devices, Semitropic proposes to begin their testing program by concentrating on the turnouts most likely to be out of compliance with the accuracy requirements of SBx7-7. Semitropic believes that selection of this stratified sample population will generate the greatest benefits with respect to improving measurement accuracy from operation of their new testing facility. The likely outcome would be a selection of 10 percent of the total number of turnouts from this population based on age, working from the oldest turnout moving towards the newest that represents the assumed lowest accuracy value from district turnout sampling. As noted above, the sampling design is to ensure the district tests and finds any problematic flow meters sooner than later in using the newly constructed in-district Meter Testing Facility.

To develop a methodology where the selected samples also account for the volume of water delivered, in effect the specific turnout size, the total number of samples assessed will be increased until the representative amount of each size is approximately equal. This may result in a selection of turnouts greater than 10 percent of the total number within SWSD. There are only four different sized flow meters used by the district, with only one meter per turnout.

A preliminary estimate indicates that, when accounting for turnout age and size as described above, at least 19 percent of the district's turnouts would likely be assessed to perform the compliance testing. The sequence of steps proposed to identify a representative population of turnouts for verification of flow measurement is as follows:

Step 1: *Formulate a list of meters* together with the relative age and volume of water supplied by each turnout (i.e. size of turnout, of four different sizes from Table 52).

Step 2: *Select the set of oldest meters* that represents at least 10 percent of the total number of district turnouts. Once a particular device is selected, that device would be designated for testing and the numbers associated with that device will be withdrawn from the pool available for future selection. This procedure will be followed until devices that represent approximately 10 percent of the Semitropic turnouts and an approximately equal number of the four different sized turnouts are identified for testing.

This procedure improves upon the example given in §597.4(b)(1) of the legislation, in that devices representing the oldest turnouts will be selected for opportunity sampling or a preferred sample population rather than a simple random sample of devices that would have simply represented all functioning turnouts in the district. As stated above, this approach supports the purpose to find the turnouts with meters most likely to be outside an acceptable ± 12 percent accuracy limit imposed by SBx7-7 by testing the older metered turnouts first.

Step 3: *Evaluate selected meters and record data*, at the district Testing Facility. Flow measurement devices at turnouts selected for testing in Step 3 will be evaluated by Semitropic for accuracy and measured accuracy will be retained for ten years or two AWMP cycles as per §597.4(c).

Step 4: *Determination of compliance*. Semitropic will estimate the annual volumetric accuracy of measurement of the selected sample of flow measurement devices. The district will expand their number of turnout samples if the accuracy is determined to be outside the limit imposed by SBx7-7 to determine the extent of any measurement issues. Non-compliant turnouts will be repaired or replaced by the district.

11. Demonstration of Reduced Reliance on the Delta

The Delta Plan provides a regulatory process for activities that qualify as “covered actions.” The Delta Reform Act established a self-certification process for demonstrating consistency of “covered actions” with the Delta Plan. State and local agencies proposing “covered actions,” prior to initiating the implementation of that action, must prepare a written certification of consistency with detailed findings as to whether the covered action is consistent with applicable Delta Plan policies and must submit that certification to the Delta Stewardship Council (DSC).

As SWSD is anticipating participating in various projects that would be considered “covered actions”, including multi-year water transfers, conveyance facilities, or new diversions that involve transferring water through or exporting water from the Delta, it has elected to prepare a demonstration of its consistency with the Delta Plan and Delta Reform Act. The data and information provided herein is consistent with Section (c)(1) of Policy WR P1, Reduced Reliance on the Delta Through Improved Regional Water Self-Reliance.

To comply with WR P1, the regulation specifies that water suppliers have done the following: (see 23 CCR Section 5003 (c)):

- (A) Completed a current Urban or Agricultural Water Management Plan (Plan) which has been reviewed by the Department of Water Resources for compliance with the applicable requirements of Water Code Division 6, Parts 2.55, 2.6, and 2.8;
- (B) Identified, evaluated and commenced implementation, consistent with the implementation schedule set forth in the management Plan, of all programs and projects included in the Plan that are locally cost effective and technically feasible which reduce reliance on the Delta; and,
- (C) Included in the Plan, commencing in 2015, the expected outcome for measurable reduction in Delta reliance and improvement in regional self reliance. The expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance shall be reported in the Plan as the reduction in the amount of water used, or in the percentage of water used from the Delta watershed. For the purposes of reporting, water efficiency is considered a new source of water supply, consistent with Water Code Section 1011(a)

The following information provides “self-certification” of the SWSD’s compliance with Delta Reform Act and each of the three criteria listed above from WR P1.

11.1. Completion of an Agricultural Water Management Plan (23 CCR Section 5003 (c)(1)(A))

SWSD has prepared this 2025 Agricultural Water Management Plan update, in compliance with Water Code §10800 – 10853 (the Agricultural Water Management Planning Act), which requires agricultural water suppliers to submit to the DWR an Agricultural Water Management Plan that addresses the

elements listed in Water Code §10826. An agricultural water supplier is defined as a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding the acreage that receives recycled water.

The AWMP has been approved by SWSD’s Board of Directors and submitted to DWR according to the schedule presented in Table 1-1.

11.2. Implementation of Locally Cost-Effective Projects (23 CCR Section 5003 (c)(1)(B))

This update to SWSD’s AWMP demonstrates the district’s implementation of cost-effective programs and actions to maximize its efficient use of all available water supplies. This program and projects are listed and described in Section 8, Water Management Objectives and in Section 9, Efficient Water Management Practices Information.

As demonstrated in this AWMP SWSD is proactive in improving the efficient operation of this own water delivery and conveyance facilities, it also supports numerous programs that assist local landowners in improving their own efficient water management practices. Since the district’s formation in 1958 it has continually developed projects and programs to promote best water management. The district was one of the first districts in the State to implement a groundwater banking and conjunctive use program to improve the management of local and state-wide water supplies. Through the years the district has continued to make improvement to its conveyance and distribution facilities to increase the capacity of its conjunctive use program and interconnection with neighboring districts. SWSD has supported increased efficiencies in its distribution facilities and in landowner irrigation systems. Table 11-1 below provides an overview of the major projects and programs that have been implemented by the district.

Table 11-1. Schedule of Implementation of Water Management and Efficiency Projects and Programs

Year	Water Management Action
1958	Formation of Semitropic Water Storage District
1972 - 1977	Construction of original irrigation distribution system
1973	First delivery of SWP water
1979	Adoption of the General Project Service Charge (GPSC)
1990	Water banking Demonstration Project with DWR
1992	1992 Project Election Pilot water banking program with Metropolitan Water District of Southern California
1993	Interconnection with Shafter-Wasco Irrigation District Construction of California Aqueduct Turnout No. 2
1994	Formation of Semitropic Groundwater Monitoring Committee Approval of Semitropic Groundwater Banking Program (1 million acre-feet of storage capacity)
1995	Formation of and district participation in Kern Water Bank Authority
1997 - 1998	Construction of irrigation distribution system
1999	Subscription to Pioneer Water Bank

Year	Water Management Action
1999 - 2000	Construction of P-384 irrigation distribution system
2002	Construction of P-923 irrigation distribution system
2003	Adopted Groundwater Management Plan
2006	Construction of B-369 irrigation distribution system Construction of California Aqueduct Turnout No. 3
2007	Construction of P-1030 irrigation distribution system Adopted Poso Creek Integrated Regional Water Management Plan
2008	Construction of P-565 irrigation distribution system Construction of Pond Poso Spreading Grounds
2011	District funded on-farm irrigation improvement projects (\$1 million)
2015	Construction of Pond Road Substation Construction of enhanced reverse flow project District funded on-farm irrigation improvement projects (\$1 million)
2017	New Land Surcharge Program Established ET monitoring on a monthly basis by landowner parcel
2018	SGMA Basin Sustainability Charges/Credits
2019	Expansion of the In-Lieu Recharge system (System x, y and z)
2020	Groundwater Sustainability Plan Cox Canal Pumping Station, interconnection with Buena Vista Water Storage District.
2021	Landowner Water Budgets provided to all landowners for educational purposes
2022	Landowner Water Budget implemented for all landowners with a \$500 charge for consumptive use over annual budget amounts
2023	Constructed the SWSD / Shafter Wasco Irrigation District Leonard Ave Intertie Project and extended in-lieu distribution systems to approximately 2,800 acres of existing agricultural lands. Constructed and operated 1,200 acres of temporary and 100 acres of permanent recharge facilities on SWSD owned properties
2024	Adopted a Revision of the Kern Subbasin GSP and SWSD Blue Page GSP and continued working with SWRCB in the SGMA Probationary period.
2025	Adopted final Kern Subbasin GSP and SWSD Blue Page GSP and successfully transitioned out the SGMA Probation process.

11.3. Reduction in Delta Reliance and Improved Regional Self Reliance (23 CCR Section 5003 (c)(1)(C))

When addressing the issue of reduced Delta reliance, it is important to note that SWSD’s Delta water supplies makeup less than one-third of the district’s total water supply. Table 11-2 identifies, as a percentage, the portion of the district’s water demands which are met with Delta water supplies.

Table 11-2. Percent of Delta and Non-Delta Water Supplies

Period	Delta Supplies	Non-Delta and Local Water Supplies
2007 to 2015	21.1%	78.9%
2016 to 2020	21.4%	78.6%
2021 to 2025	25.6%	74.4%

Furthermore, the information presented in this AWMP demonstrates SWSD’s compliance via a clear reduction in the district’s reliance on the Delta and improved regional self-reliance using the metrics of 1) production per unit of applied water and 2) revenue generated per unit of applied water. The change in both metrics over time demonstrates a reduction in the percentage of water used from the Delta for the production food crops and generation of revenue associated with food crops.

As documented in Section 4.1.1, Surface Water Supply, and Section 5.0, Annual Water Budget, the district has been and will continue to increase water supplies from local and other non-SWP sources. Even with an increase in such sources, however, the district will also need to maximize, whenever possible, deliveries of SWP contract water to opportunistically replenish its local groundwater supply via the district’s extensive conjunctive use program. Historic reductions in Delta exports, due to regulatory constraints, have unfortunately increased local reliance on groundwater resources, which in turn triggered the passage of the Sustainable Groundwater Management Act. As SWSD implements SGMA, its landowners will be required to reduce their reliance on groundwater. Without reliable deliveries of the district SWP contract entitlement, and absent the development of other non-Delta water supplies, landowners in the district will be forced to fallow thousands of acres of prime and productive farmlands.

To demonstrate improvements to on-farm water use efficiency SWSD used crop production and valuation data from the Kern County Department of Agriculture and Measurement Standards and crop survey developed by the district. Table 11-3 compares results for 2021 and 2024. Although production-per-AF and revenue-per-AF decrease over this period, these values reflect differences in hydrologic conditions rather than reductions in irrigation efficiency.

Calendar Year 2021 was a critically dry year in which growers applied only the minimum water needed for crop ET, and productivity per acre-foot appears high. Calendar Year 2024 followed one of the wettest years on record, and SWSD delivered more than six times the water delivered in 2021. Much of this water was used for recharge and uses that increase applied water without proportionally increasing crop production. This results in lower average productivity metrics, even though on-farm efficiency remained strong, as shown in Table 11-3. Dry years produce higher production-per-AF values, while wet

years include beneficial uses for recharge. Therefore, SWSD’s water-use performance remains stable or improving while the district continues to reduce reliance on Delta supplies.

Table 11-3. Comparison of Semitropic Crop Production and Valuation for 2021 and 2024

	District Acreage	Total ET (AF)	ET (AF/Ac)	Percent of District Irrigated Acres	District Production (tons)	District Value (\$)	Production per (tons/af)	Revenue per af (\$/af)
2021								
Almonds	48,913	175,771	3.59	39.0%	55,271	\$ 240,983,583	0.314	\$ 1,371.01
Pistachios	25,749	69,261	2.69	20.5%	41,456	\$ 200,231,171	0.599	\$ 2,890.98
Grapes-Table	4,145	12,045	2.91	3.3%	50,777	\$ 85,155,989	4.216	\$ 7,069.70
Grapes- Wine	1,673	5,125	3.06	1.3%	20,499	\$ 34,377,948	4.000	\$ 6,708.55
Wheat	10,330	28,077	2.72	8.2%	28,303	\$ 9,679,662	1.008	\$ 344.75
Alfalfa	9,416	32,591	3.46	7.5%	68,832	\$ 15,624,794	2.112	\$ 479.42
Subtotals	90,810	290,278	2.99	72.5%	265,139	\$ 586,053,147	0.82	\$ 18,864.41
2024								
Almonds	44,335	163,601	3.69	36.8%	40,788	\$ 175,387,678	0.249	\$ 1,072.05
Pistachios	31,157	104,784	3.36	25.9%	34,273	\$ 138,461,923	0.327	\$ 1,321.40
Grapes-Table	1,290	4,676	3.63	1.1%	12,344	\$ 20,284,896	2.640	\$ 4,338.20
Grapes- Wine	4,334	11,174	2.58	3.6%	41,475	\$ 68,156,463	3.712	\$ 6,099.49
Wheat	12,732	30,713	2.41	10.6%	27,628	\$ 5,553,165	0.900	\$ 180.81
Alfalfa	6,452	21,621	3.35	5.4%	53,231	\$ 12,615,802	2.462	\$ 583.50
Subtotals	100,299	336,569	3.17	83.3%	209,738	\$ 420,459,926	0.62	\$ 13,595.45
Change Ratio (2021 to 2024)					0.79	0.72	0.76	0.72

Sources: Kern County Department of Agriculture and Measurement Standards, 2021 and 2024 Kern County Agricultural Crop Report

Appendix A Semitropic Water Storage District Groundwater Sustainability Plan, 2025

<http://www.semitropic.com/>

Appendix B Public Hearing Notice and Resolution of AWMP Adoptions

Pending

Appendix C Semitropic Water Storage District Consolidated Rules and Regulations for Distribution of Water

Recording Requested by and mail to:
SEMITROPIC IMPROVEMENT DISTRICT
OF SEMITROPIC WATER STORAGE DISTRICT
Post Office Box 8043
Wasco, CA 93280

BUTTONWILLOW, POND-POSO
AND
SEMITROPIC IMPROVEMENT DISTRICTS
OF
SEMITROPIC WATER STORAGE DISTRICT

CONSOLIDATED
RULES AND REGULATIONS

FOR

DISTRIBUTION OF WATER

Adopted by an Agreement Consolidating Activities
May 12, 1993, Effective January 1, 1993
Memorandum of Agreement

Recorded August 26, 1993, Book 6897, Pages 1622 et seq.

Adopted by Resolution No. 96-1, Re-recorded January 22, 1996, Document #0196008422

Amended May 11, 2005, Adopted by Resolution No. ST 05-5

Amended February 10, 2016, Adopted by Resolution No. ST 2016-02

Amended May 17, 2017, Adopted by Resolution No. ST 2017-09

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BUTTONWILLOW, POND-POSO AND SEMITROPIC IMPROVEMENT DISTRICTS
OF
SEMITROPIC WATER STORAGE DISTRICT

**CONSOLIDATED
RULES AND REGULATIONS FOR
DISTRIBUTION OF WATER**

These consolidated rules and regulations are established pursuant to the requirements of the California Water Code for Buttonwillow, Pond-Poso Improvement Districts of Semitropic Water Storage District, hereinafter collectively called "District" by the Board of Directors of Semitropic Water Storage District acting for and on behalf of said Improvement Districts of Semitropic Water Storage District, hereinafter called "Board", for the distribution and use of water within the District, to enable the District to perform its functions most efficiently and to deliver water to Water Users at the least possible cost, and are the Rules and Regulations mentioned in those certain water service contracts between Buttonwillow, Pond-Poso and Semitropic Improvement Districts and various landowners within the District.

As provided in an "Agreement Consolidating Activities...", dated May 12, 1993 (hereinafter "Consolidation Agreement"), among other things, SEMITROPIC IMPROVEMENT DISTRICT (SID) was authorized to act for itself and as Agent for Buttonwillow and Pond-Poso Improvement Districts in administering contracts between said Improvement Districts and various landowners. A Memorandum of Agreement referencing said Consolidation Agreement was recorded August 26, 1993 of Book 6897, Pages 1622 et seq. of the Official Records of Kern County. These Rules and Regulations supersede previous Rules and Regulations adopted for Buttonwillow and Pond-Poso Improvement Districts.

1. DEFINITIONS

Terms and expressions employed in the Rules and Regulations are as defined in the water service contracts executed by the Buttonwillow and Pond-Poso Improvement Districts, including Intermittent Water Service Contracts executed by Semitropic Improvement District, with their respective landowners, with the exception of certain terms or expressions used herein which do not appear in said contracts but which terms or expressions are defined or explained at the point where they are introduced in the Rules and Regulations.

2. AUTHORITY

- A. Semitropic Improvement District: SID shall act as Agent for Buttonwillow and Pond-Poso Improvement Districts in carrying out and implementing these Rules and Regulations, except that Buttonwillow and Pond-Poso Improvement Districts shall levy charges provided at Articles 5 and 6 hereof, all as provided by the Consolidating Agreement.

- B. Manager: The District's Project Facilities are under the exclusive management and control of the Manager, who is the person appointed by the Board to manage the affairs of the District pursuant to its direction. No person except the Manager or his designee shall operate any of the District's Project Facilities.
- C. District Employees: The Manager shall supervise the activities of all District employees in connection with operation and maintenance of the District's Project Facilities and all other activities of the District. The authority of the employees of the District shall be designated by the Manager, and any controversy between a Water User and District employee that cannot be settled directly shall be appealed to the Manager. In the event the Manager is unable to reach a satisfactory decision, an appeal may be made to the Board. The decision of the Board shall be final and conclusive.
- D. Right of Access: District employees authorized by the Manager have reasonable access to lands within the District for the purpose of conducting District business, which may include, among other matters, the following:
 - 1) Inspection of the lands upon which water delivered from Project Facilities is being applied for the purpose of determining Water User's compliance with the terms of the applicable Water Service Contract and these Rules and Regulations and for purposes of determining whether or not wells in the Intermittent Surface Water Service Area are operating.
 - 2) Inspection, maintenance, repair or modification of Project Facilities.
 - 3) Determination of improper use or wasting of water.
 - 4) Measurement of ground water levels and obtaining water quality samples from wells.

3. WATER SERVICE

- A. Contract Surface Water Service Area: Contract Water Service will be provided only to lands in the District's Contract Surface Water Service Area. The lands included in said Contract Surface Water Service Area are those certain parcels of real property described in the Exhibit "A" of those certain Water Service Contracts which have been executed by the Buttonwillow and Pond-Poso Improvement Districts and the landowners and are on file in the District's office. Lands within the Contract Surface Water Service Area are shown on a map on file at the District office designated as "Contract Surface Water Service Area" as amended from time to time. In a case of conflict between the lands described in the Exhibit "A" of said Water Service Contracts and said map, the description contained in said Exhibits shall govern.

- B. Intermittent Surface Water Service Area: Intermittent Water Service will be provided only to lands in the District's Intermittent Surface Water Service Area. The lands included in said Intermittent Surface Water Service Area are those certain parcels of real property described in the Exhibit "A" of those certain Intermittent Water Service Contracts which have been executed by the Semitropic Improvement District and the landowners and are on file in the District's office. Lands within the Intermittent Surface Water Service Area are shown on a map on file at the District office designated as "Intermittent Surface Water Service Area" as amended from time to time. In a case of conflict between the lands described in the Exhibit "A" of said Intermittent Water Service Contracts and said map, the description contained in said Exhibits shall govern.
- C. Additions of Lands to Contract Surface Water Service Area and Intermittent Surface Water Service Area: Lands may be added to the Intermittent and Contract Surface Water Service Areas pursuant to an application filed with the Board therefore by the owner or owners of said lands only if: (1) such addition is determined by the Board to be feasible and in the best interests of the District and in accordance with criteria established by the Board, and (2) the owner or owners of said lands execute a contract with the District for water service for said lands in the form established by the Board.
- D. Exclusion of Lands from either the Intermittent or Contract Surface Water Service Area: Lands may be excluded from either surface water service area pursuant to an application filed with the Board therefore only if: (1) the Board determines that such exclusion will not be detrimental to the best interests of the District, and (2) the obligations of the contract for water service, if any, binding said lands are assumed by other lands within the District which are added to either surface water service area as provided in Section 3(C) above. Assumption of said obligations must be under terms and conditions which will result in no financial loss to the District.
- E. Noncontract Water Service: Noncontract Water may be offered to Water Users for agricultural use on lands within the Intermittent or Contract surface water service area (sometimes called "Unscheduled Water") and for agricultural use on irrigated lands outside said service areas (sometimes called "Temporary or Noncontract Water"), from water supplies available to District in excess of delivery requirements of District to supply the Contract Amounts of Water (or proration thereof in case of shortage) of the Intermittent and/or Contract Water Users. Such water may be made available only if it does not interfere with obligations of the District to supply the quantities of water (or proration thereof in case of shortage) available to each Water User under its applicable Water Service Contract for Contract or Intermittent water service and shall be delivered on an interruptible and non-dependable basis. The acceptance of such Noncontract Water will be at the option of Water User/Landowner. Noncontract Water will be made available to lands within and outside of the Contract and Intermittent

surface water service area on the same priority.

- F. Special Purpose Water Service: From time to time the District may have available water in excess of project demands which may be used to provide temporary water service for special purposes unrelated to agriculture. Such Special Purpose Water Service shall be made available under terms and conditions established by the Board.

4. DELIVERY, USE, AND MEASUREMENT OF WATER

- A. Annual Water Delivery Schedule: The District on behalf of each Contract Water User that executed a Water Service Contract for Project Water from the State Water Project, will file with the Kern County Water Agency (“Agency”), an Annual Water Delivery Schedule indicating the amount of water estimated to be delivered each month for the succeeding five years. The District will schedule deliveries taking into consideration previous years cropping patterns and other factors it may deem appropriate. It should be recognized that the District's supply of water is limited in the month or months of maximum demand by contractual provisions, capacity of the California Aqueduct available to the District and by capacity of the District's distribution system. Revisions to the annual schedule submitted by the District may be filed by the Water User at any time. The District will make every reasonable effort to comply with any revised schedule, but will do so only if the Manager or his designee determines that it is practicable and feasible to do so, and the District assumes no obligation for the delivery of water under such revised schedule.
- B. Daily Water Use Schedule: Orders to turn on or to turn off water, or orders to increase or decrease the rate of water delivery (herein called “water orders”), shall be made at District office in person or by telephone by Water User or his designee as provided in these Rules and Regulations.

Water orders are to be called in to the Dispatcher. Water orders will not be accepted by field personnel. Water orders for Tuesday through Friday must be called in by 8:00 a.m. the day before the water service. Water orders for Saturday through Monday must be called in by 8:00 a.m. on Friday. On holiday weekends (e.g. Labor Day, Thanksgiving, etc.), water orders must be placed by 8:00 a.m. on the last weekday before the holiday weekend. Requests received after the order deadline may not be accommodated. It is essential that the policies be followed for ordering your water through turn-outs or farmer operated in-canal pumps.

Orders shall normally be made on the basis of continuous use of water during a 24 hour period commencing between 7:00 a.m. and 8:00 a.m. from October 1 to March 30, and commencing between 6:00 a.m. and 8:00 a.m. from April 1 to September 30. In the event of an emergency, or when a change is in the delivery

point within the service area of the same lateral, or when it may otherwise be practical to do so, changes in deliveries may be approved on lesser notice, but the District assumes no obligation to do so. Although the District will make every reasonable effort to comply with the requested water orders, the conveyance capabilities and delivery capabilities of the District's facilities as well as the achievement of overall economy of operational costs make it necessary that at times, and particularly during periods of peak irrigation water use, essentially 24 hour operation of the conveyance and delivery capabilities on a seven-day week basis be maintained in order to assure that all Water Users receive adequate supplies of irrigation water.

- C. Authorization Form: In the case of leased land, or for any other reason where the Water User wishes to authorize someone else to place water orders, Water User may execute and file with the District an Authorization Form. This form will authorize the lessee or the designee to file the Annual Water Delivery Schedule and to make subsequent water orders and shall constitute the consent of the Water User to the collection and to all charges in any manner authorized under the Water Service Contract and by Sections 47181 to 47185, inclusive, of the California Water Code. Said form may authorize the lessee or designee to receive copies of District billings arising from the affected Water Service Contract. This authorization shall remain in effect until suspended, or until revoked in writing by Water User or the lessee or designee.
- D. Appointment of Agent: Where the Water User consists of more than one individual, except husband and wife living at the same address, or when Water User is an entity, i.e., a corporation, partnership, limited liability company, or state, county or other public agency, Water User shall appoint an agent for the purpose of performing any and all acts to be done by Water User as defined in the Water Service Contract, and for receiving all notices from the District and billings for charges incurred by reason thereof. The form of the appointment shall be prepared by the District and signed by the Water User. The appointment of such an agent will in no way release Water User or his lands from any obligation under the Water Service Contract.
- E. Authority of Representative: Any person acting in any representative capacity as Water User shall furnish evidence of his authority to so act and bind Water User to the satisfaction of the District. Such representative shall include a guardian, conservator, administrator, executor, trustee, partner including limited partnership, attorney-in-fact, operator of lands affected by a master operating agreement, and the like.
- F. Interruptions and Service: Attention is directed to section 3(h) of the Water Service Contracts, which provides as follows:

"District may temporarily discontinue or reduce the amount of water to be furnished to Water User as herein provided for the purpose of investigation, inspection, maintenance, repair or replacement, as may be reasonably necessary, of any of the Project Facilities for the furnishing of water to Water User, or of the facilities of the State Water Project, but, so far as feasible, District shall give Water User due notice in advance of such temporary discontinuance or reduction, except in the case of an emergency, in which case no notice need be given. In no event shall any liability accrue against the District or any of its officers, agents, or employees, for any damage, direct or indirect, arising from such temporary discontinuance or reduction of water deliveries."

Under paragraph 3(h) of the Intermittent Contract, the District similarly reserves the right to temporarily discontinue water deliveries.

In the case of emergency shut off by the District, an effort will be made to notify Water User as soon as possible. Notice may be given by leaving a note under the meter cap of the affected turnout(s).

G. Turn-Offs/Turn-Ons by Water User

- 1) Emergency Turnoffs by Water User: Water User may, in an emergency, including but not limited to acts of God, turn off the supply of water to Water User's turnout. If Water User affects such emergency turnoff, he must notify the District office immediately by telephone or in person. Water User and anyone affecting such an emergency turnoff does thereby agree to assume the defense of and hold harmless the District and its officers, agents and employees from any and all loss, damage, liability, claims or causes of action of every nature whatsoever, for damage to or destruction of property, including District's property, or for injury to or death of persons in any manner arising out of or incidental to such emergency turnoff.
- 2) Unnotified turn-ons and turn-offs: Any turn-ons or turn-offs made by Water User without notifying District prior to the change and being authorized to make same will be charged a special service charge of \$75 for each occurrence which amount may be adjusted from time to time by the Board.
- 3) Failure to comply with the District's delivery rules and regulations may result in the District padlocking a valve or removal of a meter until compliance is assured.

H. After Hours Adjustments and Changes: After hours adjustments may be scheduled with the Dispatcher, however, there will be a \$25.00 charge per change. Changes made after 9:00 p.m. will be treated as after hours changes. Self initiated changes performed without notifying the District will also be charged a special service charge per g (2) above.

I. Use of Other Water Supplies: Except as limited by the Intermittent Water Service Contract, Water User may use water furnished by District concurrently with water

from other sources, provided that Water User can demonstrate to the satisfaction of the Manager or his designee that Project Water is not being used on land other than that for which it is intended, as set forth in the Water Service Contracts.

- J. Waste of Water: Water delivery may be discontinued by the District for any Water User found to be wasting water either willfully, carelessly, or on account of defective or inadequate ditches or pipelines or inadequately prepared land or improper management, and said water delivery will not be resumed until such conditions are corrected; PROVIDED, HOWEVER, that Water User shall in no way be relieved of any responsibility for payment of any charges or obligations by reason of such discontinuance of water service.
- K. Drainage Water: In order to insure acceptable water quality in District Facilities, waste water, tail water or surface runoff will not be allowed to enter District Facilities at any time unless a written determination is made by the Manger that it is of acceptable quality.
- L. Farm Turnouts: Except as hereinafter provided for Noncontract, Unscheduled, Temporary, and Special Purpose deliveries of water, and as provided in the Water Service Contracts, all deliveries will be made only through District owned and operated turnouts or other turnouts or facilities approved in writing by the District.
- M. Connections: All plans for the connection of Water User's on farm system to District's facilities shall be submitted to the Manager or his designee for approval, and no such connection will be permitted until written approval has been given. All connections to District's facilities shall be made in a manner so as to prevent damage from occurring to District's system resulting from operation of Water User's system and so as to prevent unauthorized water from Water User's system from entering District's system without written permission by the District. Any required modification of District's facilities shall be made by District or a contractor approved by the District. All costs associated with such connections shall be born by the Water User, except the initial hookup costs of affected lands for the Intermittent Surface Water Service Area will be borne by the District.
- N. Combined Turnouts: In accordance with the District's design criteria, water service will be provided to parcels less than 20 acres in size within the Surface Water Service Area only in conjunction with service to an adjacent larger parcel or several adjacent smaller parcels where the total combined area is 20 acres or more. Service to such parcels as well as service to any other land described in Exhibit A of the respective Water Service Contracts that split ownership subsequent to execution of the applicable water service contracts, will be made through a single turnout designated a combined turnout. Water will be furnished through such a combined turnout to a group of Water Users only upon condition that said group of Water Users first files with the District an agreement, in a form

approved by the District, executed by each and every Water User in said group and providing, among other things, the following:

- 1) Acceptance of delivery of water through the combined turnout.
- 2) Granting of an easement to the other Water Users, as necessary, to convey water from the combined turnout to their respective lands.
- 3) Authorization for one individual to represent said group in all matters relating to delivery of water by District through said combined turnout.

O. Noncontract and Special Purpose Deliveries: Delivery of water for Noncontract and Special Purpose Service will be made in the manner decided by the Manager or his designee. As a condition to Noncontract Water Service for lands not within the Contract or Intermittent service areas, the owner of lands to be served shall have executed an agreement establishing a covenant running with the land in a form provided by the District, wherein the landowner expressly acknowledges that the affected lands have no right to firm water service from the District.

P. Transfers and Wheeling of Water Supplies: The overall objective of this policy is to provide operational flexibility so that Water Users can utilize water supplies available to them in the most cost effective and efficient manner, but in a manner that does not adversely affect the water supply, water quality or costs of fellow Water Users within the District. For the most part, the policies which follow have been informally administered over the years as part of the Districts ongoing water management project. The following refine, clarify and supersede such prior policies.

1) Permanent Transfers of Water Service Contracts

Consistent with Paragraphs 3 (C) and (D) of the Rules and Regulations, a Water User may petition the Board to change the lands provided with Contract Water Service or Intermittent Water Service Area. In addition to those matters provided in Paragraphs 3(C) and (D) [generally providing the transfer must be feasible, in the best interests of the District, not detrimental to the District and binding contractual obligations are made] such a transfer must be within the Semitropic Improvement District (SID) and generally involve equal acreage relinquishing and assuming the affected contract. (Where there are minor differences in acreage, compensation adjustments may be made in the amended water service contract which insures that other Water Users are not adversely affected by the transfer.) The District Board will closely scrutinize such requests to insure that on a cumulative basis they are consistent with the objectives of the SID adopted projects and not interfere with the District carrying out its water management activities.

2) Annual Transfers Within A Farming Unit

The District allows a Water User to utilize water available to him under contracts for Contract Water Service on any lands which he owns or leases within SID. Water made available as Noncontract Water may be used on any lands the Water User owns or leases within SID.

Within the Contract Surface Water Service Area the District's policy is that in event of limitations of system capacity that the available capacity will be prorated based on the original Contract Amount of Water of each Water User for that system. Delivery of the "transferred" water must be on the basis of no adverse impact on the original contract users within that system.

3) Wheeling Of Groundwater Within The Service Areas

From time to time a Water User may find it beneficial in order to maximize efficient use of water and/or save costs to pump groundwater into the District's distribution system from a well on lands he owns or leases which are farmed (i.e., are subject to the General Project Service Charge) for delivery to other lands he owns or leases in the District which are farmed. This will be permitted whenever the District does not have Noncontract Water available, at which time it would be under limited circumstances, namely:

- a) The Water User must sign a Groundwater Pumping Agreement which will provide, among other things, the water pumped into the District's canals or distribution system be under the District's specifications, be metered and the water must be of acceptable quality as determined at the time by the District. The water user must also pay wheeling fees to offset increased O&M costs, as established from time to time by the Board.
- b) The Groundwater Pumping Agreement also requires the well owner to operate the well for District purposes when he is not using it, or alternatively, the well owner will pay a capital fee of \$44.00 per acre foot for all water pumped in to the system (2004 dollars, which shall be escalated from time to time).
- c) The ability to transport groundwater within the District using District facilities is limited to available capacity. Delivery of such water shall be on a lower priority than delivery of surface supply water within the District and of the District transporting groundwater for carrying out its internal water management program or banking programs with others. Additionally, in order for water to be wheeled in the district, there must be a "downstream" demand for the water at the time it is being pumped in.
- d) In the event any Water User or landowner within the District believes that the District permitting a Water User to wheel groundwater as herein

permitted is or will adversely affect him by causing a disproportionate withdrawal of groundwater from a particular location which adversely affects him in a manner which would not occur if the District did not permit such wheeling of groundwater, such landowner or Water User may file a complaint with the District Manager. The District Manager will promptly investigate the complaint and based on available information and data will make a written determination whether such an adverse affect has occurred or is likely to occur. The Manager may also on his own initiative deny a request for such wheeling if based on available information and date it is likely such wheeling would have such an adverse impact on other Water Users and/or landowners. Such determinations made by the Manager in response to a complaint or on his own initiative may be appealed to the Board of Directors as provided in Paragraph 20 of the Rules and Regulations.

- e) Such use of groundwater must be beneficial use of groundwater and the location from which it is pumped must be in the same groundwater basin (the entire District being within the same basin).

4) Wheeling Of Groundwater From Outside The Service Areas

If a Water User wishes to pump groundwater from lands which are not farmed and/or are located outside of the Improvement District's boundaries (i.e., are not subject to the General Project Service Charge) the same conditions as prescribed in Parag. 4(P) (3) shall apply, except that in addition to charges therein provided, there shall be levied an "in-lieu" General Project Service Charge which shall be assessed per acre foot pumped for such purpose. The per acre-foot Charge shall be the then current General Project Service Charge for the Improvement District closest to the well divided by 3.5. In such case, the Groundwater Pumping Agreement reference above at Parag. 4(P) (3) shall also establish a lien for the affected lands as security for payment of such in-lieu Charge.

The General Manager shall maintain adequate records of water being transferred and wheeled within the District pursuant to Parag. 4(P) (2), (3), and (4), in the event it becomes necessary to determine whether any cumulative affects are occurring or may occur which are adverse to particular Water Users and/or landowners. Based on such information, the Board may consider further amendments, modification or repeal of these policies.

5. PAYMENTS FOR WATER

A. Contract Water Service:

1) For Contract Water Service Contract Water Users, each shall pay in lieu of the Water Use Charge and Service Charge provided for in the Water Service Contracts the following:

- a. A SWP Water Charge based on the Contract Amount of Water, as set for in Exhibit "A" of each Water User's Contract, which for each acre-foot of Contract Amount of Water shall be calculated as follows: The District's total fixed costs under the respective Agency Contracts estimated based on the costs for the preceding year; Times the Table A Contract Water Percentage which is equal to 100%, less an allocation of such Agency Contracts fixed costs attributed to District activities to import supplies into the District in addition to Table A Amounts for the benefit of all District landowners utilizing water, as determined by the Board from time to time; Divided by the Total Contract Amount of Water of all Water Users' contracts (approximately 155,000 acre-feet). Said cost per acre-foot of Contract Amount of Water shall be paid each year by each Contract Water User, regardless of the allocation which is actually made available under the Agency Contracts to the Contract Water Users.
- b. An Additional Water User Charge to reflect the estimated variable costs in any given year will be comprised of the following: (i) The variable delivery charge as incurred for the delivery of Table A amounts under the Agency Contracts for the preceding year and (ii) the current District variable costs to deliver such water to turnouts in the District, including operation and maintenance costs of the District's distribution system and energy costs, and which Charge may change from time to time during a given year based on conditions at the time. Said charge shall be based on the acre-feet delivered to each Contract Water User.

Until further notice is given through amendment of these Rules and Regulations, in lieu of the SWP Water Charge and Additional Water Use Charge herein provided, the District shall waive fixing and collecting the Water Use Charge and Service Charge provided for in the respective Water Service Contracts.

2) Procedure for Fixing and Collecting Charges: The procedure established for fixing and collecting the SWP Water Charge and Additional Water Use Charge shall be as follows:

- a) Until such time as this policy or these procedures are changed as provided in subparagraph (6) hereof, at the regular meeting in October preceding

the affected Year or at such other time as may be announced at said meeting, the Board shall consider, determine, and by resolution fix the preliminary amounts to be raised from said charges for the ensuing year for both the Buttonwillow and Pond-Poso Improvement Districts; provided, however, said resolution shall be adopted at the regular December, 2015 meeting for 2016, and shall be in lieu of proceedings for fixing of charges that have earlier occurred for 2016. Said resolution shall fix:

- i. the total Contract Amount of Water provided by the Water Service Contracts in acre feet;
 - ii. the total preliminary amount of money necessary to be raised from the Surface Water Service Area during said Year to recover such of the improvement district's costs incurred by reason of construction and operation of its Adopted Project, in fulfillment of its obligation to provide water service under conditions of Contract Water Service;
 - iii. the amount of money estimated to be collected from the Water Use Charge;
 - iv. the total preliminary amount of money to be raised from the SWP Water Charge, as described at Section 5.A.1 hereof;
 - v. the total preliminary amount of money necessary to be raised from the Additional Water Use Charge as described at Section 5.A.1 hereof, declare that said Additional Water Use Charge is in addition to and in lieu of the Water Use Charge and Service Charge specified in the Water Service Contracts and is payable and to be collected upon the terms and conditions as the Water Use Charge as set forth in the Water Service Contracts and the Rules and Regulations, and declare the per acre-foot rate of the Additional Water Use Charge;
 - vi. declare that delinquent charges and penalties shall constitute a lien upon the affected real property as provided in said Water Service Contracts and the Rules and Regulations;
 - vii. declare the time and place of the public hearing to be held as required herein; and
 - viii. fix the form of notice of said hearing.
- b) The District's Secretary shall give notice to all Contract Water Users and persons authorized to receive billings for water service. Said notice shall be mailed to all Contract Water Users and persons authorized to receive

billings for water, which mailing is to be completed at least 10 days prior to the date of said hearing. Said notice shall also be published once a week for two successive weeks, as provided in Section 39057 of the Water Code, publication to commence at least 25 days prior to the date of said hearing.

- c) There shall be held, by the Board, on the date of the regular meeting in November, or at such other time fixed by the Board, at the District office, a public hearing at which time any person interested in District's operations may in person or by representative appear and be heard regarding the fixing of said charges. The Board may adjourn said hearing from time to time and may adjourn said hearing to a different place if deemed necessary. Said hearing is to be completed by December 31st prior to the affected Year, but in no event shall it be continued beyond the following January 15th, provided, however, for 2016, said hearing shall be completed by March 31, 2016.
 - d) At the hearing the Board may change or modify the proposed rates and charges; provided, however, that no proposed rate or charge shall be raised or increased from that set forth in said resolution and notice, unless notice of intention to make said increase shall be published once at least ten (10) days prior to the hearing on the proposed charge.
 - e) At the conclusion of the hearing the Board shall, by resolution, determine whether the proposed charges, as originally proposed or modified as provided herein, are not discriminatory or excessive and will be sufficient to comply with the requirements of this Rule; adopt said proposed charges as proposed or as modified as provided herein and order that said charges be collected as provided in the Water Service Contract and the Improvement Districts' Rules and Regulations and that said charges shall constitute a lien upon the land.
 - f) Following adoption of said resolution finalizing charges, the District shall forthwith notify all affected Water Users and persons authorized to receive billings for water service of the Board action and the rates of said charges. The SWP Water Charge and Additional Water Use Charge may be billed at a composite rate.
- 3) Payments for Contract Water Service: The SWP Water Charge, shall be paid by the Contract Water User in eight equal installments, said installments

to become due and payable on the 10th day of the months of February through September; PROVIDED, HOWEVER, for 2016, the first two installments shall be due and payable on the 10th day of March. The Additional Water Use Charge shall be invoiced to Water User monthly based upon deliveries.

- 4) Adjustments: The Board may at any time during the Year decrease the SWP Water Charge or the Additional Water Use Charge by making retroactive adjustments in said charges, or either of them. PROVIDED, HOWEVER, said charges may only be decreased if monies necessary to meet the District's financial obligations in lieu of the monies not raised by the reduced charge(s) are obtained from the Contingency Reserve Fund under conditions established by the Board, from other sources or from borrowings.

Under the assumption that most years will be water deficient years and in order to provide Contract Water Users with an estimate of the annual cost to be incurred for the delivery of Contract Water, an initial annual Contract Water Statement, which will include the SWP Charge and the estimated Additional Water Use Charge, will be prepared and sent out to Contract Water users at the beginning of the water year on the assumption of an 80% Contract Water supply year.

- 5) Amendments: This policy and procedure affecting Contractual Water Service shall continue until such time as the Board determines, pursuant to noticed public hearing, that said charges, or any of them, are to be fixed on some basis other than that herein provided or until such time as there has been a reassessment of Project costs as provided in Section 46355 of the Water Code; PROVIDED, HOWEVER, pursuant to petition of the holders of title to ten percent (10%) of the land to receive such charge or charges filed with the Board not later than five days preceding the regular meeting date in September preceding the affected Year, the Board shall set a noticed public hearing to consider whether such policy should be continued or the amount of such charge or charges or all of such matters, as may be specified in said petition.

Notice of time and place of such public hearing, specifying the matters to be considered, shall be by publication once a week for two successive weeks, as provided in Section 39057 of the Water Code, and by depositing in the mail, at least three weeks before said hearing date, a copy of the notice directed to each holder of title to lands within the improvement district at their last known address as determined in accordance with Chapter 3, Part 1, Division 14 (commencing with Section 39050) of the Water Code. Said date of hearing shall not be less than thirty days after the first date of publication.

- B. Intermittent, Noncontract and Special Purpose Service: For Intermittent, Noncontract and Special Purpose Service, payment shall be made at the rate or rates and under terms and conditions established by the Board for such services. On Contract Water accounts only, it will be assumed that water delivered in a given month was Contract Water unless the Water User advises the District before the end of the month as to the amount of water, if any, that is to be considered as Noncontract Water, in which case, an invoice will be sent.

A Contract Water User may at any time request a reclassification from Noncontract to Contract Water, but once it is reclassified, it cannot be reversed to a Noncontract designation. If payments have been received before the water is reclassified, credits will be applied for the Noncontract account which then may, at the Water User's option, be returned or transferred to the Contract account.

Invoices will be due and payable on the 15th of the month in which the invoice was prepared.

If payment has not been received by the 15th of the following month or 30 days after it was due and payable, whichever is later in time, then (1) all water deliveries, including contract deliveries, will be shut off; and (2) penalty (10%) and interest (1% per month) will be applied to the Noncontract Water account.

If payment remains delinquent, the unpaid amount will become a lien on the land which ultimately results in sale of the property as provided in Sections 47181 to 47185, inclusive, of the California Water Code.

If an account remains delinquent until after a Notice of Sale has been processed, then that Water User shall, for the subsequent calendar year pay for Noncontract Water in advance in a manner prescribed under the District's 1998 policy.

- C. Delinquency in Payments: If any payment which Water User is required to make to the District is not received by the District at 5:00 p.m., on the 30th day after the date it becomes due and payable, said payment is delinquent within the meaning of Section 5(h) of the Water Service Contract, and delivery of water to said Water User shall be discontinued. No further water deliveries will be made to said Water User until all delinquencies, plus penalties and interest, are paid. Also, any payment remaining unpaid for a period of thirty (30) days after the date it becomes due and payable is delinquent as provided in Section 5(i) of said Contract, and a penalty of ten percent (10%) of that payment will be charged plus interest at twelve percent (12%) per year from the date it was due and payable until all payments are brought up to date. If a Water User has been delivered his full Contract Amount of Water (in the case of a Contract Water User) and, thereafter, becomes delinquent in any installment, all remaining installments for that year shall forthwith be due, payable and delinquent as herein provided.

Should a Water User be delinquent on October 10, or at other times as the Board may determine from time to time, the District will commence proceedings to collect the charge as provided in Sections 47181 to 47185, inclusive, of the Water Code. This may lead to the sale of the property affected by the Water Service Contract and to continued refusal of water service, all as provided in the Water Service Contract and the Rules and Regulations. Nothing herein contained shall be construed in any manner as abridging, limiting, or depriving District of any means of enforcing any remedy, either at law or in equity, for any breach by Water User in failing to timely pay any assessments, tolls, or charges.

D. Payments –

1. General: All payments to the District will be by check, cash or may be by electronic deposit as authorized by The Check Clearing For The 21st Century Act (“Check 21”) (PL 108-100).
2. If a check payment made to the District is not honored by the issuer’s bank, the District shall impose a Returned Check Fee of \$25. If a returned check results in an account being delinquent, the terms in Paragraph 5C above will apply.

If two check payments are dishonored by the issuer’s bank within 12 months, the district will only accept a cashier’s check as payment.

6. PROCEDURE FOR FIXING TOLLS AND CHARGES NOT ESTABLISHED BY CONTRACT

- A. In accordance with Section 43003 of the Water Code, the following procedures are established for fixing tolls and charges authorized by Sections 43006 and 47180 other than those tolls and charges established by the Water Service Contracts for Contract or Intermittent water service and by the Board from time to time for Unscheduled, Temporary, Wheeling and Special Purpose Water Service. Before fixing any such toll or charge, the Board shall pass a resolution declaring its intention to do so and in the resolution establish a time not less than two weeks nor more than four weeks from the date of the resolution when the matter of fixing such toll or charge will be considered in open meeting. A copy of the resolution of intention shall be published once a week for at least two weeks before the time appointed by the Board for the open meeting in a newspaper of general circulation in Kern County. At the time established for the open meeting by the Board, it shall consider the matter of fixing the tolls or charges and hear any objections thereto.
- B. In order to provide for payment of Project costs in proportion to services rendered to all lands within each Improvement District and in proportion to the services rendered to developed lands within the Surface Water Service and Ground Water

Service Areas under present Project conditions it is necessary that the following charges, in addition to the charges fixed pursuant to Water Service Contracts for lands within its Contract or Intermittent surface water service area or such short-term Water Service Contracts as may be entered into, be established, namely:

1. General Administrative Service Charge: Being the amount of money necessary to be raised by Buttonwillow and Pond-Poso Improvement Districts to provide for and to recover such of its costs of salaries, services, supplies, and other expenses as are applicable to the general administration of the affairs of each Improvement District, plus a reasonable percentage not to exceed fifteen percent (15%) for delinquency and the percentage necessary to cover cost of collection.

Said charge shall be fixed annually in such amount as reflects that portion of the costs of such Improvement Districts' services as reflect the services and benefits to lands within the Improvement Districts by reason of being in an organized improvement district, importing supplemental water.

In order that such charge be collected from all persons receiving the benefit thereof and that such charge be collected in proportion, as nearly as practicable, to such services rendered, said charge shall be fixed at an equal rate per acre upon each acre of assessable land within each improvement district; EXCEPTING, that a minimum rate per parcel shall be established for tracts of land less than one acre in area.

2. General Project Service Charge: Being the amount of money necessary to be raised by Buttonwillow and Pond-Poso Improvement Districts to provide for and to recover such of its costs incurred by reason of construction and operation of the Adopted Projects of Buttonwillow, Pond-Poso and Semitropic Improvement Districts, including repayment of construction loan contracts, service and retirement of Improvement Districts' securities, water service from the Kern County Water Agency or from other sources, and operation, maintenance, and replacement of completed Project Facilities in excess of said General Administrative Service Charge and such tolls and charges as are to be collected for Surface Water Service provided in Buttonwillow and Pond-Poso Improvement Districts' long-term Water Service Contracts with lands within their Surface Water Service Area or such short-term Water Service Contracts as may be entered into, plus a reasonable percentage necessary to cover costs of collection.

Said charge shall be fixed annually in such amount as reflects that portion of the costs of such Improvement Districts' services as reflect that portion of the Project services and benefits to certain lands within each improvement district arising as a consequence of the construction and operation of the Buttonwillow, Pond-Poso and Semitropic Improvement Districts' adopted

projects, which projects are designed to provide a more reliable water supply on a long-term basis by the importation of supplemental water. Such general project services and benefits accrue equally to all assessable lands using or having the potential to use Surface Water Service by reason of a long-term or short-term Water Service Contract with Buttonwillow and Pond-Poso Improvement Districts, and/or the Semitropic Improvement District and to all other assessable lands developed in reliance upon the use of ground water, including all commercial, industrial, and residential lots or parcels, all of which, as a consequence of the District's operations, will be in a long-term stabilized water area.

In order that such charge be collected from all persons receiving the benefit thereof and that such charge be collected in proportion, as nearly as practicable, to such services rendered, the charge shall be fixed at an equal rate per acre upon each acre of such assessable land within Buttonwillow and Pond-Poso Improvement Districts; EXCEPTING as follows: (1) EXCEPTING that a minimum rate per parcel may be established for tracts of land less than one acre in area; (2) FURTHER EXCEPTING a separate minimum rate per acre, not to be less than one-quarter of the general per acre rate, may be established for tracts of land permanently developed and used for recreational purposes, including commercial duck club uses, and for irrigated native pasture; PROVIDED, HOWEVER, such lands shall not be considered as being used for such purposes unless it has been exclusively used for such purposes for a continuous five-year period preceding the year in which any such charge has been fixed or was undeveloped during said preceding years or the landowner demonstrates to the satisfaction of the Board that the property has been converted to such uses and will not in the future be used for irrigated agriculture, other commercial, industrial or residential uses; (3) FURTHER EXCEPTING, the charge for all public entities with an alternative supply of water and which operate ground water extraction facilities that withdraw water from otherwise undeveloped lands within the District (not already receiving the General Project Service Charge) (hereinafter "public well site lands") shall be fixed at a rate per acre-foot, which rate shall be based on the assumed average applied water demands of other developed agricultural lands within the District, applied to the amount of water extracted during the prior irrigation season of April 1 through March 31, calculated by a reasonable method approved by the Board.

- C. It is necessary that the following procedure be established for annually fixing and collecting the foregoing charges:
1. Until such time as this policy and procedure is changed, as provided in subparagraph (5) hereof, at the regular meeting in April or at such other time as may be announced at said meeting, the Board shall consider, determine, and by resolution fix the amount of such charges for the current Fiscal Year.

In compliance with Section 47980 of the Water Code, said resolution shall fix the total amount of each such charge; the percentage for delinquency and cost of collection attributable to such charges; the minimum charge for parcels less than one acre in area; set the time and place for hearing of objections to the roll as provided in subparagraph (3) hereof; and determine the newspaper or newspapers in which notice shall be published.

2. In accordance with the provisions of Section 47980(b) of the Water Code, the Treasurer shall prepare a roll setting forth the assessee parcels and the assessee names for such parcel of assessable land in the District, determined in accordance with the provisions of Chapter 3, Part 1, Division 14 (commencing with Section 39050) of the Water Code and matters on file in District's records; the acreage assessed to each such assessee according to District's records and the acre-feet of water extracted for public well site lands during the prior irrigation season and the classification of each such tract of land, said classifications being non-developed, developed, recreation or irrigated native pasture and public well site, and shall prepare plat maps in accordance with said roll.

The Treasurer shall determine the preliminary rates per acre for said charges, which rates shall be based upon the matters set forth in said roll and the determinations of the Board and shall be separately stated as a rate per acre for parcels receiving only a General Administrative Service Charge and a composite rate for those lands also receiving the General Project Service Charge.

3. Said roll, plat maps, and preliminary rates shall be filed with the Secretary and be available for public inspection at the District office. The Secretary shall forthwith give notice of filing of said roll, which notice shall set forth the preliminary rates per acre, the minimum charge for parcels less than one acre in area, if any and, the special per acre rates for lands developed and used for recreational purposes and for irrigated native pasture and the rate per acre-foot for public well site lands, and declare the time and place set by the Board when the Board will meet and hear any objections to the charges established for said respective tracts of land in accordance with the matters set forth in said roll. A copy of said notice shall be published once a week for two successive weeks, as provided in Section 39057 of the Water Code, and shall be deposited in the mail, addressed to each holder of title to lands within the Improvement Districts receiving a charge at their last known address as set forth in said roll. The first publication shall be at least three weeks (21 days) prior to the date of said hearing and mailing shall be completed at least ten (10) days prior to said hearing date.
4. At the time and place for hearing of objections, the Board shall consider such objections to the roll and make such corrections thereto as are necessary and

proper. Upon conclusion of the hearing, the Board shall adopt said roll as finally fixed and determined; make such changes in the preliminary rates per acre necessitated thereby; order the Treasurer to certify said roll, declare whether all or any part of said charges be collected by the County of Kern pursuant to the provisions of Article 4, Part 9, Chapter 13, Division 14 (commencing with Section 47980) of the Water Code or by the District pursuant to Water Code Section 43006 or 47180 et seq. and, in the former case, determine the District account at the County to which said funds shall be deposited when collected.

If it is ordered that the charges be collected by the County of Kern then, on or before July 15 and no later than the third Monday in August, the Secretary shall file with the County Auditor-Controller of Kern County certified copies of said final roll, the resolution fixing charges and the resolution adopting said roll, fixing the rates per acre and ordering collection by the County.

5. This policy and procedure shall continue until such time as the Board determines, pursuant to noticed public hearing, that said charges, or either of them, are to be fixed on some basis other than that herein provided or until such time as there has been a reassessment of project costs as provided in Section 46355 of the Water Code; PROVIDED, HOWEVER, pursuant to petition of the holders of title to ten percent (10%) of the land to receive such charge or charges, filed with the Board not later than five days preceding the regular meeting date in August, the Board shall set a noticed public hearing to consider whether such policy should be continued or the amount of such charge or charges or all of such matters, as may be specified in said petition.

Notice of time and place of such public hearing specifying the matters to be considered, shall be by publication once a week for two successive weeks, as provided in Section 39057 of the Water Code, and by depositing in the mail, at least three weeks before said hearing date, a copy of the notice directed to each holder of title to lands within the District at their last known address as determined in accordance with Chapter 3, Part 1, Division 14 (commencing with Section 39050) of the Water Code. Said date of hearing shall not be less than thirty (30) days after the first date of publication.

- D. In addition to the charges provided for at Section 6.A and 6.B, and in order to encourage conservation of water resources, to help achieve compliance with the Sustainable Groundwater Management Act, and to more accurately distribute the actual cost the Improvement Districts incur to provide water supplies for the benefit of their landowners and water users in proportion with the costs to serve individual parcels, as authorized by Water Code Sections 42006 and 47180, and Section 44200 through 44208 with respect to groundwater, the following procedures shall be administered. This procedure is adopted on an interim basis and may be modified at a later date, including at such time as the

District adopts a Groundwater Sustainability Plan or it becomes effective pursuant to Water Code Section 10720 et seq.:

1. Commencing in 2017, the Improvement Districts shall annually determine the consumptive use of water for lands within the Improvement Districts on a per-acre basis utilizing Landsat and ground-based evaporatranspiration (ET) sensors, or similar methods, including consumptive use of both surface water supplied or wheeled by the Improvement Districts and groundwater. Each year at or by the regular board meeting in April (and for 2017 at the regular May meeting), or a date announced at that meeting, the Board shall make a determination as to the estimated average annual per-acre consumptive water use within the Improvement Districts (which shall herein be referred to as the "Baseline Consumptive Use") for that year; provided, however, for lands that pursuant to Section 6.B.2 have been classified as being used for recreational purposes, including commercial duck club uses, or for irrigated native pasture, a special Baseline Consumptive Use shall be established for such lands based on the estimated average annual consumptive use for such uses (herein called the "Recreation Baseline Consumptive Use"). At that same time, the Board shall also establish the following rates and credits:

- (a) For a landowner that uses less than the Baseline Consumptive Use per acre for acreage subject to the General Project Service Charge on the collective lands it owns, a credit amount will be earned for each acre-foot conserved (or portion of an acre-foot) less than the Baseline Consumptive Use per acre (herein called the "Basin Sustainability Credit"). Such credit shall be determined by the following formula: the projected General Project Service Charge for the forthcoming year divided by the Baseline Consumptive Use and then multiplied by 1.0. Therefore the Credit due will be calculated as the Basin Sustainability Credit (\$/Acre-feet), multiplied by the difference between the Baseline Consumptive Use (Acre-feet) and the Actual Consumptive Use (Acre-feet).

- (b) For a landowner that uses more than the Baseline Consumptive Use per acre for acreage subject to the General Project Service Charge on the collective lands it owns, an additional charge for each acre-foot (or portion of an acre-foot) used in excess of the Baseline Consumptive Use will be imposed (herein called the "Basin Sustainability Charge"). The Basin Sustainability Charge shall be determined by the following formula: The projected General Project Service Charge for the forthcoming year divided by the Baseline Consumptive Use and then multiplied by 1.5. Therefore the Charge due will be calculated as the Basin Sustainability Charge (\$/Acre-feet)

multiplied by the difference between the Actual Consumptive Use (Acre-foot) and the Baseline Consumptive Use (Acre-foot).

(c) For land subject to the Recreation Baseline Consumptive Use, the credits and charges shall be established in the same manner as provided above in Section 6.D.1 (a) and (b) but shall substitute the Recreation Baseline Consumptive Use in place of the Baseline Consumptive Use.

(d) A Basin Sustainability Credit or a Basin Sustainability Charge under Section 6.D.1 (a), (b), or (c) shall not be provided or assessed to the extent the General Manager determines that a landowner has imported a metered water supply to meet all or a portion of the consumptive uses of his/her lands that is not otherwise available to the Improvement Districts, and importation of such supply does not interfere with use or availability of Improvement District facilities for other purposes or water supplies.

(e) For 2017, the Basin Sustainability Credits and Basin Sustainability Charges shall be determined for each landowner but shall be administered on a trial basis only, and no such credits or charges shall be provided or assessed under Section 6.D.1 (a), (b), or (c).

(f) For any lands that are developed to irrigation or other water uses after July 1, 2017, a charge in addition to the General Project Service Charge shall be imposed for each acre-foot based on the consumptive use on those lands at a rate which is the estimated cost of developing new water supplies for lands in the Improvement Districts minus the General Project Service Charge otherwise payable (herein called the "New Lands Surcharge"). The New Lands Surcharge will not be imposed where the owner of such lands imports a metered water supply to those lands pursuant to a separate agreement with the Improvement Districts that is not otherwise available to the Improvement Districts and that does not reduce or impede the use or availability of the Improvement Districts' water supplies. Any lands subject to the New Lands Surcharge shall not be entitled to a Basin Sustainability Credit or assessed a Basin Sustainability Charge.

2. On or before April 1 of each year commencing in 2018 the Improvement Districts shall prepare and mail to each landowner that was assessed the General Project Service Charge the prior year or that is subject to the New Lands Surcharge a statement based on the consumptive use of its lands during the prior year as determined utilizing the methods enumerated above in Section 6.D.1 hereof, and advise the landowner as

follows; provided that for 2018 (for the prior year of 2017) the Basin Sustainability Credit, Basin Sustainability Charge and such recreational credits and charges shall not be provided or charged:

(a) If the landowner is entitled to a Basin Sustainability Credit, so advise and seek an election by the landowner whether it wishes the credit to be (i) provided as a cash payment, (ii) applied as a credit for future Basin Sustainability Charge(s) against any subsequent year within five years in which the landowner exceeds the Baseline Consumptive Use, or (iii) applied to a landowner bank account as hereinafter described; provided, if the landowner fails to timely respond, the Improvement District shall presume that the landowner wished to have the credit applied to future Basin Sustainability Charge(s). Such a landowner bank account as mentioned in 6.D.(a)(iii) shall be subject to a separate agreement with the Improvement District and shall have the following characteristics: it shall be made up of bank accounts of imported water held for the account of the Improvement Districts (such as return flows, water that was directly recharged for the District and “leave behind” water from banking partners), the account for the benefit of the landowner may be decreased by up to 10% per year and such deductions returned to the account of the Improvement Districts, the quantity provided to the landowner’s bank account will be based on the District’s valuation of the banked imported water supply as determined by the District Board of Directors, and the bank account shall be for use within the District only;

(b) If the landowner is to be assessed a Basin Sustainability Charge or New Lands Surcharge, such amount shall be invoiced to the landowner and is due and payable and delinquent 60 days of invoicing, and if not timely paid, subject to penalties, interest and collection proceedings as otherwise described at Section 5.C hereof; and if a New Lands Surcharge shall be annually levied upon the lands subject to the New Lands Surcharge.

(c) For land used for recreation purposes as provided in the District’s Rules and Regulations, New Lands Surcharges if applicable shall be established pursuant Section 6.D.1 for such uses shall be administered in the same manner as provided above in Section 6.D.2

(d) Where for the prior year a cash payment, a credit for future years or a landowner bank account is available as provided for under Section 6.D.2.a. above, where an additional Basin Sustainability Charge or New Lands Surcharge are due under Section 6.D.2.b. above, or a charge or credit is imposed or available under Section 6.D.2.c. above, as the case may be, upon the sale of lands, such credit, account or charge which is applicable shall run with the land and the subsequent owner(s) thereof, unless as part of such sale the seller and

buyer of such lands provide the Improvement Districts joint instructions otherwise.

3. In addition to consumptive use information collected as provided at Section 6.D.1 hereof, the Improvement Districts may also annually require that landowners supply information on the amount of groundwater extracted each year, commencing in 2018, in the manner as provided at Water Code Section 44204 and determined in the manner provided at Water Code Section 44206(b), if applicable. Until 2021, in lieu of requiring meters and providing information from meter readings as herein provided, the Improvement Districts in any year may alternatively permit landowner to determine groundwater extractions utilizing crop coefficients provided by the Improvement Districts.

7. WATER SHORTAGES

Pursuant to powers granted by Section 43003, et seq., of the California Water Code, the Board has established and does hereby establish the policy to provide for the sharing of the burden of any shortages in the quantity of water available for distribution to Water Users.

- A. For Contract Water Service, in any year when District's water supply from the Kern County Water Agency is less than the total of the Contract Amounts of Water for all Water Users, each Water User will be allocated a share of District's total supply in the ratio of said Water User's Contract Amount of Water to the total of Contract Amounts of Water of all Water Users. The District may supply all or a portion of the Contract Amount of Water allocated to a particular Water User from sources other than the Kern County Water Agency, including water it obtains for ground water banking and from the underground.
- B. For Intermittent Water Service, as provided at paragraph 3(k) of the Intermittent Water Service contract, the Board shall determine from time to time the quantity available to such Water Users and the manner to allocate among such Water Users.

8. DISPOSAL OF WATER

For Contract Water Users, as provided in Section 5(j) of the Water Service Contract, the District will make reasonable efforts to dispose of water not required by Water User in any year and credit to Water User any net revenue from such disposal.

9. CONTROL, USE AND RECAPTURE OF WATER

District will not be responsible for the control, carriage, handling, use, disposal or distribution of water delivered to Water User hereunder outside the facilities then being operated and maintained by District. Water User shall indemnify and shall assume the defense of and hold harmless the District and its officers, agents and employees for any and all loss, damage, liability, claims or causes of action of every nature whatsoever, for damage to or destruction of property, including the District's property, or for injury to or death of persons, in any manner arising out of or incidental to the control, carriage, handling, use, disposal or distribution of water outside such facilities.

Without obligating District to assume any responsibility therefore, District shall have the right to the use of all waste, seepage and return flow resulting from surface water which escapes or is discharged beyond Water User's recovery facilities, if any, and nothing herein contained shall be construed as an abandonment or relinquishment by District of the right to the recapture and the use of any such water; PROVIDED, HOWEVER, that nothing herein contained shall limit or detract from the obligations assumed by Water User.

10. PRESERVATION OF PUMPING RIGHTS

In order that no Water User be prejudiced by utilizing Project Water or other imported water in lieu of exercising whatever rights he may have to pump ground water, and in recognition of the anticipated benefit to the District's underground water supply arising from the implementation of the District's project, all Water Service Contracts for the Contract Surface Water Service Area include at Section 3(m), and for the Intermittent Surface Water Service Area include at Section 3(l), language which memorializes such matters and are incorporated by this reference, and which provides as follows:

"In the interest of preserving to Water User his rights to pump ground water for use on his lands which will be served with water under this Contract, it is agreed that during all the years that District delivers water to Water User, to the extent the Water User shall reduce his pumping of ground water and shall make use of water so delivered to him by District, Water User's said use of water so delivered to him by the District shall be deemed the same as if he had pumped from the underground a quantity of water equal to the quantity of water so delivered to him by District. Water User also agrees to recognize and be bound by the pumping rights similarly preserved to other Water Users in the District pursuant to Water Service Contracts heretofore and hereafter executed. It is further agreed that, in the event District were to carry out a program for spreading of water and percolation thereof to underground storage, District shall have the right to use of the underground storage for spreading and recovery of water in connection with supplying water service to Water User and to all other Water Users, and it is further agreed that, to the extent that District may pump water from underground supplies for furnishing to Water Users, District shall be deemed to be exercising said Water User's rights to pump water from underground water supplies; PROVIDED, HOWEVER, that

nothing herein contained shall prevent or hinder Water Users from exercising his rights to pump groundwater."

In implementing this policy, it is declared that without obligating District to assume any responsibility therefore and without limiting or detracting from the obligations assumed by Water Users in this regard, District shall have the right to the use of all waste, seepage and return flow resulting from imported water which escapes, percolates or is discharged beyond Water User's recovery facilities, if any, and nothing herein contained shall be construed as an abandonment or relinquishment by District of the right to the recapture, use and benefit of all such water and any use made of any resulting benefit to ground water conditions arising from imported water is made with the consent of the District, which consent is revocable at any time and such use is not to be considered a use adverse to District's rights nor shall any such use under any circumstances create an estoppel in asserting such rights at any time.

Further in implementing this policy, it is declared that during all the years that District delivers water to a Water User, to the extent that such Water User shall have reduced his pumping of ground water and shall make use of water so delivered to him by District, any use made of the resultant benefit to ground water conditions is made with the consent of said Water User, which consent is revocable at any time, and such use is not to be considered a use adverse to his right to the continued exercise of his rights to pump and utilize ground water nor shall any such use under any circumstances create an estoppel in asserting any such right at any time.

Notwithstanding the foregoing, but without limiting the right of landowners to exercise overlying ground water rights as provided above, at any time the District receives additional supplies for the purpose of banking or storing such supplies, and the District delivers such supplies to Water Users or others who otherwise would pump ground water, the District retains the right to subsequently withdraw such banked water, all in accordance with such banking and/or storage program.

11. PROTECTION OF DISTRICT FACILITIES

Without limiting rights otherwise reserved, and except for drains and waterways which may be built by the District expressly for the conveyance of Water User's drainage water, no persons will be allowed to drain irrigation water upon District owned property, and any person doing so will be in violation of the Rules and /Regulations, and will be subject to fine and damages, and water service may be terminated.

It is the duty of Water User to furnish reasonable protection for the individual farm turnout to prevent damage to said turnout. In the event that damage occurs to farm turnout as a result of failure by Water User to provide such protection, the repair of such damage will be made by the District, the expense of such repair will be charged to Water User, and no water will be furnished through the affected turnout until such repairs are made and the charges for damage and repairs paid to the District.

12. ENCROACHMENT ON DISTRICT PROPERTY

Without limiting rights otherwise reserved, before any drains, fences, pipelines or other encroachments from private sources will be permitted to be upon the District's property, written consent for such encroachment must be obtained from the District. Consent forms will be furnished by the District to the applicant and consent must be obtained from the Manager or his designee before any construction begins. Where District rights in any property are an easement, no encroachments will be permitted which will in any manner interfere with or exceed the rights of the District under said easement, and the District's written consent must first be obtained before any pipelines or other encroachments are constructed in any easement area. The work shall be constructed to specifications approved by the District, at the sole expense of the permittee, and maintained to the satisfaction of the District. If such consent is granted, the permittee shall be solely responsible for and shall indemnify and shall assume the defense of and hold harmless the District and its officers, agents and employees from any and all loss, damage, liability, claims or cause of action of every nature whatsoever, for damage to or destruction of property, including the District's property, or for injury to or death of persons in any manner arising out of permittee's exercise of the rights and privileges given in the granting of such consent. Issuance of consent does in no way grant a permanent right but shall be a revocable license only, and on demand of District said works shall be removed and the District's property restored to its original state at the sole expense of the permittee. Granting of such consent shall not be deemed to surrender or subordinate the District's control or supervision over the encroachment. Any person or his authorized agent who uses the property of District for the movement of equipment shall be responsible to District for any damage to District property. No livestock will be allowed to enter upon or graze on District's property without written consent from the Manager or his designee. If such consent is granted, the permittee shall be solely responsible for and shall indemnify and shall assume the defense of and hold harmless the District and its officers, agents and employees from any and all loss, damage, liability, claims or cause of action of every nature whatsoever, for damage to or destruction of property, including the District's property, or for injury to or death of persons or livestock in any manner arising out of permittee's exercise of the right and privileges given in the granting of such consent. Any persons using a District right-of-way for any purpose assumes all risks associated therewith and assumes the responsibility for any damage to District property resulting therefrom and also for any damage to private property caused by such damage to District property.

13. MODIFICATIONS OF PROJECT FACILITIES

No changes shall be made in the constructed Project Facilities except by District personnel or its contractors and in accordance with the District's specifications. If a modification is made at the request of a Water User, and for his benefit, the cost thereof shall be paid in advance by the Water User requesting said modification. The advance payment shall be determined by the Manager based upon an estimate of the costs, including but not limited to reasonable charges for engineering performed by the District and overhead, and after completion

of the work a final accounting shall be submitted to the Water User. Within thirty (30) days after submission of said final accounting, the Water User will pay the difference between the actual cost and the estimate thereof or the District will make a refund if the actual cost is less than the advance payment. Any additions to Project Facilities so constructed become the property of the District.

14. SALE OR TRANSFER OF TITLE TO LANDS

Without limiting the provisions of the Water Service Contracts (Section 10 for Contract Water Service and Section 9 for Intermittent Water Service), when land affected by a Water Service Contract is sold or title otherwise transferred to another party, District will be under no obligation to deliver water to such lands until the Water Service Contract is assigned to and assumed by the new landowner. Such assignments and assumption agreements shall be on forms provided by the District, executed and completed in a manner satisfactory to the District. In the event of a transfer of ownership as to a portion of the lands described in an Exhibit "A" to a Water Service Contract and in the absence of written instructions from the affected parties, the Water Service Contract will be administered and the agreement will be prepared so as to allocate the rights and obligations under said Water Service Contract on an acreage basis.

Notwithstanding any transfer or change of ownership, the District shall be entitled to administer the Water Service Contract in accordance with matters in the files at the District office, including but not limited to Water Delivery Schedules and Water Use Schedules and revisions thereto, appointments of agents, authorization forms and billing of tolls and charges until or unless District has received actual notice in writing that any or all of such matters are revoked.

15. MISCELLANEOUS PROVISIONS REGARDING ASSIGNMENTS AND TRANSFERS

The execution by the District of any assignment and/or the giving of its consent to transfer of the rights of a Water User under a Water Service Contract shall be without any warranty of title on the part of the District and shall not be interpreted as any representation, express or implied, by or on behalf of District, that such assignment, transfer or disposal is free and clear of outstanding encumbrances.

Without attempting to establish or in any manner affect the rights of any person arising from a deed of trust, any person or entity having any interest in a deed of trust on property subject to a Water Service Contract, may file with the District a written request for notice of failure to make the payments required by such Water Service Contract or a request for notice of any specific act that the District may be requested to undertake or to consent to under the Water Service Contract or the Rules and Regulations that such person alleges will detrimentally affect its interest, but not limited to (1) a request for exclusion from the Surface Water Service Area, (2) a request for written permission to utilize water on lands other than those described in Exhibit "A" to a Water Service Contract for a period in excess of a year, or (3) a request for assignment of rights under Water Service Contract for a period in excess of a year. Upon receipt of such

notice District shall give such person written notice of default or of any request that it take such action as is set forth in the request for notice, at least fifteen (15) days prior to foreclosure proceedings or prior to such other specified act by the District, unless such person has given written consent to the requested action. In addition to setting forth the matters as to which notice by the District is requested, the request for notice shall set forth a legal description of the land affected; the name of the current owner of the fee; the name and address where the requested notice is to be sent and a copy of the deed of trust showing the recording information. Any notice from the District shall be effective when deposited in the mail, postage prepaid, directed to the address shown in the notice; PROVIDED, HOWEVER, District may disregard any request for notice which has not been refiled within fifteen (15) days of a written demand therefore by the District mailed in the same manner and with the same effect as hereinabove provided for the notice by the District: PROVIDED, FURTHER, HOWEVER, nothing herein provided shall render District liable to any person under any circumstances. As used in this paragraph, the term deed of trust shall be deemed to include mortgages, contracts of sale, and other liens and encumbrances.

16. REAPPORTIONMENT OF ASSESSMENTS

The provisions hereof are supplementary to the provisions of Article 8 (commencing with Section 46325) of Chapter 2 of Part 9 of the Water Code.

When any tract of land upon which an assessment has been levied has been subdivided into smaller parcels of land, the Board may, in the absence of any application being filed therefore, prior to a call on said assessment or prior to closing of the County Assessment Rolls if the alternative procedure for collecting District assessments is utilized, order that such assessments be reapportioned in the same manner as utilized in establishing the assessments on the entire tract being reapportioned without notice and hearing unless a person interested shall have filed with the Board a request for notice of hearing of reapportionment of assessments to be made pursuant to said Section 46325.

Applications for reapportionment of assessments on tracts of land in the District shall be in such form as is approved by the Board; landowners' signatures shall be acknowledged in the same form as a conveyance of real property and the application shall be accompanied by certified copies of recorded deeds showing the current ownership of the entire tract to be reapportioned. If the application be signed by less than all the landowners within the subdivided tract, a hearing will be held and notice of hearing shall be by mail directed to landowners affected at the address shown in District records and only to such other persons as are interested who have filed with the Board a request for notice of reapportionment, mailed at least ten (10) days prior to the day of hearing. District may require a report as to status of title of said reapportioned tract and may require payment of such fees and costs by the applicant as the Board may establish.

17. SECTION 592 OF THE PENAL CODE OF THE STATE OF CALIFORNIA

Attention is directed to the provisions of Section 592(a) of California Penal Code, as follows:

"Every person who shall, without authority of the owner or managing agent, and with intent to defraud, take water from any canal, ditch, flume or reservoir used for the purpose of holding or conveying water for manufacturing, agricultural, mining, irrigating or generation of power, or domestic uses is guilty of a misdemeanor."

18. AUTHORITY OF CONTRACTS

The Rules and Regulations are in implementation of the Agency Contract, the Master Contract and any amendments to the foregoing, and the Water Service Contracts; and in the case of inconsistency between these Contracts and the Rules and Regulations, the Contracts shall govern.

19. ENFORCEMENT OF RULES AND REGULATIONS

The Manager shall be responsible for the enforcement of the Rules and Regulations. Failure of a Water User to comply with any of the Rules and Regulations shall be sufficient cause for the termination of water service, and water service will not again be furnished to such Water User until full compliance has been made with all the requirements as herein set forth; PROVIDED, HOWEVER, that Water User shall in no way be relieved of any responsibility for payment of any charges or obligations by reason of such termination of water service. When in the sole judgment of the Manager it is practicable to do so, advance notice of any such termination of water service will be furnished to Water User. In no event shall any liability accrue against District or any of its officers, agents, or employees, for damage, direct or indirect, arising from such terminations of water service.

20. APPEAL OF DECISION OF MANAGER

In event the Water User disagrees with a decision made by the Manager in administering the Rules and Regulations, he shall have the right to appeal to the Board within ten (10) days after notice of such decision. Appeal shall be submitted in writing to the Board and shall specifically set forth the decision being appealed and shall give reasons for said appeal. Appeals shall be considered at the regular meeting of the Board next after ten (10) days following the appeal.

21. MISCELLANEOUS

- A. The Rules and Regulations shall become effective immediately and may be added to, amended, or repealed at any time by resolution of the Board.
- B. If any provision of the Rules and Regulations, or the application thereof to any person or circumstance, is held invalid, the remainder of the Rules and Regulations and the application thereof to other persons or circumstances shall not be affected thereby.

C. Words used herein in the masculine shall include the feminine or an entity.

MP_SWSD Rules & Rules_5.17.2017

Appendix D Poso IRWM Drought Contingency Plan



Drought Contingency Plan
Poso Creek IRWM Region
Kern County, CA

October 2022

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1. Introduction

The Poso Creek Regional Water Management Group (RWMG) has received funding through the United States Bureau of Reclamation (Reclamation) WaterSMART Drought Response Program to develop this Drought Contingency Plan (Plan) for the Poso Creek Integrated Regional Water Management (IRWM) Region. This Plan is a collaborative effort among the member agencies of the RWMG (see **Table 1-1**) and will be incorporated into the Poso Creek IRWM Plan (IRWM Plan) and Agricultural Water Management Plans (AWMP) of all member agencies, with the exception of North West Kern Resources Conservation District who does not deliver water supplies and overlays most of the area of the other member agencies to provide soil and water conservation services.

Table 1-1. Poso Creek RWMG Member Agencies

Member Agencies	
Semitropic Water Storage District (SWSD)	North Kern Water Storage District (NKWSD)
Cawelo Water District (CWD)	Shafter-Wasco Irrigation District (SWID)
Kern-Tulare Water District (KTWD)	Delano-Earlimart Irrigation District (DEID)
North West Kern Resource Conservation District (NWKRCDC)	Southern San Joaquin Municipal Utility District (SSJMUD)

Planning occurred in two phases in accordance with the Drought Response Program Framework (Framework) as outlined in **Figure 1-1**. Phase I included the development of a Drought Planning Task Force (Task Force), a Communication and Outreach Plan (C&O Plan), and a detailed Work Plan to describe the tasks, schedule and budget required to complete the plan (Reclamation, 2016a).

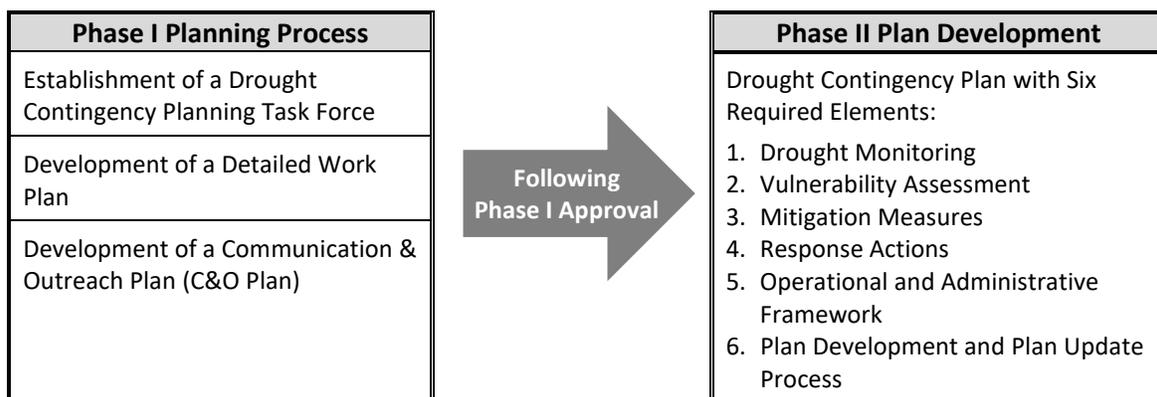


Figure 1-1. Drought Response Program Framework

Development of Phase I documents were completed and approved by Reclamation in March 2020. This Plan is driven by and expands on work completed during Phase I to complete the six required

elements specified in **Figure 1-1**. These elements were developed through a collaborative stakeholder process with the RWMG and is consistent with and incorporate elements of the Sustainable Groundwater Management Act (SGMA) and Urban Water Management Plan (UWMP), and AWMP planning efforts within the region. This Plan builds on each of these planning efforts to incorporate measures centered around managing wet year water supplies to better prepare for and manage during dry or drought periods. The response and mitigation actions presented herein align with those outlined under the previous drought planning to optimize existing regional planning efforts. By integrating with parallel water management programs, this Plan seeks to support overall regional water supply reliability and sustainability.

1.1 Drought Contingency Plan Purpose

The purpose of this Plan is to expand and coordinate existing long-term drought planning efforts to improve future drought monitoring and response strategies to build long-term resiliency to drought. Complementary to the purposes defined in the Framework, the Plan is intended to assist member agencies with:

- Developing a comprehensive drought plan with input and participation from local stakeholders;
- Establish monitoring to aid in recognizing the early stages of drought;
- Understanding how drought affects the region and identifying vulnerabilities;
- Identifying and developing mitigation actions to build long-term resiliency to drought; and
- Identifying and developing response actions taken in response to emerging and ongoing drought.

This Plan accomplishes these purposes by identifying and implementing strategies that monitor short and long-term water availability; assess risks to critical resources in the case of drought; promote mitigation efforts; prioritize wet and drought response actions; ensure that administrative framework and associated responsibilities are clear and transparent; and provide for periodic evaluation and updating of the Plan. Additionally, several member agencies have elected to develop district-specific drought memoranda, with each being included as Appendix A to this Plan. These memoranda provide additional details on drought planning within each member agency's jurisdiction within the Poso Creek Region. Findings of these memoranda are incorporated throughout this Plan to ensure that drought vulnerabilities, mitigation actions, and response actions are appropriately captured to build and implement strategies for the region. Additional coordination took place with member agencies who opted out of providing a memorandum to ensure the above-mentioned elements were captured and incorporated to represent conditions, response strategies and vulnerabilities in their districts.

1.1.1 Drought Plan Objectives

Building off previous regional drought planning efforts and the drought planning purposes provided in Section 1.1, **Table 1-2** outlines the objectives this Plan seeks to accomplish. These objectives are to be accomplished through implementation of the six required planning elements presented in **Figure 1-1**.

Table 1-2. Drought Plan Objectives

Drought Plan Objectives
Enhance reliability and effectiveness of surface water supplies delivered to the Region
Improve regional water conveyance, direct recharge, and in-lieu service actions
Improve effectiveness of water delivery
Improve direct recharge areas
Improve reliability of delivering water supplies to stakeholders
Implement region-wide management actions
Enhance regional conjunctive water use
Maintain quality of water supply.
Facilitate implementation of regional opportunities, projects, and programs
Facilitate implementation of region-wide water management actions
Adapt to change in amount, intensity, timing, and in-lieu service areas
Increase absorptive capacity for banking water when available

These objectives center around the core goal of the Plan to build long-term drought resiliency for the region in advance of a drought crisis. This aligns with the current disaster and drought management planning objectives.

To achieve the goal and objectives as stated above, requires proactive management before a drought occurs, including maximizing the regions capacity to recharge and bank water locally during wet periods. Therefore, in addition to monitoring drought conditions in the watersheds where imported water supplies are developed for the IRWVG, this Plan will also include monitoring for wet conditions when surplus water may be available to support groundwater recharge and banking. A majority of the objectives in **Table 1-2** require and support coordination during wet years. A process for drought monitoring is provided, and mitigation and response actions have been developed based on a regional vulnerability assessment to enhance the capabilities of the region to manage drought consistent with sustainable groundwater management goals and objectives and regional, urban, and agricultural water management.

1.2 Planning Area

The Plan covers the entire Poso Creek IRWM region, which includes all RWVG agencies (or districts), cities, and communities. To reiterate, the RWVG agencies are: SWSD, CWD, NKWSD, SWID, KTWD, DEID, NWKRC, and SSJMUD. The RWVG service areas encompass approximately 934 square miles, which covers numerous cities and communities. The cities that are included within the service areas are: Cities of Shafter, Wasco, McFarland, Delano, and Lost Hills, which also includes communities such as Richgrove CSD. Majority of the cities and surrounding areas are considered disadvantaged communities (DACs), with additional

communities outside of the city boundaries also considered as DACs. Given that there are multiple DACs in the Poso Creek region, identifying and developing strategies for combatting drought in these communities is an important aspect of the Plan.

The region depends heavily on local agriculture, which in recent years has seen a trend away from field crops in favor of nuts, primarily almonds and pistachios (**Table 1-3**). This trend towards permanent crops represents a “hardening” of the crop water requirement for the area and reduced annual water demand flexibility. Table 1-3 demonstrates the percentage of specific crop use in the Poso Creek region in a given year and also the percentage of change. The cumulative change shows the reduction of field crops over the years and the increase in permanent crops.

Table 1-3. Crop Pattern for Poso Creek Region

Crop Category ⁽²⁾	2005 ⁽¹⁾	2013 ⁽¹⁾	2014 ⁽³⁾	2016 ⁽⁴⁾	2017 ⁽⁴⁾	2018 ⁽⁵⁾	2019 ⁽⁴⁾	2020 ⁽⁶⁾	Change (2020-2019)	Cumulative Change
Citrus and Subtropical*	9%	7%	6%	5%	6%	7%	5%	4%	-0.4%	-5%
Deciduous Fruits and Nuts*	37%	51%	47%	65%	61%	59%	69%	73%	4.1%	36%
Field Crops	13%	5%	4%	10%	11%	6%	8%	7%	-0.8%	-6%
Grain and Hay Crops	14%	14%	11%	8%	8%	5%	5%	5%	0.1%	-9%
Truck, Nursery, and Berry Crops	5%	3%	5%	3%	2%	2%	2%	1%	-0.2%	-4%
Vineyards*	22%	21%	27%	10%	9%	15%	9%	7%	-2.0%	-15%
Small Vegetables	0%	0%	0%	0%	0%	0%	0%	0%	0.0%	0%
Other	0%	0%	0%	0%	3%	5%	1%	1%	-0.8%	1%
Total	100%	-	-							
Permanent Crops	68%	78%	80%	79%	75%	82%	83%	85%	1.7%	17%

*Permanent crops.

¹ Baseline conditions based on crop surveys conducted by each district in the Region.

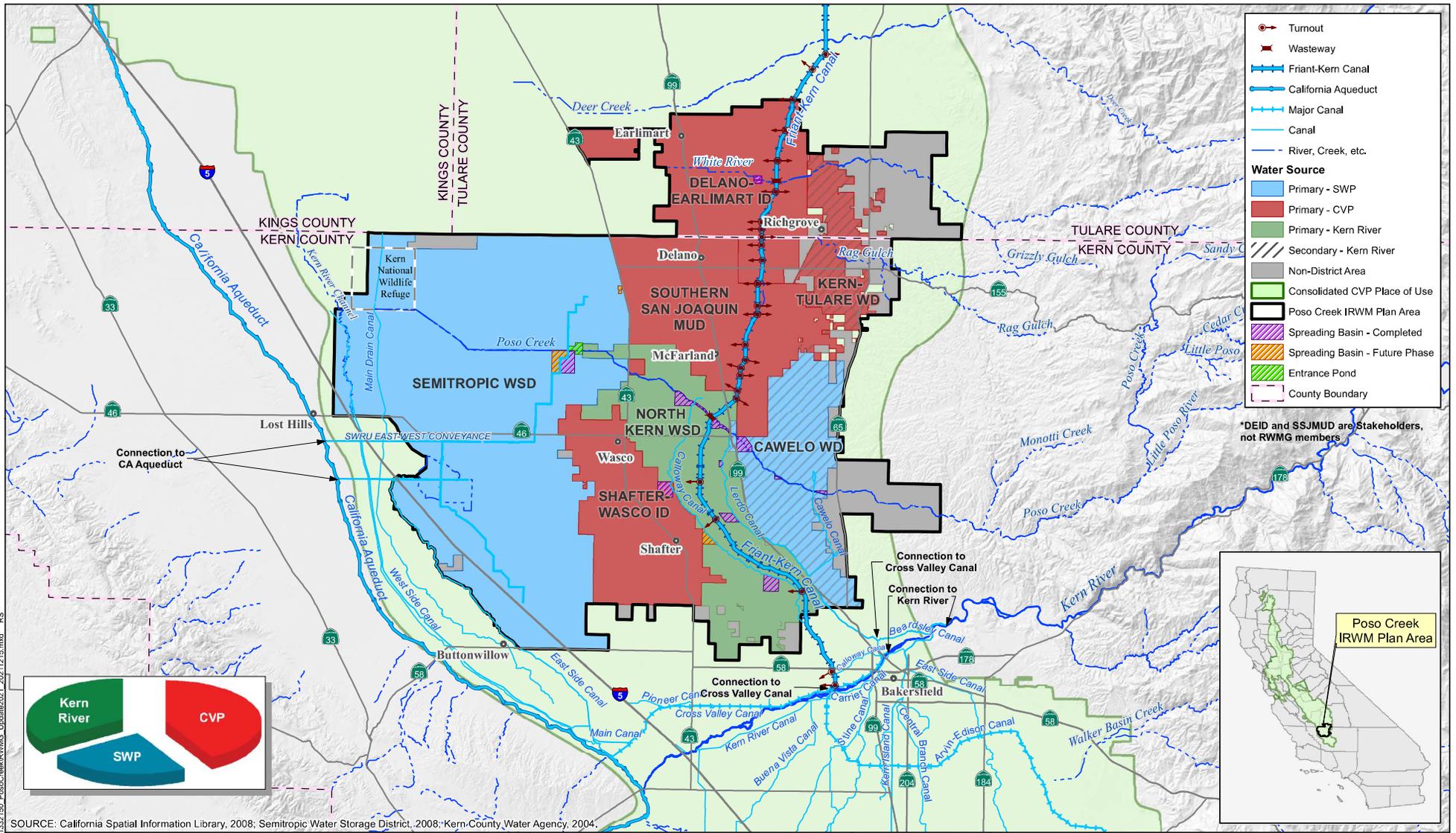
² Percentages are based on the total for the crop categories shown in the table.

³ Percentages are based on 2020 LandIQ data (most recent available data) for each district in Region

⁴ Based on crop surveys available for NKWSD and CWD, and Land IQ data available SWSD.

⁵ Based on crop surveys available for NKWSD, KTWD, and CWD, and Land IQ data available SWSD and SSJMUD.

⁶ Based on crop surveys available for NKWSD, SWID, and CWD, and Land IQ data available SWSD.



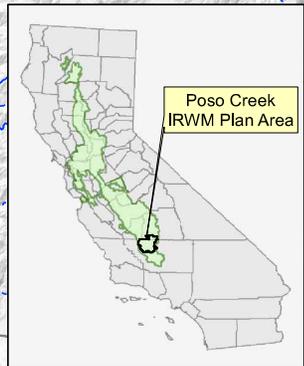
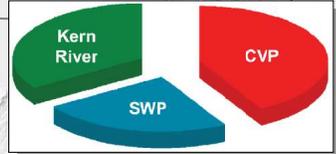
Legend

- Turnout
- Wasteway
- Friant-Kern Canal
- California Aqueduct
- Major Canal
- Canal
- River, Creek, etc.

Water Source

- Primary - SWP
- Primary - CVP
- Primary - Kern River
- Secondary - Kern River
- Non-District Area
- Consolidated CVP Place of Use
- Poso Creek IRWM Plan Area
- Spreading Basin - Completed
- Spreading Basin - Future Phase
- Entrance Pond
- County Boundary

*DEID and SSJMUD are Stakeholders, not RWMG members



15Dec2021 Z:\Projects\1332150_PosoCreekRWMG_Update\2021_20211215.mxd RS

SOURCE: California Spatial Information Library, 2008; Semitropic Water Storage District, 2008; Kern County Water Agency, 2004.



Poso Creek IRWM Plan, 2021 Update
Southern San Joaquin Valley, California

Poso Creek IRWM Plan Area (Region)



POSO CREEK IRWMP REGION

DECEMBER 2021

FIGURE 1-2

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1.3 Background

As identified in the 2019 Poso Creek IRWM Plan Update (Poso RWMG, 2019), droughts are expected to become more frequent and intense, interspersed with severe wet periods as a result of climate change. Droughts are common throughout the Western U.S, and California experiences a drought every 7 years on average. However, recent years have seen increasingly intense drought conditions and there is growing evidence to attribute these effects to climate change (Reclamation, 2016b). For this reason, the RWMG has developed this drought contingency plan to support long-term drought resiliency.

Drought contingency planning builds on and complements existing planning efforts in the region with respect to integrated regional water management and conjunctive use, and sustainable groundwater management. Existing planning efforts include but are not limited to:

Table 1-4. Complementary Drought Planning Efforts

Complementary Planning Efforts	Elements Used for Drought Planning
<p><u>2019 Poso Creek IRWM Plan Update:</u> Reflects the IRWM Group’s efforts to address new requirements, specifically focusing on regional water self-reliance and adapting to the effects of climate change such as drought and reduced water imports</p>	<p>Regional goals and measurable objectives used as basis for drought plan objectives; Developed projects to maximize imported surface water benefits and reduce overdraft of groundwater integrated into drought mitigation actions; and climate change assessment used to support the drought vulnerability assessment</p>
<p><u>Agricultural Water Management Plans:</u> AWMPs are plans specific to each agricultural water supplier in the region and are being implemented to improve the efficiency of agricultural water management</p>	<p>Updated agricultural water demand estimates and land use</p>
<p><u>Urban Water Management Plans:</u> UWMPs are prepared by urban water suppliers to support long term resource planning and ensure that adequate water supplies are available to meet existing and future water needs</p>	<p>Surface water supply reliability for urban water suppliers</p>
<p><u>Groundwater Sustainability Plan of the Kern Groundwater Authority:</u> The Kern Groundwater Authority has implemented the Sustainable Groundwater Management Act to mitigate groundwater overdraft balancing the inflow of water with pumping and groundwater use. Groundwater sustainability plans have been developed and are under implementation by each RWMG agency</p>	<p>The basin setting; water budgets; monitoring network; sustainable management criteria; and projects and management actions sections were used as basis for development of the DCP six required planning elements.</p>
<p><u>Local Drought Planning Memoranda From Member Agencies:</u> Provide additional details on drought planning within each member agency’s jurisdiction within the Poso Creek Region.</p>	<p>Findings of these memoranda are incorporated throughout this Plan to ensure that drought vulnerabilities, mitigation actions, and response actions are appropriately captured to build and implement strategies for the region.</p>

1.4 Plan Development

The following sections provide an overview of the planning process and development of the Plan. All relevant meeting documents and materials are provided in Appendix B.

1.4.1 Drought Task Force

A Task Force was formed consisting of interested stakeholders and members of the RWMG, with SWID as the Task Lead (**Table 1-5**). In coordination with stakeholders, consultants, and subject matter experts, the Task Force and Task Lead supported the development of several Plan aspects. Prior to Plan development, the Task Force convened to review and approve the contents of the Work Plan and the C&O Plan. This Task Force operates under an “open door” policy in which additional interested parties are welcomed and encouraged throughout the drought planning process.

Table 1-5. Drought Task Force

Stakeholder	Organization/Agency	Sector
Kris Lawrence (Task Lead)	Shafter-Wasco Irrigation District	Agriculture
Isela Medina	Semitropic Water Storage District	Agriculture
David Ansolabehere	Cawelo Water District	Agriculture
Eric Quinley	Delano-Earlimart Irrigation District	Agriculture
Steve Dalke	Kern-Tulare Water District	Agriculture
Ram Venkatesan	North Kern Water Storage District	Agriculture
Brian Hockett	North-West Kern RCD	Agriculture
Roland Gross	Southern San Joaquin Municipal Utility District	Agriculture
Amanda Rollin	Lost Hills Utility District	DAC/Municipal
Andrew Garcia	Santa Clara Valley Water District	Municipal
Biridiana Bishop	City of Wasco	DAC/Municipal
Geoffrey Vanden Heuvel	Milk Producers Council	Agriculture
Jeff Eklund	Kern IRWM Facilitator / Provost & Pritchard	Municipal/DAC/Agriculture
Jon Reiter	Maricopa Orchards	Agriculture
Timothy Gobler	Illume Agriculture	Agriculture

Documentation of Task Force meetings and stakeholder outreach is presented in **Table 1-6** and Appendix B, respectively. Since this Plan will be incorporated into the Poso Creek IRWM Plan, Task Force meetings are held in conjunction with RWMG meetings in the form of an agenda discussion and/or action item. **Table 1-6** provides documentation of public RWMG meetings that included discussion on the Plan.

Table 1-6. Task Force Meetings

Meeting	Date	Action/Purpose
Poso Creek RWMG Meeting	October 1, 2019	Approval of Interim Task Force for Drought Plan Development
Poso Creek RWMG Meeting	December 18, 2019	Presentation of Work Plan and C&O Plan with preliminary approval of Work Plan
Poso Creek RWMG Meeting	March 9, 2020	Presentation and final approval of Drought Work Plan
Poso Creek RWMG Meeting	September 1, 2020	Update on Drought Plan development
Poso Creek RWMG Meeting	November 2, 2021	Presentation and adoption of final Drought Contingency Plan

All meeting materials were distributed prior to convening in accordance with the C&O Plan. Additional correspondence with the Task Force took place throughout the drought plan development to circulate and provide opportunity for several planning documents including the Work Plan, C&O Plan, and draft Drought Contingency Plan document. It is important to note that the RWMG served as the interim Task Force until a more inclusive and representative Task Force of the region was established in March 2020.

1.4.2 Communication and Outreach

A C&O Plan was developed to describe the planned activities for engaging interested parties in the development and implementation of the Drought Contingency Plan for the Poso Creek Region and to provide opportunities for interested parties to participate. The following sections provide overview of the C&O Plan with the complete document provided as Appendix C. This plan serves as a roadmap to support the desired outcomes identified below.

- Objective 1: Educate the public about the importance of the Drought Contingency Plan and their participation.
- Objective 2: Engage a diverse group of stakeholders representing different social, cultural, and economic elements of the population.
- Objective 3: Make stakeholder participation easy and accessible.
- Objective 4: Provide a roadmap for RWMG leadership.

Throughout drought plan development, two public workshops were held virtually to present key components of the Drought Contingency Plan and provide opportunity for public input and feedback. Workshops (**Table 1-7**) were open to the public and input was taken under thoughtful consideration when developing the six required plan elements. While only two workshop was dedicated for public outreach, all RWMG meetings presented in **Table 1-7** where public and members of the communities were encouraged to participate. Appendix B provides the meeting agendas for each DCP workshop. Only meeting minutes for Task Force meetings are provided since they were hosted by the RWMG, which is Brown Act governed.

Table 1-7. Outreach Workshops

Meeting	Date	Action/Purpose
Poso Creek IRWM Drought Contingency Plan Workshop – I	November 18, 2020	Presentation of drought plan development strategy including drought monitoring as well as mitigation and response actions.
Poso Creek IRWM Drought Contingency Plan Workshop – II	April 6, 2021	Presentation of drought monitoring programs including mitigation and response actions.

1.5 Roles and Responsibilities of Plan Implementation

Table 1-8 lists the roles and responsibilities of the members of the RWMG, which have been separated out into two groups in the region: agricultural water districts and DACs/municipalities. Both these groups are responsible for the implementation of each element of the Drought Contingency Plan for their respective area. The DACs and municipalities are collectively referred to as DACs since they are synonymous and hold the same responsibilities. In addition, the California governor is listed as the responsible entity to declare drought emergencies at a state and local level. However, regional monitoring of climate and critical resource conditions may detect severe drought conditions prior to the official declaration of a drought emergency. Responsible agencies for regional monitoring include the California Department of Water Resources (DWR), California Data Exchange Center (CDEC), the local Friant Water Authority, the California Nevada River Forecast Center, and the National Oceanic and Atmospheric Administration (NOAA).

Table 1-8. Roles and Responsibilities

Roles and Activities
<p>Each entity is responsible within their respective area for:</p> <ul style="list-style-type: none"> ▪ <u>Drought Monitoring</u>: Districts and DACs will consider the data reported in Section 2 of the Drought Contingency Plan and provide updates based on monitored drought conditions impacting their respective area. <ul style="list-style-type: none"> ▪ Resources: drought monitoring and climate tools developed by government agencies such as DWR. ▪ <u>Drought Stages</u>: The DCP has defined four stages of hydrologic conditions for proactively managing drought conditions. The entities listed in Table 2-2 are responsible for determining the stage of drought for their respective areas. <u>Vulnerability Assessment</u>: Districts and DACs will utilize the assessment done in Section 3 of the Drought Contingency Plan and continue to assess vulnerabilities as needed to further develop and implement necessary mitigation and response actions for their area. <ul style="list-style-type: none"> ▪ Resources: Monitoring tools, Data collection from subject matter experts for supply and demand of water sources. ▪ <u>Mitigation Actions</u>: Districts and DACs will initiate and implement mitigate actions according to the processes described in Section 4 of the Drought Contingency Plan for their area and develop additional actions as needed and in coordination with parallel programs. <ul style="list-style-type: none"> ▪ Resources: State, Federal and local drought relief programs as described in Section 4. ▪ <u>Response Actions</u>: Districts and DACs will implement, and initiate response and response actions described in Section 5 of the Drought Contingency Plan for their area during drought conditions as well as develop additional actions as needed. <ul style="list-style-type: none"> ▪ Resources: State, Federal and local drought relief programs as described in Section 5. ▪ <u>Plan Update Process</u>: The Poso Creek RWMG is responsible for the plan update. Each entity is responsible for examining, evaluating, and providing updates to each element of the Drought Contingency Plan for their area on a regular basis; at least every 5 years. <ul style="list-style-type: none"> ▪ Resources: Further details are described in Section 6 of the Drought Contingency Plan. ▪ <u>Communicate with Public</u>: Each entity will communicate the severity of drought conditions and necessary mitigation actions and response actions to implement for the area. ▪ The entities will contract with consultants and other experts who will perform technical work for the elements of the Drought Contingency Plan as needed such as procurement and resource tracking. <p>• According to the Department of Water Resources (DWR), it is the responsibility of the California Governor to declare State or local drought emergencies for vulnerable regions under the provisions of California's Emergency Services Act. ⁽¹⁾</p>

¹Retrieved from: <https://water.ca.gov/water-basics/drought>

2. Drought Monitoring

The drought monitoring process established for the Poso Creek Region, relies on water supply and availability forecasting by various regulatory agencies outside of the region. Droughts in the Poso Creek Region are the result of drought conditions in other regions of the State that effect the availability of imported water to water purveyors of the RWMG members. Specifically, the availability of imported surface water from the State Water Project (SWP) and the Central Valley Project (CVP) determine the level of drought severity in the Poso Creek Region. As such, drought monitoring is heavily dependent on delivery projections from the SWP and CVP. Another critical supply source is the Kern River, which service several RWMG members. Finally, groundwater level conditions provide important criteria for drought management. As developed through the SGMA process, the RWMG service area has minimum thresholds for groundwater levels that represent a minimum groundwater level allowable without causing unreasonable impacts to groundwater users in the region. When groundwater levels are sufficiently above established minimum thresholds, groundwater can be pumped to offset reductions in imported surface water. When groundwater levels are close to or below minimum threshold values, overlying users may be restricted from pumping groundwater. The water management agencies within the Poso Creek Region are coordinating management efforts to maintain groundwater levels above the established minimum thresholds even during drought conditions.

Drought monitoring will be coordinated through the Drought Task Force, who will guide drought indicator monitoring and coordinate response actions among the RWMG water management entities. As drought levels increase, as described below, the level of communication will increase between the Drought Task Force, water management entities, and stakeholders. In the Poso Creek Region, where there is a high dependance on imported water in all year types, the ability to mitigate drought conditions begins with managing surplus water during wet years. Therefore, the drought monitoring program for the Poso Creek Region includes a wet stage to trigger actions by local water management entities to maximize the capture and storage of surplus water within the local groundwater basin for use during dry periods.

2.1 Drought Indicators

As highlighted above and described in greater detail in the following sections, drought conditions in the Poso Creek Region are primarily driven by the availability of imported surface water supplies and not local climate conditions. Therefore, the primary drought indicators are allocation from the SWP and CVP, and runoff conditions on the Kern River. Local precipitation and temperature trends have little effect on drought conditions in the Poso Creek Region.

2.1.1 State Water Project Allocations

State Water Project is delivered to SWSD and CWD, which represents 43 percent of irrigated acres and 46 percent of the agricultural water demand. The water supply availability for delivery by the SWP depends on rainfall, snowpack, runoff, reservoir storage, pumping capacity of SWP facilities, and regulatory and environmental mandates on SWP operations. Water from rainfall and snowmelt runoff is stored in SWP conservation facilities such as Lake Oroville, flows through the Sacramento-San Joaquin Delta (Delta) and is delivered via SWP transportation facilities like the California Aqueduct. The amount of SWP water available to SWSD and CWD varies yearly, based on hydrologic conditions and reservoir storage in Northern California.

Through the SWP, DWR delivers Table A water and Article 21 water. Table A allocations represent a portion, or all the annual Table A amount (total contract water entitlement) requested by SWP water contractors and approved for delivery by DWR. SWP Article 21 supplies are short-term surplus water made available to the SWP contractors. Article 21 water is a critical wet year supply that local districts rely on for groundwater recharge and banking. These wet year supplies offset the overall reduction of SWP deliveries during non-wet years and especially during drought years.

The DWR provides annual SWP allocation forecasts to SWP contractors water supplies, typically beginning in January and continuing monthly through March or May, depending on hydrologic conditions. These forecasts are the critical planning tool available to SWP contractors to determine water available and whether a water year is wet or dry, as defined in Section 2.2.1. These DWR forecast will serve as the drought monitoring indicator for the SWP supplies available to RWMG member agencies.

2.1.2 Central Valley Project Allocations

Reclamation delivers Friant Division CVP water to Shafter-Wasco ID, Delano-Earlimart ID, Southern San Joaquin MUD and KTWD. These four districts represent 17 percent of irrigated acres and 38 percent of agricultural water demands in the Poso Creek Region. The volume of Friant Division water delivered to CVP contractors varies from year to year and is dependent upon hydrological conditions in the San Joaquin River watershed. Friant Division contractors receive either “Class 1” or “Class 2” water. “Class 1” water is a supplemental supply of water for certain contractors. “Class 2” water is undependable supply. The Class 2 supply of water is that which can be made available subject to the contingencies for delivery from Millerton Lake, Madera Canal, and the Friant-Kern Canal in addition to the supply of Class 1 Water. In addition to Class 1 and Class 2 supplies, other sources available for delivery for banking, transferring, and exchanging include Section 215 water, floodwater, water from the San Joaquin River Settlement and recaptured Friant water.

KTWD is a Cross Valley and Friant CVP contractor that receives water from northern California through the California Aqueduct and the Cross Valley Canal (CVC). The amount of water surplus

to a CVP contractor's irrigation demand each year is unpredictable and varies depending upon hydrologic events in Northern California or the San Joaquin River.

While several of the RWMG member agencies do not have long-term CVP contracts (non-CVP districts), they have historically entered temporary contracts for Section 215 Water and have accepted delivery of CVP surplus flows. Contracts executed with non-CVP districts for Section 215 Water supplies are dependent upon water becoming available as defined in Section 215 of the Reclamation Reform Act. Additionally, the non-CVP districts have a lower priority to take delivery of these non-storable surplus flows. The non-CVP districts are offered 215 Water only after the needs of the Friant Division and CVC have been met. Typically, this water is not available during drought conditions, but these supplemental supplies are important wet year sources that many of the RWMG member agencies can take advantage of and are used to support groundwater recharge program that improve the water supply reliability for the local agencies.

Reclamation provides annual Friant Division CVP water allocations, typically beginning in February and continuing monthly through June or July, depending on hydrologic conditions. These forecasts are the critical planning tool available to Friant Division contractors to determine water available and whether a water year is wet or dry. These CVP forecasts will serve as the drought monitoring indicator for the Friant Division supplies available to RWMG member agencies.

2.1.3 Kern River Allocations

The Kern River provides water to the NKWSD, which represents 16 percent of irrigated acres and 15 percent of agricultural water demands in the Poso Creek Region. NKWSD maintains various Kern River "pre-1914" water rights. Because the District's river rights are largely "junior" rights and subject to large swings in yield depending on river hydrology, the District has developed a series of projects focused on "re-regulating" these highly variable supplies for the purpose of "maintaining economic pumping lifts" for landowners within the District. Re-regulation is primarily accomplished through construction and operation of "recharge/spreading ponds" to maximize the capture of wetter year river supplies accruing to the rights and groundwater wells to "recover" previously stored water in drier years when surface supplies accruing to the rights are limited.

The DWR provides annual forecasts for Kern River water allocations. These forecasts are the critical planning tool available to NKWSD to determine water available and whether a water year is wet or dry. These Kern River forecasts will serve as the drought monitoring indicator for the NKWSD.

2.1.4 Poso Creek Flows

Although intermittent, NKWSD, SWSD, and CWD occasionally receive surface water from Poso Creek, which originates from the east of the Poso Creek Region with its headwaters in the Greenhorn Mountains. Diversions are governed by an agreement that began in 1997 made between NKWSD, SWSD, and CWD, who collectively share the runoff of Poso Creek. Under the

agreement, riparian users are satisfied first followed by CWD, NKWSD, and SWSD based on flow of Poso Creek at Highway 65. Records of stream flow at Highway 65, 328-square mile drainage area for Poso Creek, have been maintained over the past 40 years. This location marks the point at which Poso Creek enters CWD, which is also the eastern boundary of the Poso Creek Region. Figure 2-1 illustrates the fluctuation in annual runoff volumes which enter the region as surface flow.

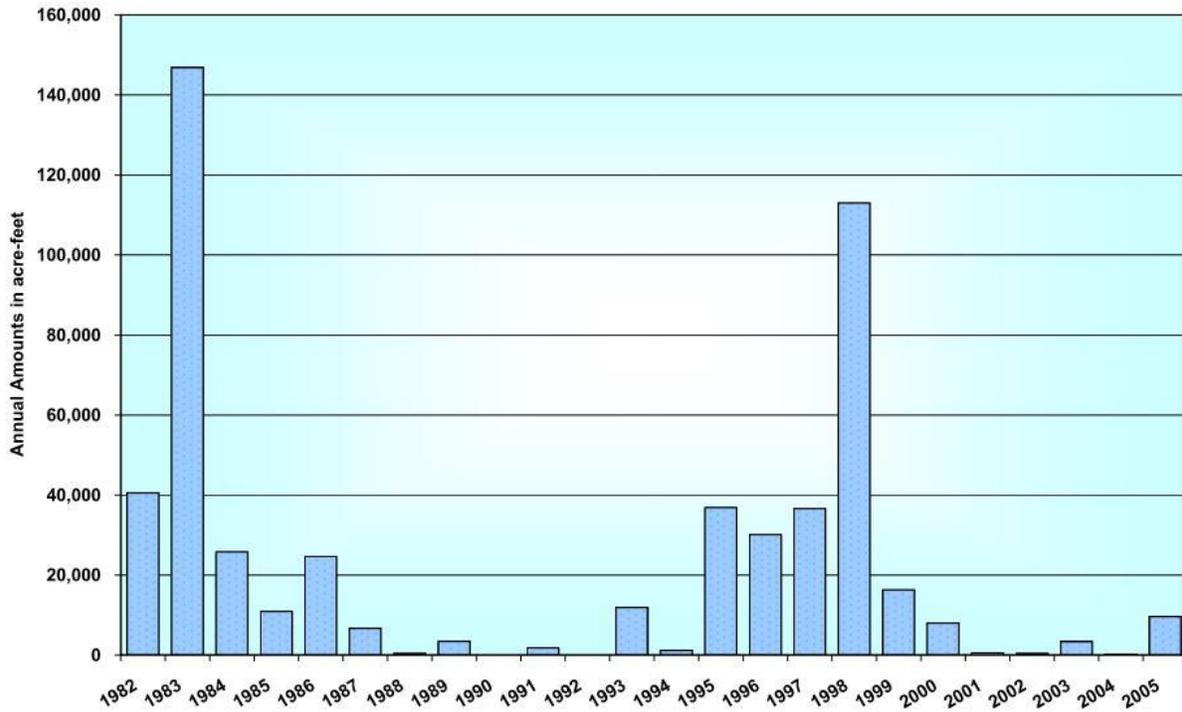


Figure 2-1. Annual Runoff of Poso Creek at HWY 65

The average annual runoff for the years 1982 through 2005 was approximately 22,000 acre-feet. Of this average, it is worth noting that two of these years, 1983 and 1998, were considered wet years. Runoff predominately occurs in the months of January through May. Given the erratic nature of the stream, the primary use of this supply is its contribution to the underlying groundwater supply through natural recharge from the stream channel or spreading activities by NKWSD, SWSD, and CWD, during wet years when there is significant flow in the creek.

Poso Creek flows are not appropriate for use a drought indicator, as the flows in Poso Creek do not support any significant water supply to the water districts in the region and Poso Creek does not experience flows of any significance in average or dry hydrologic conditions. Poso Creek does provide source of manageable water during wetter hydrologic conditions and is considered an indicator of surplus conditions, as defined in the following sections. Flows on the Poso Creek can contribute to groundwater recharge during wet years when flows exceed 500 cfs. Therefore, Poso Creek is included as a surplus supply indicator.

2.1.5 Groundwater Conditions

The other primary indicator of drought are local groundwater conditions. Through the SGMA process, the Poso Creek IRWM members developed Groundwater Sustainability Plans (GSPs) through the Kern Groundwater Authority (KGA) or the Delano-Earlimart Irrigation District Groundwater Sustainability Agency (DEID-GSA). The RWMG agencies participating in the KGA prepared Management Area Plans (MAPs) as a local management element of the KGA-GSP. **Table 2-1** lists the GSPs developed in the Poso Creek Region. Each GSP establishes Sustainable Management Criteria (SMCs) for the long-term sustainable management of groundwater. The SMCs process establishes Minimum Thresholds for groundwater levels in the Poso Creek Region.

Minimum Thresholds represent a minimum groundwater elevation that, if exceeded, could cause Undesirable Results to local groundwater users and uses, which are defined by the SGMA as the point at which significant and unreasonable impacts over the planning and implementation horizon affect the reasonable beneficial use of, and access to, groundwater by overlying users (SWSD, 2019). Therefore, it is the objective of local districts to maintain groundwater elevations above established Minimum Threshold groundwater elevation. Minimum Thresholds have been set at each representative SGMA monitoring well as the point at which impacts to beneficial uses and users are significant and unreasonable and that cannot be mitigated. Minimum thresholds have been set within the boundaries of each RWMG agency to ensure the diversity of geographic conditions and beneficial users are considered and represented. Minimum threshold values for each RWMG agency can be found on the Kern Subbasin Data Management System¹. Under SGMA, groundwater levels are measured semi-annually in the spring and fall by the implementing agencies, which include each RWMG agency.

Table 2-1. Groundwater Sustainability Plans Covering the Poso Creek Region

RWMG Agency	SGMA Plan
Semitropic Water Storage District	KGA GSP MAP
North Kern Storage District	KGA GSP MAP
Shafter-Wasco Irrigation District	KGA GSP MAP
Southern San Joaquin Municipal Utility District	KGA GSP MAP
Cawelo Water District	KGA GSP MAP
Shafer-Wasco Irrigation District 7 th Standard Annex Area	KGA GSP MAP
Kern-Tulare Water District	KGA GSP MAP
Delano-Earlimart Irrigation District	DEID GSA GSP

Through groundwater recharge programs implemented during wet periods, local districts strive to maintain and improve groundwater conditions to elevations sufficiently above Minimum Thresholds to allow for increased groundwater pumping in drier periods, or periods of reduced imported water allocations. When groundwater levels are sufficiently above Minimum Threshold values, local districts and landowner may choose to rely on groundwater to meet agricultural demands to reduce the impact of reduced imported water allocations. The MAPs of the local

¹ <https://dms.geiconsultants.com/kern/>

districts specify both groundwater recharge program and their operational capacities and the level of groundwater extractions that can be made during drought conditions, with the goal to maintain groundwater sustainability. When groundwater levels approach or are below the Minimum Threshold values, districts may choose to restrict groundwater, thereby reducing available water supplies and creating an additional drought constraint. The monitoring of groundwater conditions is performed by each district and coordinated through the Kern Groundwater Agency, who also works with districts to determine if impacts to groundwater levels are caused by regional or local groundwater management activities.

Specific Minimum Thresholds and groundwater management strategies are provided in the MAPs covering the Poso Creek Region. Each MAP is unique to the groundwater conditions, land uses and water supply sources of the local district. As groundwater levels approach or exceed Minimum Threshold Values its impact to the Drought stages will also increase.

2.2 Drought Forecasting

As described throughout this Plan, Drought conditions in the Poso Creek Region are primarily driven by hydrologic conditions effecting the SWP, CVP, and Kern River watersheds. The DWR for the SWP, the Reclamation for the CVP, and the Kern River Watermaster, for the Kern River, all provide some form of water reliability forecasting. Drought monitoring in the Poso Creek Region will rely on annual forecasting from these sources to define the Drought Stage in the region, which are typically provided beginning in early winter to late spring. Annual delivery forecasts are updated by each of the identified entities throughout the winter–spring period as hydrology conditions change in the source watersheds. Additionally, as specified in Table 1-8, it is the responsibility of the California Governor to declare State or local drought emergencies for vulnerable regionals under the Provisions of California’s Emergency Services Act. Both forecasting and direction from the California Governor will be considered when determining drought conditions.

Determination of drought stages in the Poso Creek Region will be dependent on an individual district’s evaluation of first the annual allocation of imported water supply as reported by either the DWR, Reclamation, or the Kern River Watermaster. Each of these entities provides annual forecasts at differing times and frequencies, therefore each district in the Poso Creek region is responsible for monitoring annual forecasts for its specific water supplies. Secondly, each district is responsible for monitoring local groundwater conditions relative to measurable objectives and minimum thresholds developed through the SGMA process. When combination of imported water allocation and groundwater conditions meet a trigger for drought conditions, the district will report these conditions to the Drought Task Force and the Task Force will begin the process of implementing drought responses in coordination with the districts.

2.2.1 Drought Stages

The Poso Drought Contingency Plan has defined four stages of hydrologic conditions for proactively managing drought conditions. These stages, described below, include a both dry and wet condition monitoring with associated mitigation responses. The entities listed in Table 2-2 are responsible for determining the stage of drought for their respective areas and will use forecasting outlined in Section 2.2 when determining drought stages. Drought stages will be communicated by each District to DACs within their respective boundaries.

2.2.1.1 Surplus Conditions Stage

The Surplus Conditions Stage is the most critical stage of drought monitoring in the Poso Creek Region. As described in this Plan, the ability of the Poso Creek Region to manage and mitigate drought conditions is through the capture and recharge of surplus water supplies into the local groundwater aquifer, where it can be held for use in future drought conditions. Each RWMG water management entity has developed groundwater recharge program, individually or in coordination with other Kern County entities to maximize the recharge capability in the Poso Creek Region, as well as Kern County. During the Surplus Conditions Stage, the Drought Task Force will initiate coordination among the RWMG water management entities and other recharge and banking projects in Kern County to ensure the region is maximizing its ability to capture, convey, and recharge all available surplus waters. **Table 2-2** list the surplus water supplies potentially available, the RWMG district to which those supplies are available, and the Surplus Conditions trigger.

Table 2-2. Primary Surplus Conditions Stage Water Sources

Surplus Water Source	Entity Source is available to	Stage Trigger
CVP – Friant Division Class 1	DEID, SWID, SSJMUD	+75% allocation
CVP – Friant Division Class 2	DEID, SWID, SSJMUD, KTWD	+50% allocation
CVP – Cross Valley	KTWD	+90% allocation
CVP – 215 Water	DEID, SWID, SSJMUD, KTWD, SWSD	Any allocation
Kern River	NKWSD	120% of normal April-July forecast
Poso Creek	CWD, NKWSD, SWSD	+ 500 cfs

The Drought Task Force will engage the Surplus Condition Stage whenever a Stage Tigger is exceeded. The goal of the Task Force will be to maximize coordination among RWMG member agencies to ensure surplus water is captured and stored locally for use during dry years.

2.2.1.2 Drought Stage 1 – Severe Drought

Drought Stage 1 represents the first level of drought response in the Poso Creek Region where the region is experiencing severe drought. At this stage the Drought Task Force will engage to coordinate an initial stage of managing the recovery of locally banked water or support water transfers to RWMG member agencies to meet any shortages in imported water supplies. **Table 2-**

3 provides the triggers for Drought Stage 1. When one or more of the triggers in **Table 2-3** are experienced, the Poso Creek Region will enter Drought Stage 1.

Table 2-3. Drought Stage 1 Trigger

Surplus Water Source	Entity Source is available to	Stage Trigger
SWP – Table A	SWSD, CWD	25% to 11% allocation
CVP – Friant Division Class 1	DEID, SWID, SSJMUD	25% to 11% allocation
CVP – Cross Valley	KTWD	25% to 11% allocation
Kern River	NKWSD	75% to 51% of normal April-July forecast allocation
Groundwater Levels	All RWMG agencies	Exceedance of up to 5% of Minimum Thresholds in a MAP area

2.2.1.3 Drought Stage 2 – Extreme Drought

Drought Stage 2 represents an increased level of drought response in the Poso Creek Region where the region is experiencing extreme drought. At this stage the Drought Task Force will engage to coordinate more active recovery of locally banked water, water transfers to RWMG member agencies, and management of groundwater levels to maintain compliance with SGMA and Minimum Thresholds established in MAPs. **Table 2-4** provides the triggers for Drought Stage 2. When one or more of the triggers in **Table 2-4** are experienced, the Poso Creek Region will enter Drought Stage 2.

Table 2-4. Drought Stage 2 Trigger

Surplus Water Source	Entity Source is available to	Stage Trigger
SWP - Table A	SWSD, CWD	10% to 1% allocation
CVP – Friant Division Class 1	DEID, SWID, SSJMUD	10% to 1% allocation
CVP – Cross Valley	KTWD	10% to 1% allocation
Kern River	NKWSD	50% to 26% of normal April-July forecast allocation
Groundwater Levels	All RWMG Entities	Exceedance of up to 50% of Minimum Thresholds in a MAP area.

2.2.1.4 Drought Stage 3 – Exceptional Drought

Drought Stage 3 represents the highest level of drought response in the Poso Creek Region where the region is experiencing exceptional drought. In this stage the Drought Task Force will engage to coordinate more active recovery of locally banked water, water transfers to RWMG member agencies, and management of groundwater levels to maintain compliance with SGMA and Minimum Thresholds established in MAPs. In Drought Stage 3, it may be possible that curtailments on groundwater may occur to maintain Minimum Thresholds and sustainability

criteria under SGMA. **Table 2-5** provides the triggers for Drought Stage 3. When one or more of the triggers in **Table 2-5** are experienced, the Poso Creek Region will enter Drought Stage 3.

Table 2-5. Drought Stage 3 Trigger

Surplus Water Source	Entity Source is available to	Stage Trigger
SWP - Table A	SWSD, CWD	0% allocation
CVP – Friant Division Class 1	DEID, SWID, SSJMUD	0% allocation
CVP – Cross Valley	KTWD	0% allocation
Kern River	NKWSD	<25% of normal April-July forecast allocation
Groundwater Levels	All RWMG Entities	Exceedance of more than 50% of Minimum Thresholds in a MAP area.

3. Vulnerability Assessment

The vulnerability assessment evaluates the risks and impacts of drought for all relevant sectors in the Plan Area. Evaluations of (1) water supply and major conveyance vulnerabilities, and (2) water quality vulnerabilities have been conducted for the Plan Area. The vulnerability assessment is based on a range of future conditions, including consideration of the effects of climate change. The assessment drives mitigation and response actions outlined in Sections 4 and 5 of this Plan.

3.1 Basis of the Vulnerability Assessment

To conduct the vulnerability assessment, primary assets and resources in the Poso Creek region that are affected by drought conditions were evaluated, while also considering available climate change information. The methodology used for developing the vulnerability assessment is as follows:

1. Review vulnerability information provided in the Groundwater Sustainability Plans (GSPs), 2019 IRWM Plan Update, UMWPs, and water budgets from the GSPs and AWMPs.
2. List vulnerabilities, as shown in **Table 3-1**.
3. Conduct a sensitivity analysis for vulnerabilities in terms of sensitivity to drought and consequences of potential effects.
4. Categorize the impact of vulnerabilities based on local or external factors.

These elements were prioritized to identify critical resources that posed vulnerabilities to drought. A list of identified vulnerabilities is shown in **Table 3-1**. An evaluation of additional factors that may cause these vulnerabilities are described in further detail in Section 3.5.2.

Table 3-1. Drought Vulnerabilities in the Poso Creek Region

Drought Vulnerabilities
Variable Kern River supplies
Variable Lake Isabella reservoir storage
Variable and reduced Friant-Kern Canal (FKC) capacity
Municipalities that rely solely on groundwater
Allocation reductions in CVP and SWP supplies due to hydrologic variability or institutional and regulatory constraints
Increased groundwater pumping costs and well impacts potentially caused by decreasing groundwater elevations
Allocation reductions to Friant Division long-term contractors as San Joaquin River channel improvements are implemented that allow for increased and ultimately full release of Restoration Flows
Reduction in groundwater availability to meet the SGMA sustainability goals.

Drought vulnerabilities are predominately from external factors since the Poso Creek Region relies heavily on imported water supplies from the SWP and CVP to meet a significant portion of the

regions water demands. Because of this reliance on imported water, drought vulnerability is generally caused when imported water supplies are reduced due to dry hydrologic conditions (droughts) outside of the regions or other regulatory and operational restrictions on water supply diversions from the Delta or San Joaquin River. Therefore, mitigation and response actions outlined in Sections 4 and 5 of this Plan focus on managing available imported water during wet years to better prepare for periods of drought. For example, enhanced effectiveness in conveyance and expansion of recharge and recovery capabilities could allow for increased storage of surplus water, when available, to enhance the water supply availability from previously banked water during dry periods when imported water is limited or unavailable.

As part of this Plan, vulnerability assessments will be examined, evaluated, and updated on a regular basis; at least every 5 to 7 years, to ensure that assessments accurately reflect potential vulnerabilities in the region. These updates will be coincident with required updates to the GSP MAPs in the Poso Creek Region. As previously stated, this assessment provides the groundwork for the development of mitigation actions and response actions presented in Sections 4 and 5.

3.2 Regional Water Resources

To better understand and assess regional drought vulnerabilities, it is important to understand the region's water supply resources and their sources. The region's primary water resources include imported supplies from the SWP and CVP, which are reliant on allocations from outside of the region, including the Delta and the San Joaquin River. Other primary sources include local surface water supplies from the Kern River, which are regulated through Lake Isabella Reservoir and local groundwater resources.

During drought conditions the region increases its reliance on local groundwater supplies to meet irrigation and urban demand as imported water supplies are curtailed. Groundwater supplies include both previously banked or recharged surface water and native groundwater that has accumulated in the groundwater basin. During years with average or higher allocations of imported supplies, water districts in the region can reduce their reliance on groundwater and bank or recharge surface water in the local groundwater basin for use in drier years. The ability to bank surface water when its available allows the region to better manage available supplies and mitigate the reduction of groundwater levels in the Kern Subbasin while also meeting irrigation needs.

3.2.1 Water Supply Reliability

Due to concerns regarding groundwater and surface water supply reliability especially in drought periods, principal sources in the region such as imported supplies from the SWP and CVP, and local supplies from the Kern River were examined. Historically, the members of the Poso Creek Region have relied on long-term water supply contracts with DWR (SWP) and Reclamation (CVP) to transport imported water supplies to the region to offset groundwater demand and reduce groundwater pumping. Imported water supplies are now more important due to the implementation of SGMA and its associated SMCs. While an important resource, in recent years, SWP allocations

have been reduced significantly because of water quality conditions and environmental regulation to preserve the Delta, thereby reducing exports south of the Delta for agricultural use for SWP contractors. Similarly, allocation of Friant Division supplies has been reduced due to the San Joaquin River Restoration Settlement Act, as well as subsidence in the Friant-Kern Canal (FKC), which has impacted Friant Contractors from concurrently meeting the needs of the restoration of a salmon fishery and irrigation demands. The water supply reliability of Kern River has also been threatened due to ongoing litigation as well as the expiration of long-term contracts.

3.2.2 Forecasted Availability

Based on analysis by DWR and Reclamation for future allocations, it is anticipated that projected annual allocations may be reduced based on hydrological factors such as rainfall, snowpack, runoff, and reservoir storage. For instance, 2021 SWP allocation was projected at 15 percent in October 2020. However, since 2021 is California's second consecutive dry year, the allocation was reduced to 5 percent in March 2021 (DWR, 2021). Similarly, CVP allocations are also affected by dry year conditions. According to the latest CVP Water Quantities for Delivery 2021, allocations for agricultural water service contractors, initially at 5 percent, are no longer available for delivery (Reclamation, 2021). However, allocations of Friant Division supplies for 2021 currently remain at its initial amounts of 20 percent for Friant Class 1 and 0 percent for Friant Class 2. As a result, allocations of surface water supplies from these sources are less reliable in dry years. Given the reliance of groundwater supplies when supplemental surface water is unavailable, declining static groundwater levels could be a concern for the region. Therefore, mitigation actions have been developed for participants to better manage available supplies during wet years and estimate for future constraints on imported supplies in the region.

3.2.3 Sources of Water

Utilizing the information from existing planning documents such as the 2019 IRWM Plan Update; GSPs; Agricultural Water Management Plans (AWMPs), and information from DWR's and Reclamation's websites, a catalog of assets and resources in the Poso Creek Region were identified. The following sections provide details on water resource use for agricultural, environmental, municipal, industrial, recreational, and socio-economic resources.

3.2.3.1 Agricultural Use

Agriculture is the primary industry in the Poso Creek Region, with approximately 380,600-acres of irrigated land. **Table 3-2** presents the various water resources that support agriculture in the region. As shown, most of the water used for irrigation is imported and infrastructure has been developed to support conveyance across the region to support conjunctive use management, which is critical during dry or drought years when participants rely on return of previously banked water to service water to growers within their respective districts.

Table 3-2. Water Supply Sources

Source	Conveyance System/Infrastructure	Type of Use
Lake Oroville	Sacramento-San Joaquin Delta	Flows from the reservoir storage at Lake Oroville through the Delta for SWP operations
Northern California CVP Reservoirs	Sacramento-San Joaquin Delta	Flows from reservoir storage through the Delta for CVP operations
Lake Isabella Reservoir	Kern River	Water Rights and Supply Contracts for irrigation use
Millerton Reservoir	Friant-Kern Canal	Diverted contracted surface water supplies for irrigation use and return of previously stored water to banking partners
Southern Sierra Nevada	Poso Creek	Intermittent surface supplies for irrigation use and groundwater recharge
Kern County Groundwater Subbasin	Local district/private wells and other groundwater sources	Groundwater pumping for irrigation use
Tule Groundwater Subbasin	Local district/private wells and other groundwater sources	Groundwater pumping for irrigation use

3.2.3.2 Environmental Use

Recognizing the presence of various ecological and environmental resources in the region, water for this type of use has been considered in the vulnerability assessment. The Kern National Wildlife Refuge (KNWR) is an approximately 1,250-acre refuge located in the northwestern portion of the region managed under the Central Valley Project Improvement Act (CVPIA) of 1992. KNWR develops and implements conveyance projects to deliver water to satisfy annual habitat requirements for species that use the refuge. In addition, districts within the region coordinate with NWKRCDD to carry out programs related to protecting natural resources and water use efficiency. **Table 3-3** provides overview of the various water resources used for environmental purposes.

Table 3-3. Environmental Use

Source	Conveyance System/Infrastructure	Type of Use
Friant-Kern Canal	Millerton Reservoir (created by the Friant dam on the San Joaquin River)	For habitat restoration to protect
Sacramento-San Joaquin Delta	Various conveyance systems in the Poso Creek Region	For habitat restoration to protect endangered aquatic wildlife such as the endangered chinook salmon and other wildlife that rely on this water source

3.2.3.3 Municipal and Industrial Use

While water use in the region is predominately agricultural, there are multiple cities and communities that rely on groundwater for drinking water purposes. These cities and communities are mostly classified as disadvantaged communities (DACs) as discussed in Section 3.3.3. In addition to municipal use, there are also various industrial uses within the region that rely on various district supplies and groundwater to support operations. **Table 3-4** provides the various sources used to support municipal and industrial uses.

Table 3-4. Municipal Use

Source	Conveyance System/Infrastructure	Type of Use
Kern County Groundwater Subbasin	Local wells	For drinking water
Tule Groundwater Subbasin	Local wells	For drinking water
Various District water supplies	Varies (i.e., Kern River, Groundwater)	For industrial uses

3.2.3.4 Recreational Use

Recreational water use within the region is predominately located within KNWR and several “duck clubs” which are located near KNWR. Water demand is attributable to grain irrigation and/or flooding ponds for waterfowl, including duck clubs. Other recreational uses that import supplies are located outside of the region and include the Isabella Reservoir, also known as Lake Isabella, and Lake Ming, which are located east of the City of Bakersfield and supplied by Kern River water. Other recreational areas include Lake Woollomes, which adjoins the FKC and serves as a regulating reservoir for the FKC operations; and the Buena Vista Aquatic Recreation Area near the SWP California Aqueduct (Poso Creek RWMG, 2019). While not within the region, these uses must be considered in this vulnerability assessment since they use the same water sources the region is reliant upon. **Table 3-5** presents several water resources utilized for recreational purposes.

Table 3-5. Recreational Use

Source	Conveyance System/Infrastructure	Type of Use
Lake Isabella reservoir	Kern River	For various recreational activities including supply to Lake Ming
CVP and SWP	Varies	For various recreational activities for Lake Woollomes and Lake Buena Vista, respectively

3.2.4 Critical Resources

Resources that are prioritized as highly important to protect and preserve because of potential risk they pose to the region during periods of droughts are defined as critical resources. As previously stated, the main sources in the region are imported surface water supplies from the SWP, CVP, and local supplies from the Kern River. Through the evaluation of the sources of these three-surface water and groundwater supply resources, the following are considered critical resources:

- Kern County Groundwater Subbasin and the Tule Groundwater Subbasin are the source of groundwater supplies. Lowering of groundwater levels create drought vulnerabilities in dry years when imported surface water is reduced.
- Lake Oroville as primary water source for SWP and Millerton Lake as the primary water source for CVP. Both are critical water sources for imported surface water supplies.
- Sacramento-San Joaquin Delta is the key conveyance hub for SWP and CVP water supply allocations. Restrictions in exports from the Delta result in an increased use of stored groundwater supplies to meet irrigation demands.
- Lake Isabella Reservoir is the source for Kern River local supplies. Lower reservoir storage results in lower flows through Kern River, thereby increasing the use of stored groundwater supplies to meet irrigation demands.
- Sierra Nevada is the source for Poso Creek local supplies. Lower precipitation at Sierra Nevada results in lower flows to Poso Creek, thereby reducing this additional surface water supply to the region.

Since the region is heavily dependent on groundwater during dry or drought years, surface water is critical in building stored water supplies. Stored supplies can later be extracted, conveyed, and utilized during dry years when imported surface water supplies are limited or unavailable.

3.3 Regional Water Demand

As previously stated, the primary industry in the region is agriculture, which includes crop irrigation, dairies, production, food processing, and manufacturing. Other industries include industrial, municipal, domestic, and commercial operations for local cities, communities, and industrial entities. Environmental and recreational industries include the KNWR, duck clubs, and groundwater recharge ponds that attract waterfowl and aquatic wildlife. Considering the direct impact of water use on these industries, water users in the region are described as beneficial users.

Forecasting the regions future water demands is a difficult task due to the multitude of variables effecting agricultural practices in the region. Crop pattern in the region have changed significantly over the past decades, once being dominated by cotton and now by nut crops. These changes in

crop patterns and resulting water demands have been driven by economic and agricultural practices rather than water supply availability or climate factors. In the future individual landowners will be required to adjust agricultural practices due to a reduced reliability of water supplies, primarily driven by limits to groundwater extractions; changing climate conditions effecting crop productivity; economic conditions impacting agricultural commodity prices; and a variety of other economic, social and regulatory influences. Local water district's will manage water supplies as a balance of available imported water and allowable groundwater extractions to landowners, who will then be required to manage their demands within those available supplies, thereby altering the regional agricultural demand in consideration of the influences identified above. Managing water supplies, especially groundwater conditions, will protect potentially vulnerable municipalities, communities, and DACs in the regions, consistent with analyses prepared in the regions Groundwater Sustainability Plans.

In reviewing the GSPs and 2019 IRWM Plan Update, the following water users were identified in the region: Poso Creek RWMG agencies that are agricultural water districts such as SWSD, NKWSD, SSJMUD, DEID, CWD, and KTWD, as well as municipal, domestic, and industrial users of the disadvantaged communities (DACs) in the region (See Section 3.3.3). The following sections provide a breakdown of the water supply demand needed in the region for agricultural, municipal, and industrial uses.

3.3.1 Irrigated Acreage

The following section provides the planning area demand of the Districts in the Poso Creek Region based on data developed from local studies, and GSP work from Land IQ and ITRC for members of the Poso Creek IRWM Group. The irrigated acreage and major crop types of the districts have been gathered from existing GSPs and Management Areas Plans under SGMA and are provided in **Table 3-6**.

Table 3-6. District Irrigated Acreage and Crop Types

District	Irrigated Acreage	Crop Types
Semitropic Water Storage District	125,300	Cotton, alfalfa, grain, and deciduous nuts
North Kern Water Storage District	59,969 ¹	Field crops, pasture and grain crops, and deciduous nuts and fruits
Shafter-Wasco Irrigation District	29,410	Field crops, pasture and grain crops, and deciduous nuts and fruits
Southern San Joaquin Municipal Utility District	51,000	Vineyards, citrus, and deciduous fruits and nuts
Delano-Earlimart Irrigation District	56,500	Primarily grapes, almonds, pistachios, and tree fruit
Cawelo Water District	38,328	Citrus, trees, deciduous nuts, and vineyards
Kern-Tulare Water District	20,140	Field crops including blueberries, citrus, trees and nuts, and vineyards.

¹Acreage includes Rosedale-Ranch Irrigation District

3.3.2 Water Supply Demand

The following section provides current water supply demand estimates based on data developed from GSPs and MAPs under SGMA for members of the Poso Creek IRWM Group. **Table 3-7** provides a summary of estimated demand for agriculture uses. As previously mentioned, demand is satisfied by importation of surface water that is often banked and later extracted as groundwater during dry or drought years.

Table 3-7. District Water Use in the Poso Creek Region

District	Agricultural Water Use (AF)
Semitropic Water Storage District	363,000 ⁽¹⁾
North Kern Water Storage District	155,600 ⁽²⁾
Rosedale Ranch Improvement District	11,300 ⁽³⁾
Shafter-Wasco Irrigation District	83,700 ⁽⁴⁾
Southern San Joaquin Municipal Utility District	120,700 ⁽⁵⁾
Delano-Earlimart Irrigation District	137,773 ⁽⁶⁾
Cawelo Water District	105,780 ⁽⁷⁾
Kern-Tulare Water District	48,895 ⁽⁸⁾

(1) Data provided is reported for current conditions based on the most recent hydrology, water supply, water demand and land use information. This value is an average of the best case (320,000 AFY) and worst case (405,000) demand for developed agricultural land based on cropping patterns (SWSD, 2019, p. 130).

(2) Data provided is the estimated Irrigated Acre ET for current conditions based on the average of 2013-2015 ET data developed by ITRC for the 2014 irrigated acre (NKWSD and SWID, 2019, p. 166)

(3) Data provided is the estimated Irrigated Acre ET for current conditions based on 55% of the 2014 ET data developed by ITRC for the 2014 irrigated acre (20,500 AF) (NKWSD and SWID, 2019, p. 168)

(4) Data provided is the estimated Irrigated Acre ET for current conditions based on the average of 2013-2015 ET data developed by ITRC for the 2014 irrigated acre (NKWSD and SWID, 2019, p. 169)

(5) Data provided for current conditions is based on the CVP model that uses an average of 2013 to 2015 irrigated acreage (SSJMUD, 2019, p.127).

(6) This value is reported for the 2016 water year (DEID, 2020, p. 5-4 and Tule Subbasin Appendix C Table 1a).

(7) This value reported is the average Crop ET for the current period from 2015-2017 (CWD, 2020, p. 85).

(8) This is the Applied water demand based on difference between Crop ET and Effective Precipitation reported for 2017 (KTWD, 2020, p. 2-34)

3.3.3 Disadvantaged Communities

According to the Census American Community Survey (ACS) 5-year estimates, the annual median household income for California is \$75,235 for the period 2015-2019. Disadvantaged communities (DACs) are defined as a community with an annual median household income less than 80 percent of the statewide annual median household income (\$60,188), whereas severely disadvantaged

communities (SDAC) have an annual median household income less than 60 percent of the statewide annual median household income (\$45,141).

In the development and implementation of the GSPs, the participants of the Poso Creek Group communicated with DACs and SDACs to account for water supply and demand. This section identifies the DACs in the Poso Creek Region and provides demand estimates based on GSP, UWMP, and Community Plan work from historical city pumpage demand. Estimated population for each DAC is based on the 2015-2019 ACS 5-year estimates. **Table 3-8** shows a list of DACs in the region, their estimated population, and demand for municipal and industrial water uses. Majority of the communities within the region lack data sufficient to capture municipal demand, a gap that has been identified under SGMA plans that will be addressed as plans are implemented.

Table 3-8. DAC Water Use in the Poso Creek Region

Communities	Estimated Population ⁽¹⁾	Median Household Income (MHI)	Municipal/Industrial Water Use ⁽²⁾ (AF)
Allensworth	575	\$33,214	-
City of Shafter	23,656	\$46,558	4,311 ⁽³⁾
City of Wasco	29,932	\$38,429	3,456 ⁽³⁾
City of McFarland	14,823	\$35,346	1,800 ⁽⁴⁾
City of Delano	52,886	\$43,641	8,100 ⁽⁴⁾
Ducor	636	\$26,875	-
Lost Hills	1,726	\$34,875	750
Buttonwillow	3,415	\$45,781	-
Pond School	497 ⁽⁵⁾	N/A	-
Poplar Avenue Community	-	-	-
Earlimart	14,978	\$31,706	-
Richgrove	2,316	\$20,962	-
Rodriguez Labor Camp	111	-	-
Semitropic School District	165 ⁽⁵⁾	N/A	-
Shafter North (North Park & North Shafter)	1,000	\$27,634	-
Shafter South	1,300	\$27,634	-
Sierra Vista	44	\$33,382	-

⁽¹⁾ Reported from ACS 5-year estimate for the period 2015-2019. Data retrieved from: unless noted otherwise.

⁽²⁾ Municipal and Industrial uses were combined in the GSPs. Individual UMWPs describe the types of urban uses in more details.

⁽³⁾ Reported in 2015. These represent the total city pumpage demand by percent area as reported for the 2015 UWMP. The data was adjusted to estimate 2015 usage more accurately from NKWSD, SWID, and Other Areas (NKWSD and SWID, 2019, p. 158).

⁽⁴⁾ Reported in 2015. These represent the total city pumpage demand by percent area as reported for the 2015 UWMP. The data was adjusted to estimate 2015 usage more accurately from SSJMUD (SSJMUD, 2019, p. 121).

⁽⁵⁾ Retrieved from: <https://censusreporter.org/profiles/95000US0631350-pond-union-elementary-school-district-ca/>

3.4 Regional Water Quality Conditions

Principle sources of supplemental surface water for the Poso Creek Region include, State, federal, and local supplies, all of which are used conjunctively with the underlying groundwater. Water quality monitoring for surface water is conducted by the project operators, such as the SWP and

the CVP. In addition, RWMG member agencies do some sampling and testing of surface water and groundwater supplies. Since districts predominately provide water for agricultural purposes, water quality monitoring is focused on suitability for crop irrigation. Cities and communities within the Poso Creek Region that rely exclusively on pumped groundwater focus sampling and testing on suitability for potable uses.

3.4.1 Surface Water Quality

Water quality in the following section summarizes the various surface water sources supplying the region including SWP, CVP, and Kern River water supplies. Data presented within is derived from recently update AWMPs and is representative of current water quality conditions. While imported surface water quality varies during dry or drought years, there is no expected vulnerability to the Subbasin since surface water use during dry years is minimal due to shortages.

3.4.1.1 State Water Project

Several districts within the region coordinate and rely on surface water quality monitoring conducted by other agencies. This is especially the case with imported SWP water from the California Aqueduct. Water is diverted from the California Aqueducts through multiple turnouts within the region to convey water to districts. The quality of water in the California Aqueduct is regularly monitored by DWR at several locations, including Check 21 located at Kettleman City (Station C21, KA017226), which is upstream of the first turnout for districts in the region. Therefore, water quality at this point is representative of SWP water delivered to the region. **Table 3-9** presents average concentrations of selected constituents based on DWR sampling at check 21 over a five-year period extending from 2012 through 2017 (SWSD AWMP, 2021).

Table 3-9. SWP Surface Water Quality

Parameter	Units	Concentration	Drinking Water Standards	Agricultural Thresholds
Calcium (Ca)	mg/L	20	-	-
Magnesium (Mg)	mg/L	14	-	-
Sodium (Na)	mg/L	63	-	69
Alkalinity	mg/L (as CaCO ₃)	75	-	-
Chloride (Cl)	mg/L	90	250	106
Sulfate (SO ₄)	mg/L	40	250	-
Boron (B)	mg/L	0.2	-	7
Total Dissolved Solids (TDS)	mg/L	303	500	450
Hardness	mg/L (as CaCO ₃)	109	-	-
Electrical Conductivity (EC)	µS/cm	545	900	700

Source: DWR Bulletin 132-17.

During the recent 2014 drought year, water quality levels averaged 85 mg/L for sodium, 112 mg/L for chloride, and 395 mg/L for TDS. While salinity may be slightly elevated during dry or drought years, levels are within the recommended agricultural thresholds and drinking water standards.

SWP water delivered is primarily banked and stored during wet years to be later returned during dry or drought years as groundwater when surface water deliveries are minimal. Given the limited amount of SWP water delivered during dry or drought years, water quality of the SWP is not considered a vulnerability of concern in the scope of the Drought Contingency Plan. Instead, salinity is currently being studied under the Prioritization & Optimization Study and will be addressed in the Subbasin as part of the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS).

3.4.1.2 Central Valley Project

The Central Valley Project delivers water through the Friant-Kern Canal (FKC), which is monitored by the Friant Water Authority (FWA). Annual ag suitability analyses were evaluated for vulnerability assessment purposes. Sample results from MP 122.05 at Woollomes Check is presented as it is representative of CVP water entering the region. **Table 3-10** provides the range of concentrations and average values for selected parameters reported by the FWA for the period of July 2009 through February 2019.

Table 3-10. CVP FKC Surface Water Quality

Parameter	Units	Wet Year (2013)	Dry Year (2014)	Average Concentration
Ca	mg/L	58	24.6	24.2
Mg	meq/L	3.0	0.2	0.8
Na	mg/L	69	34	23.9
Cl	mg/L	53.3	18	14.6
B	mg/L	0	0.2	0
TDS	mg/L	130	200	44
Electrical Conductivity	µS/cm	30	270	46

Source: Friant Water Authority – Friant-Kern Canal Water Analyses at Mile Point 122.05.

Water quality concentrations provided in **Table 3-10** meet the recommended agricultural thresholds and drinking water standards provided in **Table 3-9**. Like SWP water, CVP water is primarily used for irrigated agriculture with any excess banked during wet years. During dry years, water conveyed in the CVP consists of available surface water supplies blended with non-project water that is typically groundwater, and of lesser quality than the San Joaquin River. Most non-project water is returned banked water that is pumped into the canal to supplement reduced surface water supplies during dry or drought years. Accordingly, there are some fluctuations in water quality as presented in **Figure 3-1**. In dry years, water quality results in the FKC show higher salinity concentrations than normal- and wet-year operations. However, since average salinity levels are well within the specified standards, water quality of the CVP is not considered a vulnerability of concern in the scope of the Drought Contingency Plan. As with SWP water, salinity concentrations are being studied and will be addressed under CV-SALTS.

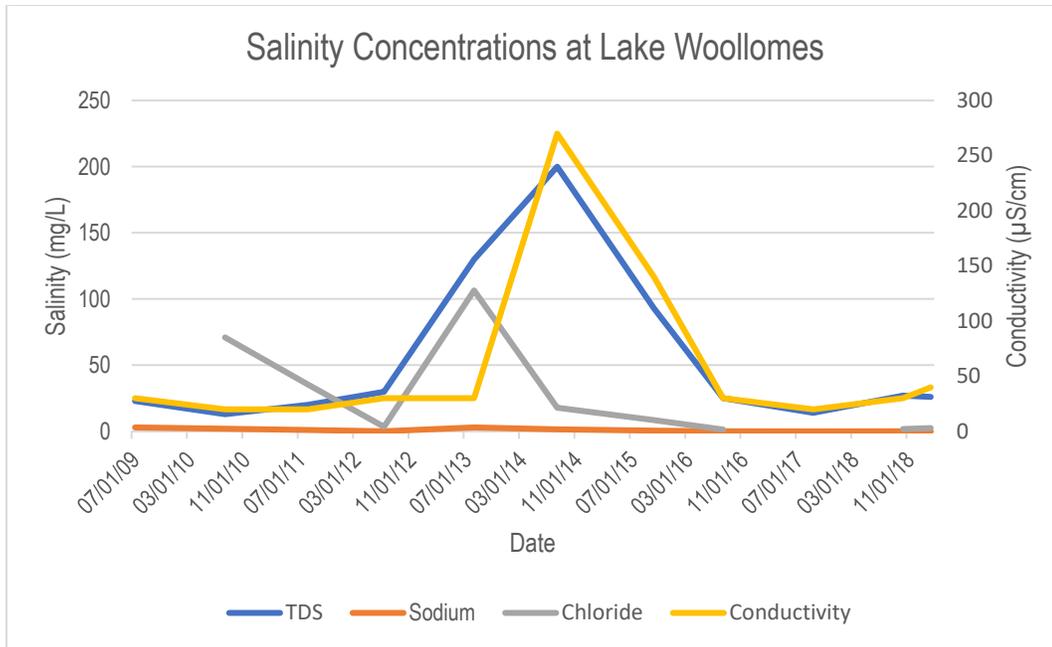


Figure 3-1. Annual Salinity Concentrations at Lake Woollomes Check

3.4.1.3 Kern River Supplies

As with SWP and CVP water, several districts receive Kern River water that is monitored by other agencies. Data for Kern River supplies is publicly available through the State Drinking Water Information System (SDWIS). **Table 3-11** below provides an overview of the 5-year water quality average (2016 through 2020) for the Kern River NE Treatment Plan Influent (1510003-252). This monitoring point is prior to first use in the Poso Creek region; therefore, water quality at this point is representative of water entering the region.

Table 3-11. Kern River Surface Water Quality

Parameter	Units	Concentration
Ca	mg/L	17
Mg	mg/L	3
Na	mg/L	16
Alkalinity	mg/L (as CaCO ₃)	55
Cl	mg/L	5
SO ₄	mg/L	14
B	mg/L	132
TDS	mg/L	126
Hardness	mg/L (as CaCO ₃)	57
Electrical Conductivity	µS/cm	195

Source: SDWIS Kern River NE Treatment Plan Influent (1510003-252)

Consistent with regional banking operations, Kern River water is primarily delivered and banked during water years for later use during dry years. While salinity of the Kern River fluctuates on an

annual basis, salinity concentrations are well below the recommended agricultural thresholds and drinking water standards listed in **Table 3-9**. An overview of salinity concentrations in the Kern River is provided in **Figure 3-2**.

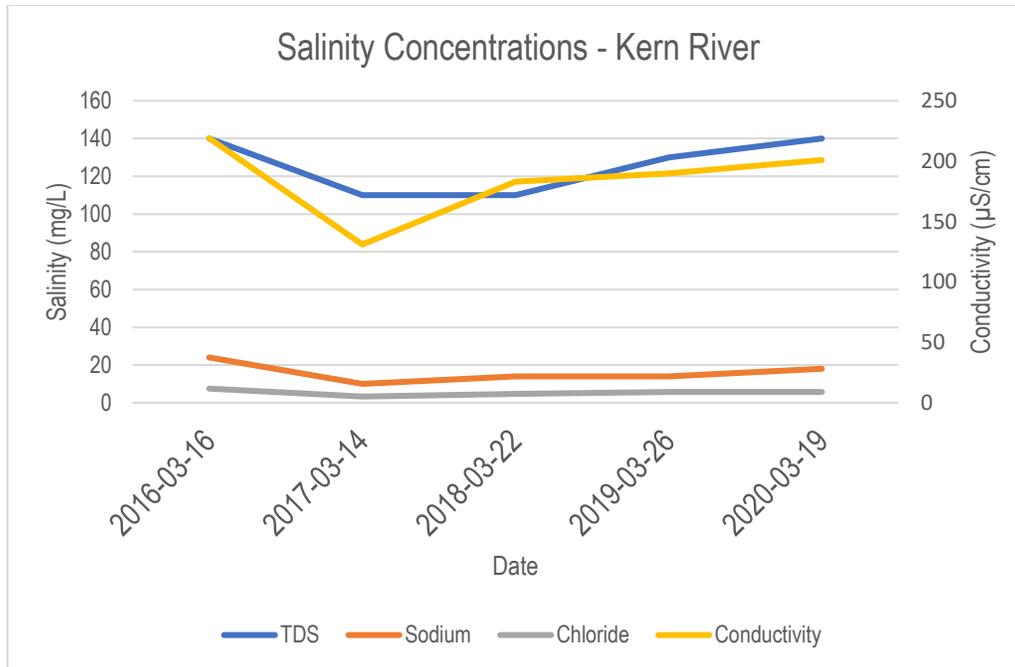


Figure 3-2. Salinity Concentrations – Kern River

3.4.2 Groundwater Quality

As stated in the 2019 Poso Creek Plan Update, the predominant constituents of concern with varying levels between the shallow and deeper groundwater are Total Dissolved Solids (TDS), nitrate, specific conductivity (EC), and arsenic. In shallow groundwater where the Corcoran clay and adjacent confining layers are present, higher salinity, nitrate, arsenic, and uranium can be found. On the other hand, the middle aquifer tends to contain lower concentrations of these constituents but increase again in the deep aquifer below 800-feet (Poso Creek RWMG, 2019).

A thorough groundwater quality assessment for each District and its respective area has been conducted since the Poso Creek IRWM Plan Update. In summary, constituents of concern for the region include TDS, arsenic, chloride, and sodium with nitrate and 1,2,3 trichloropropane (TCP) as likely contaminants of concern that are not widespread throughout the Plan Area. For details on groundwater quality, refer to each GSP or management area plan as cited in **Table 3-12** below. Findings of individual water quality assessments determined that groundwater quality does not degrade when groundwater levels decrease. Since groundwater quality is not expected to degrade, water quality is not vulnerable to drought conditions in the region. This statement is applicable for all beneficial water uses including agricultural, industrial, and municipal uses.

Table 3-12. District Water Quality Information

District(s)	Water Quality Section	Website Link
Semitropic Water Storage District (SWSD)	Section 2.3.5	http://www.kerngwa.com/reports.html
North Kern Water Storage District (NKWSD) and Shafter-Wasco Irrigation District (SWID)	Section 2.3.5	
Cawelo Water District (CWD)	Section 3.9	
Kern-Tulare Water District (KTWD)	Section 2.3.2	
Southern San Joaquin Municipal Utility District (SSJMUD)	Section 2.3.4	
Delano-Earlimart Irrigation District (DEID)	Section 2.3.4	https://www.deid.org/gsa/#gsa

3.5 Risk Assessment

This section focuses on the sensitivity and consequence analysis of drought vulnerabilities in the Poso Creek Region by accessing water supply reliability and the risks posed due to additional factors with an incorporation of climate change information. For this Plan, risks should be viewed as a combination of:

- Sensitivity and frequency of occurrence,
- Magnitude and severity, and
- Consequences.

3.5.1 Drought Vulnerabilities

With anticipated reduction in reliability to principal water sources of the region, the effects of drought conditions on the previously identified critical resources create drought vulnerabilities. **Table 3-13** shows these vulnerabilities are listed in order of most to least sensitive to drought and the consequences that can result from these vulnerabilities.

3.5.2 Risk Factors

When considering the effects of drought conditions on critical resources, local and external factors were considered to further develop mitigation and response actions. Local factors within the Poso Creek Region include climate conditions (precipitation, weather, etc.), aging infrastructure, decreasing groundwater elevations in the local aquifer, and economic factors.

Table 3-13. Water Use in the Poso Creek Region

Drought Vulnerabilities	Potential Consequences
Conservation of groundwater to meet the SGMA sustainability goals	Groundwater elevations must be maintained above Minimum Threshold values to avoid Undesirable Results. As a result, the region cannot solely rely on groundwater to supplement lower surface supplies in dry years or the groundwater levels will continue to decrease.
Allocation reductions to Friant Division long-term contractors as San Joaquin River is implemented to allow for increased and ultimately full release of Restoration Flows	Potential reductions due to environmental regulation on the San Joaquin River result in lower surface supplies to the CVP-Friant water contractors. Continued reductions could result in a decrease in irrigated lands if available supplies cannot meet demands.
Reduction in SWP and CVP allocations	Decreased SWP and CVP allocations lead to increased groundwater pumping that lead to inelastic subsidence and potential impacts to critical infrastructure
Reduction in imported water supply allocations (SWP, CVP and Kern River) with declining groundwater levels	Decreased imported supply allocations with lowering groundwater levels lead to increase land fallowing which has an economic impact to Kern County, who relies on two primary industries for revenues, agriculture and petroleum industries.
Allocation reductions in CVP and SWP supplies due to hydrologic variability or institutional constraints	Potential reductions due to variable hydrology as a result of climate change directly impacts the surface supplies provided for irrigated acres. Continued reductions could result in a decrease in irrigated lands if available supplies cannot meet demands
Variable Lake Isabella reservoir storage	Lower Lake Isabella reservoir storage causes lower flows to Kern River thereby lowering available water supply to the region. Lower storage could result in a decrease in irrigated lands if available supplies cannot meet demands
Variable Kern River supplies	This is a result of variable sources at the source (Lake Isabella reservoir) and directly affects water supplies received by Kern River water contractors.
Variable and restricted FKC capacity	Given the reliance of water supply conveyed through the FKC, this could impact the supplies received for irrigation use.
Municipalities that rely solely on groundwater	Given the requirements of SGMA, municipalities reliant on groundwater alone could be impacted by higher groundwater pumping costs as groundwater elevations decrease in dry years.
Increased groundwater pumping costs and well impacts potentially caused by decreasing groundwater elevations	This is an economic result of decreasing groundwater elevations. This could decrease the land use for irrigated acres, if groundwater pumping is too expensive during times when surface water is unavailable.

External factor can be defined as institutional, operational, or physical. Although these factors are external to the participants, they can be partially addressed through the implementation of local mitigation actions. Some external factors include reduction of imported CVP and SWP water supplies, variable reservoir storage, and variable Kern River supplies. Planned mitigations actions include enhancing conveyance and expanding recharge capacities to enhance conjunctive use capacities in years when surface water supplies are deficient through increased storage of surplus supplies when available.

3.6 Climate Assessment of Future Conditions

Climate change is defined as a long-term change in temperature, precipitation, wind, and patterns of severe weather events over a historic period (decades, centuries, or millennia) with respect to average weather conditions that are expected based on historical data. Natural climate change is anticipated over time; however according to the Intergovernmental Panel on Climate Change, most scientist agree that increased greenhouse gas (GHG) emissions have resulted in an acceleration of natural climate change.

Climate projections are difficult to predict due to variable GHG emissions, limitations in historical climate data, and current knowledge of the relation between environmental conditions and climate change. Given the unpredictability of climate change impacts on the region, climate change models focus on the generalized effects on the regions climate that can be predicted such as expected changes in timing, volume, and nature of precipitation in watersheds that provide beneficial users in the region with water supplies. In addition, future climate conditions for 2030 and 2070 are provided within the GSPs due to the uncertainty of climate projections (Poso Creek RWMG, 2019).

3.6.1 Climate Change Projections

This section was developed based on the climate analysis done for the 2019 IRWM Plan Update and information reviewed from the GSPs. The 2019 IRWM Plan Update used six Global Climate Models to examine 12 future climate scenarios regarding SWP and CVP surface water supplies to access future reliability issues caused by climate change. Considering varying GHG emissions and the potential for Delta salinity intrusion resulting from a rise in sea level, all climate projections showed a reduction in volume and reliability for the SWP and CVP conveyance systems. Currently, long-term reliability projections expect contracted amounts to be an average of 60 percent of annual SWP and CVP allocations. The projections determined that climate change will reduce reliability even further by reducing the amount of surface water supplied to the Poso Creek region.

In addition, multiple investigations were done to determine the hydrological effects of climate change on the Sierra Nevada, which the region is reliant on for runoff to supply surface water supplies. Relative to historical conditions, projections showed climate becoming warmer and drier in the mid to late 21st century. As a result, the quantities of runoff from the Sierra Nevada will

decrease, thereby reducing water delivered to the region and increasing the need for groundwater use to meet irrigation demand.

In the GSPs, future conditions for 2030 were projected using various modeling tools such as the California Water Commissions CalSim-II model for SWP and CVP supplies, the Kern Subbasin groundwater model, the Tule Subbasin model and individual District run models. If the projections show that sustainability measures are insufficient for future conditions, demands will be adjusted to achieve sustainability. Historical data shows that reduction in principle water sources are expected in future conditions to reflect the impacts of climate change. As a result, the districts will receive lower allocations of SWP, CVP and Kern River water supplies. Lower allocations for principal water sources to the region can result in future drought vulnerabilities.

4. Mitigation Actions

Mitigation actions have been developed through long-term, complementary drought planning efforts such as the Poso Creek IRWM Plan and SGMA GSPs. These efforts are expanded upon with input from the Drought Task Force, made up of the members of the Poso Creek RWMG and stakeholders. Actions also consider the risks and vulnerabilities to drought identified in Section 3 to successfully prepare for and manage for dry or drought periods. These actions are intended to build long-term drought resiliency and decrease critical resource sector vulnerabilities with the goal of reducing the need to implement Response Actions.

Implementation of projects involving conveyance improvements; infrastructure improvements; recharge and recovery facilities; and maintenance of water quality allow the region to increase operational flexibility, reduce reliance on groundwater supplies, and encourage better management of water, thereby leading to long-term drought resiliency. In addition to implementation-based projects, programs for monitoring on-farm efficiency have been developed and will provide an incentive for the region to develop additional mitigation actions in the future, which will enhance long-term drought resiliency.

4.1 Identification and Development of Mitigation Actions

As previously mentioned, mitigation actions have been developed through long-term efforts under IRWM and SGMA planning. Building on this collaborative process, Mitigation Actions have been developed to address drought vulnerabilities outlined in Section 3, **Table 3-1** and **Table 3-13**. Drought vulnerabilities are primarily driven by reliability of surface water supplies from outside the region. Therefore, mitigation actions have been developed to manage wet year surface supplies and are to be implemented during non-drought years to reduce effects during periods of drought or dry years. These actions are intended to assist the region in building resiliency and avoid crisis during drought by reducing risks posed to the previously identified vulnerabilities and minimize the need for response actions. Mitigation actions are intended to decrease sector vulnerabilities and reduce the need for response actions to help water managers build resiliency and avoid crisis during drought.

4.1.1 Mitigation Actions Objectives

The actions were developed by each District and supported by the Task Force to coordinate and consider the interest of the regional group. Mitigation actions developed by each member agency are intended to build long-term resiliency to drought, and mitigate risks posed by drought. The mitigation actions support the Drought Contingency Plan goals and objectives presented in Section 1, **Table 1-2** by addressing existing or potential risks associated with drought. Implementation of these actions will complement the Drought Plan Objectives. **Tables 4-3** and **4-4** provides a list of finalized mitigation actions that address these objectives.

4.1.2 Existing Programs, Policies, and Operational Criteria

An examination of existing programs and policies in the region was done to determine actions have been successful in promoting drought resiliency thus far and identifying areas where additional mitigation actions could be implemented. Currently, one of the districts in the region has the following Mitigation Actions in place with several districts considering similar actions:

- New Lands Surcharge program: Any new land developed after July 1, 2017, would be charged \$500/AF of consumptive use greater than the allocated native groundwater yield.
- SGMA Basin Sustainability Charges/Credits: A program whereby the District utilizes remote sensing data to determine the consumptive use (as evapotranspiration or ET) for each parcel and the aggregate by Landowner of Record in the District.

Additionally, some Districts have begun implementing actions aimed at lowering groundwater dependence and increasing groundwater recharge capacity within the region. These projects include, but are not limited to:

- Land fallowing
- Banking water on behalf of the District
- Cap on third party banking obligations
- Expansion of District recharge facilities

4.2 Evaluation of Mitigation Actions

The identified mitigation actions complement the local GSP's project and management actions to improve water use in the region as part of SGMA requirements. These actions were evaluated and screened as potential mitigation actions for drought contingency planning. These actions will be evaluated on a regular basis with the coordination of the Task Force; at least every 5 to 7 years to ensure that the action reflect the current needs of the drought plan area.

4.2.1 Prioritization of Mitigation Actions

The following factors were considered to prioritize potential mitigation actions:

- Cost to benefit ratio and likelihood of funding support
- Feasibility and ability to implement
- Sensitivity to environmental conditions
- Agency/agencies involved in implementing the measure
- Timeframe of the measure (short-, mid-, long-term)

Although all mitigation actions were evaluated, any actions that contained undesirable attributes, costs, or requirements were deprioritized to narrow in on the ideal mitigation actions for the region. Districts have prioritized projects, which can be identified by the year of initiation in Table 4-3.

4.2.2 Implementation of Mitigation Actions

Prior to initiation of mitigation actions, the RWMG member agencies and communities will research potential funding opportunities to support implementation of projects and programs within their respective planning area.

For member agencies, mitigation actions will be funded through district level funding or / and grant funding. If funding is received, the proposed action will be partially funded with an expected cost match of at least 50 percent; otherwise, the action will be fully funded at the district level. After a funding source is identified, implementation of a mitigation actions is initiated based on the need for the project or program. Then the entities will inform the public of the planned mitigation actions to be implemented.

Table 4-1 provides a list of known grant opportunities that encourage short-term and long-term drought relief and recovery that the RWMG member agencies have received in the past:

Table 4-1. Drought Relief and Recovery Programs for Water Districts

Agency	Grant
U.S Bureau of Reclamation	<ul style="list-style-type: none"> • WATERSMART Drought Response Program; Drought Resiliency Projects • WATERSMART Water and Efficiency Grants • WATERSMART Drought Resiliency Program • Bay-Delta Restoration Program: CalFED Water Use Efficiency Grants
Department of Water Resources	<ul style="list-style-type: none"> • Sustainable Groundwater Management Program • Proposition 1- Groundwater Sustainability: <ul style="list-style-type: none"> ▪ Agricultural Water Use Efficiency Grants ▪ IRWM Grants • Proposition 68- Regional Sustainability for Drought and Groundwater, and Water Recycling

Under various grants such as the DWR Prop 1 IRWM Grant and Prop 68 Grants, DAC projects will be fully funded through financial assistance opportunities to allow them to implement necessary mitigation actions. After securing a funding source, the DACs will initiate the mitigation actions and inform the public of the actions that they are implementing. Some DACs located within member agency boundaries may also receive support from the agency.

Table 4-2 The following are a list of known Grant opportunities that encourage short-term and long-term drought relief and recovery that the DACs have received in the past:

Table 4-2. Drought Relief and Recovery Programs for DACs

Agency	Grant
State Water Resources Control Board	<ul style="list-style-type: none"> • Safe and Affordable Funding for Equity and Resiliency (SAFER) • Cleanup and Abatement Account Funding Program • One-Time General Fund Appropriation – Assembly Bill 72 • Drinking Water State Revolving Fund
Department of Water Resources	<ul style="list-style-type: none"> • Proposition 1- Groundwater Grant Program <ul style="list-style-type: none"> ▪ IRWM Grants – DAC projects ▪ Stormwater Grants ▪ Small Community Wastewater • Proposition 68- Groundwater Treatment and Remediation Grant <ul style="list-style-type: none"> ▪ DAC Drinking Water Projects
Administered by Self-Help Enterprises (SHE) and Rural Community Assistance Corporation (RCAC)	<ul style="list-style-type: none"> • Drinking Water Well Replacement Program

Mitigation actions will be updated through an on-going basis. In addition, a periodic evaluation of the process used to develop these actions will be done to determine the effectiveness of the Drought Contingency Plan. Further discussion on updates to the elements of the Drought Contingency Plan are described in Section 6.

The following tables provides a detailed list of mitigation actions developed for each RWMG member agency (**Table 4-3**) and community (**Table 4-4**) within the Poso Creek Region with a brief description of each action, implementation status, timetable, and expected benefits by each entity and priority level. The listed benefits correspond with the drought plan’s goals and objectives. These tables also include schedule for implementation. Since DACs often rely on grant funding, timeline for project implementation is unknown and will occur with as funding becomes available.

Table 4-3. Drought Mitigation Actions by District

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Regional Conveyance Map	Poso Creek Regional Water Management Group	Project	Improved Conveyance Capacity	Development of a regional conveyance map to better identify needed conveyance and capacity improvements to enhance conjunctive use management in the region.	Low	Conceptual	2022	TBD	<ul style="list-style-type: none"> • Improve regional water conveyance • Enhance regional conjunctive water-use • Facilitate implementation of regional opportunities, projects, and programs • Facilitate implementation of region-wide water management actions
“Surface Water First” Incentive Program	SWID	Program	Supplemental Surface Water Supplies	Implementation of fees for groundwater use when surface water is available.	High	Conceptual	2022	2024	<ul style="list-style-type: none"> • Implement regional opportunities, projects, and programs • Implement region-wide water management actions
Bell Recharge Project	SWID	Project	Improved Conveyance Capacity	Conveyance improvements to SWID's existing distribution system that will allow CVP water to be delivered from the FKC for recharge.	High	Initiated	2020	2023	<ul style="list-style-type: none"> • Improve regional water conveyance • Enhance regional conjunctive water-use • Facilitate implementation of regional opportunities, projects, and programs • Facilitate implementation of region-wide water management actions
Kimberlina Recharge Project	SWID	Project	Improved Groundwater Recharge Capacity	Construction of a 285-acre recharge site for CVP surface water.	High	Ongoing	2020	2023	<ul style="list-style-type: none"> • Enhance reliability and effectiveness of surface water supplies delivered to Region • Improve regional water conveyance, direct recharge, and in-lieu service areas • Enhance regional conjunctive water-use • Maintain and enhance quality of water supply • Facilitate implementation of regional opportunities, projects, and programs • Facilitate implementation of region-wide water management actions
Improved Water Level Measurement of District Recharge Facility	SWID	Program	Improved Groundwater Recharge Capacity	Construction of and conversion to two monitoring wells to better manage and collect	Medium	Conceptual	2022	2024	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
				information on groundwater levels for district recharge facility.					<ul style="list-style-type: none"> Enhance regional conjunctive water-use Implement regional opportunities, projects, and programs Implement region-wide water management actions
On-Farm Efficiency/Deficit Irrigation Practices Incentive Program	SWID	Program	Demand Management Actions	Improvements to individual farming operations that address water use efficiency and/or groundwater protection through incentive programs.	Medium	On-going	2022	2025	<ul style="list-style-type: none"> Implement regional opportunities, projects, and programs Implement region-wide water management actions
On-Farm Recharge Activities Incentive Program	SWID	Program	Improved Groundwater Recharge Capacity	Development of an incentive program to encourage landowners to take delivery of available water to facilitate further groundwater recharge.	Medium	Conceptual	2022	2025	<ul style="list-style-type: none"> Implement regional opportunities, projects, and programs Implement region-wide water management actions
Subsurface Recharge Feasibility Study	SWID	Program	Improved Groundwater Recharge Capacity	Implementation of a program which would supply water to landowners for use in subsurface recharge practices.	Medium	Conceptual	2022	2023	<ul style="list-style-type: none"> Improve in-lieu service areas Enhance regional conjunctive water-use Implement regional opportunities, projects, and programs Implement region-wide water management actions
Burbank Avenue Intertie Project	SWID	Project	Improved Conveyance Capacity	Connection of an intertie to provide surface water conveyance for agricultural irrigation.	Medium	Ongoing	2021	2023	<ul style="list-style-type: none"> Improve regional water conveyance Implement regional opportunities, projects, and programs Implement region-wide water management actions Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Conveyance Improvements for Farmers Cooperative Recharge	SWID	Project	Improved Conveyance Capacity	Construction of 1,600 LF of 24-inch pipeline for increased conveyance capacity for recharge activities	Medium	Ongoing	2021	2023	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Facilitate implementation of regional opportunities, projects, and programs Facilitate implementation of region-wide water management actions
Merced Intertie Project	SWID	Project	Improved Conveyance Capacity	Connection of an intertie to provide surface water conveyance for agricultural irrigation.	Medium	Initiated	2021	2023	<ul style="list-style-type: none"> Improve regional water conveyance Implement regional opportunities, projects, and programs Implement region-wide water management actions Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge
Fresno Avenue Pipeline Project	SWID	Project	Improved Conveyance Capacity	Construction of pipeline for increased conveyance capacity for recharge activities.	Medium	Conceptual	2022	2024	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Facilitate implementation of regional opportunities, projects, and programs Implementation of region-wide water management actions Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Prospect Avenue Pipeline Project	SWID	Project	Improved Conveyance Capacity	Construction of pipeline for increased conveyance capacity for recharge activities.	Medium	Conceptual	2022	2025	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Facilitate implementation of regional opportunities, projects, and programs Implementation of region-wide water management actions Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
SE SWID Recharge	SWID	Project	Improved Groundwater Recharge Capacity	Construction of pipeline for increased conveyance capacity for recharge activities.	Medium	Conceptual	2022	2024	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Facilitate implementation of regional opportunities, projects, and programs Implementation of region-wide water management actions Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Upgrade and Replace Aging Pipelines	SWID	Project	Improved Conveyance Capacity	Conveyance improvements to SWID's existing distribution system that will allow CVP water to be diverted from the FKC for recharge.	Medium	Conceptual	2025	TBD	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
									<ul style="list-style-type: none"> Facilitate implementation of regional opportunities, projects, and programs Implementation of region-wide water management actions Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Potential North and South System Interties	SWID	Project	Improved Conveyance Capacity	Conveyance improvements to SWID's existing distribution system that will intertie the North and South distribution systems.	Medium	Conceptual	2025	TBD	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Facilitate implementation of regional opportunities, projects, and programs Implementation of region-wide water management actions Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Evaluation of Potential to Partner in Kern Fan Groundwater Storage Project	SWID	Project	Improved Groundwater Recharge Capacity	Development of a regional water bank in the Kern Fan to capture and storage Article 21 water via SWP when surface water is abundant.	Low	Conceptual	2030	2035	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Maintain and enhance quality of water supply Facilitate implementation of regional opportunities, projects, and programs Facilitate implementation of region-wide water management actions Increase absorptive capacity for banking water when available

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Evaluation of Potential to Utilize SWID Kimberlina Ponds or Other Facilities for Recharge	SWID	Project	Improved Groundwater Recharge Capacity	Evaluation of opportunities to purchase non-SWID water for recharge in the Kimberlina Ponds facilities, when Ponds have unused capacity (typically non-wet and non-drought years).	Low	Conceptual	TBD	TBD	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Maintain and enhance quality of water supply Facilitate implementation of regional opportunities, projects, and programs Facilitate implementation of region-wide water management actions
Increased Recycled Water Deliveries and Recharge	SWID Annex Area	Project	Improved Groundwater Recharge Capacity	Increase recycled water deliveries and recharge of groundwater with secondary-treated wastewater within the Annex Area	High	Ongoing	2019	TBD	<ul style="list-style-type: none"> Maintain and enhance quality of water supply Improve regional water conveyance, direct recharge, and in-lieu service actions Enhance regional conjunctive water-use Facilitate implementation of region-wide water management actions Adapt to changes in the amount, intensity, timing, and in-lieu service areas
7 th Standard Annex Management Area Storage Pond Project	SWID Annex Area	Project	Improved Groundwater Recharge Capacity	Development of a groundwater recharge facility to effectively conveyance surface water supplies when they are available, facilitation of water banking and exchange, and avoidance of direct water quality impacts.	High	Conceptual	2030	2035	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Maintain and enhance quality of water supply Facilitate implementation of regional opportunities, projects, and programs

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
									<ul style="list-style-type: none"> Facilitate implementation of region-wide water management actions
Flat Rock Canal Extension	SWID Annex Area	Project	Improved Conveyance Capacity	Development of connection from the Annex Area to the Kern Water Bank Canal, Cross Valley Canal, and Goose Lake Slough for water distribution.	Medium	Conceptual	2030	2035	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Maintain and enhance quality of water supply Facilitate implementation of regional opportunities, projects, and programs Facilitate implementation of region-wide water management actions
Identify Opportunities to Utilize Existing Infrastructure	SWID Annex Area	Project	Improved Groundwater Recharge Capacity	Evaluation of potential opportunities for recharge with existing groundwater recharge infrastructure that have unused capacity partially in non-wet years.	Low	Conceptual	TBD	TBD	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Maintain and enhance quality of water supply Facilitate implementation of regional opportunities, projects, and programs Facilitate implementation of region-wide water management actions
On-Farm Groundwater Recharge	SWID Annex Area	Project	Improved Groundwater Recharge Capacity	Implementation of a new Buried Recharge policy allows landowners to purchase and recharge non-SWID water on their own properties for on-farm banking.	Low	Conceptual	TBD	TBD	<ul style="list-style-type: none"> Implement regional opportunities, projects, and programs Implement region-wide water management actions

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Develop New Interconnections Within SWID's Conveyance System and Improve "Bottleneck" Issues	SWID Annex Area	Project	Improved Conveyance Capacity	Increase the capacity and flexibility of SWID's current conveyance system to allow access to additional supplies.	Low	Conceptual	TBD	TBD	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use
Cox Canal Pump Station	SWSD	Project	Improved Groundwater Recharge Capacity	Development of a canal for the conveyance of surface water for groundwater recharge.	High	Ongoing	2018	2023	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas. Enhance regional conjunctive water-use Implement regional opportunities, projects, and programs Implement region-wide water management actions Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Tulare Lake Project	SWSD	Project	Improved Groundwater Recharge Capacity	Development of conveyance facilities to divert Kings River flood flows for direct use and recharge in the SWSD.	High	Under development	2018	2035	<ul style="list-style-type: none"> Improve regional water conveyance Increase absorptive capacity within the region Enhance regional conjunctive water-use Facilitate implementation of regional opportunities, projects, and programs Facilitate implementation of region-wide water management actions Adapt to changes in the amount, intensity, timing, and in-lieu service areas
Stored Water Recovery Unit – XYZ	SWSD	Project	Improved Groundwater Recharge Capacity	Development of water storage to expand in-lieu service areas.	High	Ongoing	2019	TBD	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Increase absorptive capacity within the Region

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
									<ul style="list-style-type: none"> Enhance regional conjunctive water-use Implement regional opportunities, projects, and programs Implement region-wide water management actions Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Water Market Acquisitions	SWSD	Program	Demand Management Actions	Increased participation in statewide water markets for spot marker and long-term water transfers.	High	Ongoing	2020	2024	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Enhance regional conjunctive water-use Facilitate implementation of regional opportunities, projects, and programs Adapt to changes in the amount, intensity, timing, and in-lieu service areas
Pond Poso Spreading Grounds, Phase II	SWSD	Project	Improved Groundwater Recharge Capacity	Development of spreading facilities to increase groundwater recharge capacity.	High	Initiated	2020	2024	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Implement regional opportunities, projects, and programs Implement region-wide water management actions Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Leonard Avenue System	SWSD	Project	Improved Conveyance Capacity	Development of an intertie system to provide east to west surface water conveyance for supply in groundwater dependent areas.	High	Ongoing	2020	2025	<ul style="list-style-type: none"> Improve in-lieu service areas Enhance regional conjunctive water-use Implement regional opportunities, projects, and programs

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
									<ul style="list-style-type: none"> Implement region-wide water management actions Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Poso Creek MAR	SWSD	Project	Improved Groundwater Recharge Capacity	Development of floodwater capture and recharge program from Poso Creek flood flows.	High	Undergoing Pre-feasibility analysis	2020	2028	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Implement regional opportunities, projects, and programs Implement region-wide water management actions. Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Enhanced Groundwater Recharge	SWSD	Project	Improved Groundwater Recharge Capacity	Development of surface and subsurface recharge projects underlying developed agricultural lands to increase groundwater recharge capacity.	High	Ongoing	2020	2040	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Implement regional opportunities, projects, and programs Implement region-wide water management actions Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
In-District Water Markets and Transfers	SWSD	Program	Demand Management Actions	Creation of an in-district water market for the transfer of water among district landowners.	High	Ongoing	2022	2024	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Enhance regional conjunctive water-use Facilitate implementation of regional opportunities, projects, and programs

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
									<ul style="list-style-type: none"> Adapt to changes in the amount, intensity, timing, and in-lieu service areas
Brackish Water Desalination	SWSD	Project	Supplemental Surface Water Supplies	Development of brackish water treatment facility to treat locally sourced brackish water for district use.	High	Initiated Planning	2022	2025	<ul style="list-style-type: none"> Maintain and enhance quality of water supply Improve regional water conveyance, direct recharge, and in-lieu service actions Enhance regional conjunctive water-use Facilitate implementation of region-wide water management actions Adapt to changes in the amount, intensity, timing, and in-lieu service areas
Pond-Poso Entrance Ponds	SWSD	Project	Improved Groundwater Recharge Capacity	Development of spreading facilities to increase groundwater recharge capacity.	Medium	Initiated	2024	2026	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Implement regional opportunities, projects, and programs Implement region-wide water management actions Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Stored Water Recovery Unit	SWSD	Project	Improved Groundwater Recharge Capacity	Development of water storage to expand in-lieu service areas.	Medium	Initiated	2025	TBD	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Facilitate implementation of regional opportunities, projects, and programs Facilitate implementation of region-wide water management actions

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Schuster Spreading Grounds	SWSD	Project	Improved Groundwater Recharge Capacity	Development of spreading facilities to increase groundwater recharge capacity.	Medium	Conceptual	2030	2035	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Enhance regional conjunctive water-use • Implement regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Multi-District Conveyance (CA to Friant-Kern Canal)	SWSD	Project	Improved Groundwater Recharge Capacity	Development of a conveyance system to deliver surface water for groundwater recharge and irrigation.	Medium	Ongoing	2022	TBD	<ul style="list-style-type: none"> • Enhance reliability and effectiveness of surface water supplies delivered to Region • Improve regional water conveyance, direct recharge, and in-lieu service areas • Enhance regional conjunctive water-use • Implement regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
“Surface Water First” Incentive Program	SSJMUD	Program	Supplemental Surface Water Supplies	Implementation of fees for groundwater use when surface water is available.	Medium	Conceptual	2023	TBD	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Increase absorptive capacity within the Region • Enhance regional conjunctive water-use • Facilitate implementation of regional opportunities, projects, and programs • Implement region-wide water management actions

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
									<ul style="list-style-type: none"> Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
City of Delano Spreading Grounds	SSJMUD	Project	Improved Groundwater Recharge Capacity	Improvements to existing 16-acre stormwater retention basin for use as a spreading basin. Improvement to adjacent 32-acre site for expansion of spreading grounds.	High	Initiated	2020	2023	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Increase absorptive capacity within the Region Enhance regional conjunctive water-use Facilitate implementation of regional opportunities, projects, and programs Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
In-District Spreading and Recovery Facility	SSJMUD	Project	Improved Groundwater Recharge Capacity	80-acre spreading ponds and 2 recovery wells.	High	Initiated	2020	2023	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Increase absorptive capacity within the Region Enhance regional conjunctive water-use Facilitate implementation of regional opportunities, projects, and programs Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Schuster Intertie	SSJMUD	Project	Improved Conveyance Capacity	Construction of pipeline between Semitropic and SSJMUD to provide operational flexibility and allow SSJMUD to import water supplies to the Subbasin.	High	Conceptual	2023	2025	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Facilitate implementation of regional opportunities, projects, and programs

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
									<ul style="list-style-type: none"> • Implement region-wide management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
SSJMUD & NKWSD Intertie	SSJMUD	Project	Improved Conveyance Capacity	Construction of a pipeline between Cawelo and SSJMUD to provide operational flexibility and allow SSJMUD to import supplies to the Subbasin.	High	Initiated	2023	2025	<ul style="list-style-type: none"> • Enhance reliability and effectiveness of surface water supplies delivered to Region • Improve regional water conveyance, direct recharge, and in-lieu service areas • Enhance regional conjunctive water-use • Facilitate implementation of regional opportunities, projects, and programs • Implementation of region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Southeast Delano Spreading Grounds	SSJMUD	Project	Improved Groundwater Recharge Capacity	Conversion of land to permanent spreading grounds, up to 320 acres, to facilitate groundwater recharge in proximity to the City of Delano to the benefit of both the District and the City.	High	Initiated	2023	2025	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Increase absorptive capacity within the Region • Enhance regional conjunctive water-use • Facilitate implementation of regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Pond Road Spreading Grounds	SSJMUD	Project	Improved Groundwater Recharge Capacity	Conversion of land to permanent spreading grounds, up to 220 acres in proximity to the FKC, to capture and utilize excess surface water deliveries.	High	Conceptual	2023	2025	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Increase absorptive capacity within the Region • Enhance regional conjunctive water-use • Facilitate implementation of regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
On-Farm Efficiency/Deficit Irrigation Practices Incentive Program	SSJMUD	Program	Demand Management Actions	Improvements to individual farming operations that address water use efficiency and/or groundwater protection through incentive programs.	High	Conceptual	2023	2025	<ul style="list-style-type: none"> • Facilitate implementation of regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
In-District Spreading Grounds	SSJMUD	Project	Improved Groundwater Recharge Capacity	Conversion of land to permanent spreading grounds, up to 800 acres, to facilitate groundwater recharge. This project would consist of multiple locations throughout SSJMUD identified as potential recharge sites.	High	Conceptual	2023	2030	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Increase absorptive capacity within the Region • Enhance regional conjunctive water-use • Facilitate implementation of regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Conversion of Dairy to Recharge Facility	SSJMUD	Project	Improved Groundwater Recharge Capacity	Conversion of land previously used for dairy operations into permanent recharge facilities.	Medium	Conceptual	2023	2030	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Increase absorptive capacity within the Region • Enhance regional conjunctive water-use • Facilitate implementation of regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
SSJMUD & Cawelo WD Intertie	SSJMUD	Project	Improved Conveyance Capacity	Construction of a pipeline between Cawelo and SSJMUD to provide operational flexibility and allow SSJMUD to import supplies to the Subbasin.	Medium	Conceptual	2024	2026	<ul style="list-style-type: none"> • Enhance reliability and effectiveness of surface water supplies delivered to Region • Improve regional water conveyance, direct recharge, and in-lieu service areas • Enhance regional conjunctive water-use • Facilitate implementation of regional opportunities, projects, and programs • Implementation of region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Conversion of Agricultural Land to Urban Use	SSJMUD	Project	Demand Management Actions	Conversion of agricultural land to urban use within the limits of each city to reduce groundwater use due to decreased demand.	Medium	Ongoing	Ongoing	TBD	<ul style="list-style-type: none"> • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Calloway Canal Improvements: Lining from Snow Rd. to 7th Standard Rd.	NKWSD	Project	Improved Conveyance Capacity	Install concrete lining on Calloway Canal from Snow Rd. to 7 th Standard Rd. to reduce seepage for better control where water is applied for recharge and use, and to reduce loss of high-quality water seeping into poor water quality upper aquifer. This improvement in water delivery effectiveness will promote regional opportunities for water wheeling to adjacent districts.	High	Ongoing	2019	2022	<ul style="list-style-type: none"> • Improve water delivery effectiveness • Enhance regional conjunctive water-use • Maintain and enhance quality of water supply • Facilitate implementation of regional opportunities, projects, and programs • Facilitate implementation of region-wide water management actions
Water Delivery Improvements	NKWSD	Project	Improved Conveyance Capacity	Install flowmeters, water level sensors, and programmable controls and SCADA to facilitate remote monitoring of the District's water system facilities. These improvements will reduce over pumping and overuse of groundwater.	High	Ongoing	2019	2024	<ul style="list-style-type: none"> • Improve regional water conveyance • Enhance regional conjunctive water-use • Facilitate implementation of regional opportunities, projects, and programs • Facilitate implementation of region-wide water management actions
SCADA Automation and Evapotranspiration Measurement Improvements	NKWSD	Project	Demand Management Actions	Develop automation and remote sensing for ET monitoring and improved management of surface water conveyance	High	Initiated	2020	2023	<ul style="list-style-type: none"> • Improve regional water conveyance • Implement regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Expanded Recharge (RRID)	NKWSD	Program	Improved Groundwater Recharge Capacity	Expansion of recharge program to include on-farm spreading to maximize recharge capability.	High	Initiated	2022	2025	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Increase absorptive capacity within the Region • Enhance regional conjunctive water-use • Implement regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Return Capacity Improvements of Banked Water	NKWSD	Project	Improved Groundwater Recharge Capacity	Add capacity for the recovery and return of banked supply from NKWSD to the Poso Creek IRWM districts via the Friant-Kern Canal (FKC). The added recovery and return capacity from dedicated groundwater wells will help alleviate constraints in the return to the CVP Contractors since North Kern must meet its in-district groundwater/surface water needs while at the same time returning banked supply.	High	Initiated	2020	2026	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Enhance regional conjunctive water-use • Implement regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
On-Farm Recharge Activities Incentive Program	NKWSD	Program	Demand Management Actions	Development of an incentive program to encourage landowners to take delivery of available water to facilitate further groundwater recharge.	High	Conceptual	2022	2027	<ul style="list-style-type: none"> • Improve direct recharge areas • Increase absorptive capacity within the Region • Enhance regional conjunctive water-use

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
									<ul style="list-style-type: none"> • Implement regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Poso Creek Weir	NKWSD	Project	Improved Conveyance Capacity	Installation of a concrete weir on Poso Creek to replace the earthen structure and enhance water conveyance and diversion.	High	Conceptual	2022	TBD	<ul style="list-style-type: none"> • Enhance reliability and effectiveness of surface water supplies delivered to Region • Improve regional water conveyance, direct recharge, and in-lieu service areas • Enhance regional conjunctive water-use • Facilitate implementation of regional opportunities, projects, and programs • Facilitate implementation of region-wide water management actions
Spreading Pond Facilities	NKWSD	Project	Improved Groundwater Recharge Capacity	The district will evaluate and develop new or expanded recharge for district-owned property and/or landowner property.	High	Conceptual	2022	TBD	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Increase absorptive capacity within the Region • Enhance regional conjunctive water-use • Implement regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
In-Lieu Recharge Program	NKWSD	Program	Supplemental Surface Water Supplies	Implementation of fees for groundwater use when surface water is available.	High	Conceptual	2022	TBD	<ul style="list-style-type: none"> • Improve in-lieu service areas • Enhance regional conjunctive water-use • Implement regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Sub Surface Spreading Infrastructure	NKWSD	Project	Improved Groundwater Recharge Capacity	Evaluating feasibility and cost of subsurface recharge versus surface spreading Implementation of a program which would supply water to landowners for use in subsurface recharge projects.	High	Conceptual	2022	TBD	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Increase absorptive capacity within the Region • Enhance regional conjunctive water-use • Implement regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Allocation of Available NKWSD Supplies (RRID)	NKWSD	Program/Project	Supplemental Surface Water Supplies	Allocation of oilfield produced water from NKWSD to Rosedale Spreading Basin for RRID benefit.	High	Ongoing	2020	TBD	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Increase absorptive capacity within the Region • Enhance regional conjunctive water-use • Implement regional opportunities, projects, and programs • Implement region-wide water management actions

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
									<ul style="list-style-type: none"> Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Calloway Canal Lining – 7 th Standard Rd to 8-1 Pumping Plant	NKWSD	Project	Improved Conveyance Capacity	Install concrete lining on Calloway Canal from 7 th Standard northward into District to increase energy savings and effectiveness and reduce seepage for better control where water is applied for recharge and use, and to reduce loss of high quality water seeping into poor water quality upper aquifer.	High	Initiated	2021	2023	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Maintain and enhance quality of water supply Facilitate implementation of regional opportunities, projects, and programs Facilitate implementation of region-wide water management actions
Beneficial Reuse of Oilfield Produced Water	NKWSD	Project	Improved Groundwater Recharge Capacity	Oilfield produced water of sufficient quality for beneficial reuse used as source water for groundwater recharge.	High	Ongoing	Ongoing	TBD	<ul style="list-style-type: none"> Improve direct recharge areas Enhance regional conjunctive water-use Implement regional opportunities, projects, and programs Implement region-wide water management actions
Beneficial Reuse of Oilfield Produced Water – Phase 2	KTWD	Project	Improved Conveyance Capacity	Construct pipeline from CRC to Guzman Reservoir.	High	Initiated	2015	2023	<ul style="list-style-type: none"> Increase reliability of water supplies Improve water management Improve in-lieu service areas Improve water conveyance Implement regional opportunities, projects, and programs
Surface Storage Reservoir	KTWD	Project	Supplemental Surface Water Supplies	Construction of additional surface storage within, or immediately adjacent to, the District.	High	Initiated	2016	TBD	<ul style="list-style-type: none"> Enhance regional conjunctive water-use Increase reliability of water supplies Increase absorptive capacity within the Region

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
									<ul style="list-style-type: none"> • Improve water management • Improve in-lieu service areas • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge
Beneficial Reuse of Oilfield Produced Water – Quinn Intertie	KTWD	Project	Improved Conveyance Capacity	Construct pipeline from Guzman Reservoir to Cecil Reservoir.	High	Initiated	2019	2023	<ul style="list-style-type: none"> • Increase reliability of water supplies • Improve water management • Improve in-lieu service areas • Improve water conveyance
Friant-Kern Canal Capacity Correction	KTWD	Project	Improved Conveyance Capacity	Construction of parallel canal and improvements to existing canal to restore canal to original design capacity. Also includes improvements to surface water intake at pumping plants off the canal.	High	Initiated	2019	TBD	<ul style="list-style-type: none"> • Enhance regional conjunctive water-use • Improve in-lieu service areas • Increase reliability of water supplies • Implement region-wide water management actions • Maintain and enhance quality of water supply • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge • Implement regional opportunities, projects, and programs
In-Lieu Recharge Program: Groundwater Extraction Fee Implementation	KTWD	Program	Improved Groundwater Recharge Capacity	Implementation of groundwater fees to incentivize use of surface water in-lieu of groundwater in wet and average years. Develop method for measuring and billing water users for groundwater pumping including water pricing procedures; modifying existing accounting system and; creating notice and invoicing system.	High	Initiated	2020	2023	<ul style="list-style-type: none"> • Enhance regional conjunctive water-use • Improve in-lieu service areas • Increase reliability of water supplies • Implement region-wide water management actions • Maintain and enhance quality of water supply • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge • Implement regional opportunities, projects, and programs

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
District Evapotranspiration (ET) Monitoring Tools	KTWD	Project	Demand Management Actions	Develop automation and remote sensing for ET measurements to monitor consumptive water use.	High	Conceptual	2022	2023	<ul style="list-style-type: none"> Enhance regional conjunctive water-use Improve in-lieu service areas Increase reliability of water supplies Implement region-wide water management actions Implement regional opportunities, projects, and programs
In-Lieu Recharge Program: On-Farm Groundwater Use Measurement Tools	KTWD	Project	Improved Groundwater Recharge Capacity	Installation of meters, programmable controls, and SCADA on landowner wells.	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> Enhance regional conjunctive water-use Improve in-lieu service areas Increase reliability of water supplies Implement region-wide water management actions Implement regional opportunities, projects, and programs
Water Delivery Improvements – District Facilities	KTWD	Project	Improved Groundwater Recharge Capacity	Distribution system improvements to increase delivery capability to existing irrigated land within the District’s service area to reduce groundwater pumping in wet and average years to conserve groundwater for dry years.	High	Ongoing	-	TBD	<ul style="list-style-type: none"> Improve surface water conveyance Enhance regional conjunctive water-use Improve in-lieu service areas Increase reliability of water supplies Improve water management Maintain and enhance quality of water supply
Monitoring Equipment Improvements – District Facilities	KTWD	Project	Demand Management Actions	Install flowmeters, water level sensors, and programmable controls and SCADA to facilitate remote monitoring of the District’s water system facilities.	High	Ongoing	-	TBD	<ul style="list-style-type: none"> Improve surface water conveyance Enhance regional conjunctive water-use Improve in-lieu service areas Increase reliability of water supplies Improve water management
Implementation of out-of-District banking programs	KTWD	Program	Improved Groundwater Recharge Capacity	Expansion and extension of out-of-District banking programs and creation of new programs.	High	Ongoing	-	TBD	<ul style="list-style-type: none"> Enhance regional conjunctive water-use Increase reliability of water supplies Implement region-wide water management actions

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
									<ul style="list-style-type: none"> Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge Implement regional opportunities, projects, and programs
Friant Pipeline Project	CWD	Project	Improved Groundwater Recharge Capacity	The Friant Pipeline Project that would increase water importation capacity into the area. The increased capacity would allow greater access to high flow water and support banking programs with Friant Contractors	High	Ongoing	2019	2025	<ul style="list-style-type: none"> Enhance reliability and effectiveness of surface water supplies delivered to Region Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Facilitate implementation of regional opportunities, projects, and programs Facilitate implementation of region-wide water management actions
New Water Supply Purchases	CWD	Program	Improved Groundwater Recharge Capacity	Acquire long-term new water purchase contracts and/or establish a water purchase fund if contracts are difficult to secure because of high demand and competition and resulting high costs	High	Initiated	2020	2025	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance reliability and effectiveness of surface water supplies delivered to Region Enhance regional conjunctive water-use Facilitate implementation of region-wide water management actions
New Cawelo GSA Banking Partners	CWD	Program	Improved Groundwater Recharge Capacity	Banking program with Zone 7 could be modified to increase the amount of water stored for Zone 7 and/or a new banking programs and partners could be considered to fund the construction of new facilities and/or to improve existing facilities	High	Initiated	2020	2030	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Maintain and enhance quality of water supply Facilitate implementation of region-wide water management actions

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
									<ul style="list-style-type: none"> Increase absorptive capacity for banking water when available
Water Treatment Facilities	CWD	Program	Improved Groundwater Recharge Capacity	Install water treatment facilities that will allow the Cawelo to acquire treated produced water and treat it to a level that is safe for crop irrigation. Treated produced water would be considered a new water source to the basin.	High	Initiated	2020	2035	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Implement region-wide management actions, Enhance regional conjunctive water use, Maintain and enhance quality of water supply Adapt to changes in the amount, intensity, timing, and in-lieu service areas
Out of Cawelo GSA Banking	CWD	Program	Improved Groundwater Recharge Capacity	Evaluate groundwater banking projects that are outside the area but within the Kern County Subbasin and also groundwater banking projects outside of the Kern County Subbasin.	High	Initiated	2020	2035	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Maintain and enhance quality of water supply Facilitate implementation of region-wide water management actions Increase absorptive capacity for banking water when available
Increase Recharge and Banking Capacity	CWD	Program	Improved Groundwater Recharge Capacity	Increase recharge capacity to capture and recharge additional wet year high flow waters to store for future use. The project would entail building additional Cawelo GSA-owned recharge facilities and/or improve the distribution system to increase the capacity to	High	Conceptual	2030	2035	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Maintain and enhance quality of water supply Facilitate implementation of region-wide water management actions

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
				capture more water, especially during wet hydrologic events					<ul style="list-style-type: none"> • Increase absorptive capacity for banking water when available
New Monitoring Well	CWD	Project	Demand Management Action	Secure access to a new monitoring well location.	High	Conceptual	2023	2025	<ul style="list-style-type: none"> • Enhance regional conjunctive water-use • Improve in-lieu service areas • Increase reliability of water supplies • Implement region-wide water management actions • Implement regional opportunities, projects, and programs
Poso Creek Flood Water Capture	CWD	Program	Improved Groundwater Recharge Capacity	Construction of additional facilities to take advantage of appropriate rights and divert supplementary water from the creek during times of high flow. This capture of additional high flows could reduce potential downstream flooding impacts	High	Conceptual	2030	2035	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Enhance regional conjunctive water-use • Implement regional opportunities, projects, and programs • Implement region-wide water management actions. • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge
Surface Water Storage	CWD	Program	Improved Groundwater Recharge Capacity	Constructing a new 5,000 AF reservoir to provide additional storage capacity to bring more water into the area during wet years	High	Conceptual	2030	2035	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Enhance reliability effectiveness of surface water supplies delivered to the Region • Implement region-wide management actions • Enhance regional conjunctive water use • Adapt to changes in amount, intensity, timing, and in-lieu service areas

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Voluntary Land Conversion	CWD	Program	Demand Management Action	A program to incentivize landowners to reduce their total crop demand by converting farmed land to groundwater recharge areas.	Medium	Conceptual	2020-2040	2070	<ul style="list-style-type: none"> • Improve direct recharge areas • Implement region-wide management actions • Enhance regional conjunctive water use • Adapt to changes in amount, intensity, timing, and in-lieu service areas
Crop Conversion and Irrigation Efficiency	CWD	Program	Demand Management Action	Evaluate potential programs to incentivize growers to convert from relatively high water demands crops to crops that require less water and to improve the efficiency of irrigation practices	Medium	Conceptual	2020-2040	2070	<ul style="list-style-type: none"> • Facilitate implementation of regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge
Land Acquisition	CWD	Program	Demand Management Action	Program seeking to acquire appropriate land that is actively farmed to reduce irrigated acreages when available.	Medium	Conceptual	2020-2040	2070	<ul style="list-style-type: none"> • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Continued Importation and Optimization of Imported Water Supplies	DEID	Program	Supplemental Surface Water Supplies	Continue current practice of importing available water supplies from both CVP and non-CVP and optimizing those supplies for use	High	Ongoing	2020	2040	<ul style="list-style-type: none"> • Enhance regional conjunctive water-use • Implement regional opportunities, projects, and programs • Implement region-wide water management actions • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Continued In-District Recharge/ Banking Operations	DEID	Program	Improved Groundwater Recharge Capacity	Consist of continued historic and current operations of existing in-district recharge/banking operations for future groundwater extraction needs	High	Ongoing	2020	2040	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Enhance regional conjunctive water-use

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
									<ul style="list-style-type: none"> Maintain and enhance quality of water supply Facilitate implementation of region-wide water management actions Increase absorptive capacity for banking water when available
Increase In-District Recharge/Banking Operations	DEID	Program	Improved Groundwater Recharge Capacity	Efforts to increase in-district recharge/banking operations for future groundwater extraction needs	High	Ongoing	2020	2040	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Maintain and enhance quality of water supply Facilitate implementation of region-wide water management actions Increase absorptive capacity for banking water when available
Continued Out-of-District Banking Operations	DEID	Program	Improved Groundwater Recharge Capacity	The purpose of out-of-district (OOD) projects are to bank water in wet years that is surplus to the District's needs for later recovery in dry years	High	Ongoing	2020	2040	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Maintain and enhance quality of water supply Facilitate implementation of region-wide water management actions Increase absorptive capacity for banking water when available
Increase Importation of Improved Waters	DEID	Program	Supplemental Surface Water Supplies	Increasing imported water quantities above historic operations to meet consumptive use requirements, new water demands, and reduce reliance on groundwater pumping	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> Enhance regional conjunctive water-use Implement regional opportunities, projects, and programs Implement region-wide water management actions

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
									<ul style="list-style-type: none"> Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge
Increase Out-of-District Groundwater Banking Operations	DEID	Program	Improved Groundwater Recharge Capacity	Expand historic OOD water banking projects to enhance the water resources available.	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> Improve regional water conveyance, direct recharge, and in-lieu service areas Enhance regional conjunctive water-use Maintain and enhance quality of water supply Facilitate implementation of region-wide water management actions Increase absorptive capacity for banking water when available

Table 4-4. Drought Mitigation Actions by DAC

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Stormwater Improvement in McFarland	City of McFarland	Project	Water Quality Improvements	Improvements to stormwater capture and infrastructure to reduce urban runoff.	High	Ongoing	2014	TBD	<ul style="list-style-type: none"> • Increase absorptive capacity within the Region • Enhance regional conjunctive water-use • Facilitate implementation of regional opportunities, projects, and programs • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and stormwater capture.
Flood Management & Habitat Restoration Improvements in McFarland Area	City of McFarland	Project	Enhance Flood Control	Improvements to flood management and habitat restoration efforts.	High	Ongoing	2014	TBD	<ul style="list-style-type: none"> • Maintain and enhance quality of water supply • Enhance regional conjunctive water use
Browning Road Reservoir – 1 Million Gallon Welded Steel Reservoir, Booster Pump Station, and System Intertie	City of McFarland	Project	Improved Conveyance Capacity	Added capacity to improve supply reliability and conveyance capacity.	High	Conceptual	2023	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
Browning Road Well – 1,2,3-TCP Treatment	City of McFarland	Project	Water Quality Improvements	Additional of treatment for 1,2,3-TCP to improve water quality delivered to residents.	High	Conceptual	2023	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
Municipal Water Supply Well Project	City of McFarland	Project	Water Quality Improvements	Improvements to support municipal water supply.	High	Conceptual	2023	TBD	<ul style="list-style-type: none"> • Enhance regional conjunctive water-use • Improve effectiveness of water delivery • Increase reliability of water supplies to stakeholders • Maintain and enhance quality of water supply
Identification of Potential Groundwater recharge projects	City of McFarland	Program	Improved Groundwater Recharge Capacity	Implementation of a program that would identify potential groundwater recharge sites and public infrastructure projects for water recharge opportunities.	Medium	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Enhance regional conjunctive water-use • Maintain and enhance quality of water supply • Facilitate implementation of region-wide water management actions • Increase absorptive capacity for banking water when available

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Community Water Conservation Program	City of McFarland	Program	Demand Management Actions	Improvements to individual water conservative practices that address water use efficiency and meet water reduction goals.	Medium	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Implement regional opportunities, projects, and programs • Implement region-wide water management actions
Landscape Irrigation Efficiency	City of McFarland	Program	Demand Management Actions	Implement a program to measure the efficiency of new and existing irrigation systems to reduce water use.	Medium	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Facilitate implementation of regional opportunities, projects, and programs • Implement regional opportunities, projects, and programs • Implement region-wide water management actions
Electrical Upgrade Well #6 (Hail Ln) Water Well	City of McFarland	Project	Equipment Reliability Improvement	Upgrades of electrical components on Well #6 water well.	Medium	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders
Main Water Supply Service Lines Improvements	City of McFarland	Project	Water Management Improvements	Improvements to main water supply service lines to support municipal water delivery.	Medium	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
H2S Treatment Well #6 (Hail Ln) Water Well	City of McFarland	Project	Water Quality Improvements	Installation of treatment on Well #6 water well.	Medium	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
Water Meter System Improvements	City of McFarland	Project	Water Management Improvements	Water meter upgrades for entire water system.	Medium	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders
Reclaim Tank and Pump Station	LHUD	Project	Enhance Flood Control	Current dewatering operation wastes water to an evaporation pond. Installation of reclaim tank and pump station, which could save approximately 800,000 gallons per year.	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Backwash Tank Repair	LHUD	Project	Water Quality Improvements	Repair to fix leak developed at base between metal and concrete.	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
Feed Pump VFDs	LHUD	Project	Improved Conveyance Capacity	Addition of VFD will allow run time optimization. Current operations require more backwash cycles.	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
SCADA Programming	LHUD	Project	Demand Management Actions	Programming of new VFD on filter feed and backwash pumps will allow run time optimization. Current operations require excessive backwash cycles.	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
Transfer Water PS Upgrades	LHUD	Project	Improve Conveyance Capacity	Installation of two new pumps at 660 gpm/pump for system wide upgrade. Existing Transfer PS are running at full loads.	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
Two Storage Tanks in BMWD Areas	LHUD	Project	Water Quality Improvements	Replacement of old storage tanks in need of replacement. Installation of 80K gallon at BW and 35K Union Oil Tank.	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
Chlorine Station at Brown Material Road Pump Station	LHUD	Project	Water Quality Improvements	Infrastructure improvements to maintain required chlorine residual at BMWD.	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
Iron Pipe Replacement #1: I-5 (in front of Denny's)	LHUD	Project	Water Quality Improvements	Pipeline improvements to address colored water problems.	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Iron Pipe Replacement #2: Hwy 46, East of I-5 (at Bufford Station)	LHUD	Project	Water Quality Improvements	Pipeline improvements to address colored water problems.	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
I-5 Crossing Upsize	LHUD	Project	Improved Conveyance Capacity	Pipeline improvements to increase piping capacity for deliveries to majority of LHUD service area.	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
2-Inch Main Replacement (Water Distribution System)	LHUD	Project	Improved Conveyance Capacity	Pipe improvements to 4-inch pipe (includes appurtenances and tie-ins). Includes 11,600 LF of 2-inch pipe removal and improvements.	High	Initiated	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
3.6 Miles of Water Line Replacement	LHUD	Project	Water Quality Improvements	Pipeline improvements to resolve current issues associated with leaks to reduce system water loss.	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
Meter Replacements	LHUD	Project	Demand Management Actions	Installation of 481 new automated meters for recording to reduce staff time.	High	Conceptual	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
City of Delano Spreading Grounds	City of Delano	Project	Improved Groundwater Recharge Capacity	Construction of a 16-acre recharge site for water system use.	High	Initiated	2019	2023	<ul style="list-style-type: none"> • Improve regional water conveyance, direct recharge, and in-lieu service areas • Increase absorptive capacity within the Region • Enhance regional conjunctive water-use • Facilitate implementation of regional opportunities, projects, and programs • Adapt to changes in the amount, intensity, timing, quality, and variability of runoff and recharge.
Richgrove CSD Water Well and Storage Tank	Richgrove CSD	Project	Infrastructure Improvements	Implementation of a new well and storage tank to enhance water supply reliability.	High	Initiated	TBD	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply

Mitigation Actions	District/Entity	Type	Type of Project/Program	Purpose and Brief Description	Priority Level	Status	Timetable for Initiation	Timetable for Completion	Benefits to Drought Planning Objectives
Wasco Drinking Water Storage Tank	City of Wasco	Project	Water Quality Improvements	Implementation of new storage tank to support reliability of water system.	High	Ongoing	2014	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
Installation of 123-TCP Treatment Facilities	City of Wasco	Project	Water Quality Improvements	Installation of treatment for 123-TCP.	High	Ongoing	2019	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders • Maintain and enhance quality of water supply
Water Meter Upgrades	City of Wasco	Project	Infrastructure Improvements	Upgrades to water meter infrastructure to advanced meter infrastructure.	High	Initiated	2021	TBD	<ul style="list-style-type: none"> • Improve effectiveness of water delivery • Improve reliability of delivering water supplies to stakeholders

5. Response Actions

Response Actions are typically implemented when a specific stage of drought is reached, or other outside factors result in a needed action. Response actions are intended to reduce the severity of immediate impacts of drought and manage limited water supply. These actions are distinct from response actions, which do not have defined metrics or triggers.

5.1 Development of Response Actions

As previously stated, response actions are triggered when specific drought stages are reached. Initially these actions were developed by checking available information such as local water contingency plans in the area. This involved long-term drought planning through the development IRWM Plan and SGMA GSPs. Corresponding response actions were further developed once the triggers and goals of specific drought stages were clearly defined.

5.1.1 Defined Triggers based on Existing Conditions

As stated in the drought monitoring section, the metrics critical for drought response actions and regional water management include: (1) decreases in surface water allocations, and (2) decreases in groundwater levels. The data collected from annual forecast modeling for the SWP, CVP, and Kern River allows the district to manage water supplies within the drought plan area.

Triggers and metrics for each drought planning stage are clearly defined in **Tables 2-2** through **2-5** for the Surplus Condition Stage and the three Drought Stages.

5.1.2 Identification of Response Actions

The region has developed the following response actions, with input from the Task Force, for surplus conditions and drought periods where surface water supplies drop below normal levels. These response actions are listed in Table 5-1 below.

Table 5-1. Surplus Condition Response

Wet Year Response Action	Description
Water Banking Activities	Banking of surplus imported surface water deliveries per the availability and capacities available to RWMG Member agencies. Drought Task Force with engage to assist in the coordination of conveyance and recharge activities to maximize the recharge of available supplies.
Water Transfers and Supplemental Surface Water	Participation in additional water transfers or supplemental surface water programs. Drought Task Force with engage to assist in the coordination of conveyance and transfer of available supplies.

Table 5-2. Dry Year Response Actions

Dry Year Response Action	Description	Drought Stage
Public Education and Outreach	Notification of voluntary conservation and water use reduction through website, public meetings, and email and postal service mailing	Stage 1 through 3
Prorating of Water Deliveries	Prorating of water deliveries based on available supplies	Stage 1 through 3
Water Transfers and Supplemental Surface Water	Participation in additional water transfers or supplemental surface water programs	Stage 1 through 2
Water Banking Activities	Recovery of banked water from banking partners	Stage 1 through 3
Request Disaster Relief	Request disaster relief from state or federal entities during drought or dry years	Stage 3
Groundwater Pumping of District-Owned Wells	Groundwater pumping of district-owned wells to supplement deficit in surface water supplies consistent with SGMA	Stage 1 through 3
Groundwater Pumping of Landowner Wells	Groundwater to meet demand of on-farm operations when surface water is unavailable	Stage 1 through 3

The Response Action taken by each district in the region will be dependent on a number of factors and therefore, cannot be accurately forecasted. A summary of the variability of each action is briefly described below.

Public Education and Outreach – depending in the demographics of the district and the drought stage level, each district or municipality will engage in education and outreach. In districts that are almost exclusively agricultural, education and outreach will be accomplished through district Board of Director meetings or other communications with landowners. Municipal entities may engage in more broadcasted education and outreach, including, but limited to social media, media outlets and / or public meetings.

Prorating of Water Deliveries – As shown previously demonstrated imported water deliveries vary by district and therefore prorated water deliveries during drought conditions will also vary between districts. The proration of water deliveries will be based on the allocation of imported water available to each individual district.

Water Transfers and Supplemental Surface Water – Each district has varying capacity (physically or economically) to support water transfers. Water transfers may originate from other local districts through exchanges involving multiple parties or from watersheds outside of the region and as far away as Northern California. The availability of transfer water varies depending on conditions in the originating watershed and inter-regional conveyance capacities. The capacity to convey transfer water within and outside of the region is dependent on many factors, including available capacity in local and region infrastructure, regulatory restrictions, priority for access to conveyance facilities, and costs for conveyance. Each district will assess its conditions to participate in water transfers, including the availability of transfer water, market cost of transfers, and conveyance capacity. These factors change as drought conditions change.

Water Banking Activities – The capacity to either bank wet year water or to recover banked water varies by district and over time by district. Each district has developed varied in-district and regional banking programs that allow each district the ability to recover water during drought

conditions. The volume of water that could potentially be recovered in any given drought stage is dependent on many factors, including but not limited to the following:

- Volume of banked in in-district or regional banking projects
- Recovery capacity and priorities in in-district and regional banking projects
- Availability of other supplemental water supplies
- Water banking carry over objectives

Request Disaster Relief – The amount of amount of disaster relief requested by any district is dependent on the individual conditions within each district during particular drought stages and the availability of disaster relief programs.

Groundwater Pumping of District-Owned Wells – The amount of groundwater pumping of district owned wells is dependent on the amount of water available from the other sources available to each district during various drought stages, as explained above. Additionally, the amount of groundwater pumping within each district will be governed by the Measurable Objectives and Minimum Thresholds set within each district and identified in each district’s adopted Groundwater Sustainability Plan. Note that Measurable Objectives and Minimum Thresholds, set as groundwater elevations, vary across a district and across the region, and the volume of groundwater pumped within each area of the region effect groundwater elevations differently.

Groundwater Pumping of Landowner Wells – The amount of groundwater pumping of landowner wells is dependent on the amount of water available landowners from the other sources available to each district during various drought stages, as explained above. Additionally, the amount of groundwater pumping within by each landowner will be governed by the Measurable Objectives and Minimum Thresholds set within each district and identified in each district’s adopted Groundwater Sustainability Plan. Note that Measurable Objectives and Minimum Thresholds, set as groundwater elevations, vary across a district and across the region, and the volume of groundwater pumped within each area of the region effect groundwater elevations differently.

Additional actions applicable to the region will be added as further development occurs. The details for the short-action, request disaster relief, may be in development within some Districts of the region.

5.2 Evaluation of Response Actions

The responses are evaluated and prioritized by their feasibility and effectiveness to be implemented quickly during a drought.

5.3 Initiation of Response Actions

The Poso Creek IRWM Group members work closely with one another to implement projects and programs that benefit the region. Prior to the initiation of response actions, the Districts and DACs will examine the data collected from drought monitoring and climate forecasting tools as well as assess the vulnerability of water resources in the region.

Response actions are triggered when specific stages of drought are reached. These actions will be initiated and implemented by the Districts and DACs for their respective area based on the severity drought conditions effecting the availability of imported water. Initially, response actions are voluntary, but as more severe stages of drought are identified, these actions will be mandatory to achieve the goals of the drought stage. As previously stated, the California governor will declare a drought emergency at a state-wide or local level. Once a drought is declared, the public will be informed of drought conditions in the region and response actions developed by the Districts and DACs will be initiated.

Response actions will be updated through an on-going basis. In addition, a periodic evaluation of the process used to develop these actions will be done to determine the effectiveness of the Drought Contingency Plan.

6. Plan Update Process

This section describes the process for updating the Drought Contingency Plan. The update and evaluation process describes the schedule for monitoring, evaluating, and updating the Drought Contingency Plan.

6.1 Plan Development Process

Planning occurred in two phases in accordance with the Drought Response Program Framework (Framework). Phase I included the development of a Task Force, a Communication and Outreach Plan, and a detailed Work Plan to describe the tasks, schedule and budget required to complete the plan (Reclamation, 2016a).

Development of Phase I documents were completed and approved by Reclamation in March 2020. This Plan is driven by and expands on work completed during Phase I to complete the six required elements specified in **Figure 1-1**. These elements were developed through a collaborative stakeholder process with the RWMG and is consistent with and incorporate elements of the SGMA, UWMP, and AWMP planning efforts within the region. This Plan builds on each of these planning efforts to incorporate measures centered around managing wet year water supplies to better prepare for and manage during dry or drought periods. The response and mitigation actions presented herein align with those outlined under the previous drought planning to optimize existing regional planning efforts. By integrating with parallel water management programs, this Plan seeks to support overall regional water supply reliability and sustainability.

6.2 Update and Evaluation Process

The Drought Contingency Plan will be updated by the Poso Creek RWMG through both an ongoing process and a “post-drought evaluation.” The ongoing process will test the effectiveness of the Drought Contingency Plan under simulated drought conditions, and will be done periodically to note possible shortcomings of the Drought Contingency Plan due to changes in technology, infrastructure, laws, political leadership, etc. The post-drought evaluation is intended to measure the real-world effectiveness of the Drought Contingency Plan.

The elements of the Drought Contingency Plan will be updated on an as needed basis, or at least on a 5-year basis. Drought monitoring will be conducted on an on-going basis using known drought tools to indicate current conditions of drought. The vulnerability assessment will be updated based on the severity of drought and climate change conditions in the region. Mitigation actions will be updated based on District updates to the SGMA GSPs and response actions will be updated based on drought conditions. The operational and administrative framework, as well as the plan update process will be updated, as needed, based on the effectiveness of the Drought Contingency Plan.

The Poso Creek IRWM will also include the Drought Contingency Plan as part of the Poso Creek IRWM Plan. Currently, the Group updates the IRWM plan every 5 to 7 years to meet various grant program eligibility criteria (such as the Department of Water Resources IRWM planning program or Reclamation's WaterSMART program). As such, there is an expectation that the Group will incorporate a new Drought Contingency Plan as a new chapter in the next IRWM Plan update.

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