Board of Directors Meeting

AGENDA

Wednesday February 9, 2022
9:00 a.m. – 12:00 p.m.
Teleconference Only
Call-In Information Provided Below

I. **Call to Order/Pledge of Allegiance & Safety Announcement/Roll Call** (*Please remember to keep your phone line muted and unmute when announcing yourself for attendance or speaking)

II. **Workshop**

A. ESJ IWFM Model- Future Baseline and GSA Water Budgets (WC; Dr. Taghavi, Sara Miller) (**Attachment 1 - Page 4**)

1. Discuss Hydrologic Budget, Operating Budget Elements
2. Questions, Issues and Needs to Support GSA Review

B. Water Accounting Framework (WAF) Strategy Development

1. WAF & Financing Plan Approach and Overview (Matt Zidar; Glenn Prasad)
2. Survey Results
3. Focus Groups and Potential Interview Questions
4. Roles, Process and Work Plan (Emily Finnegan)

C. Funding & Financing Strategy Development- Basic Tools for the GWA and GSAs (Matt Zidar)

III. **Business Meeting & Scheduled Items**

A. Action Items:

1. Approval of the December 8, 2021, Meeting Minutes (**Attachment 2 - Page 91**)
2. Discussion and Possible Action to Adopt Resolution R-22-XX Determining to Conduct Meetings Using Teleconferencing Pursuant to Government Code 54953 as Amended by AB 361 (**Attachment 3 - Page 107**).
3. Resolution Approving Submittal of a Grant Application and Spending Plan to the Department of Water Resources for the Sustainable Groundwater Management Act Implementation Grant Under the Sustainable Groundwater Planning Grant Program (**Attachment 4 - Page 109**).

4. DWR GSP Comments and Response Plan
    a. DWR Comments (**Attachment 5.1 - Page 112**)
    b. Draft Response Matrix (**Attachment 5.2 - Page 134**)
    c. Response Plan

IV. Staff/DWR Reports

A. Staff Report
B. DWR Report (**Attachment 6 - Page 140**)

V. Directors' Comments

VI. Public Comment (non-agendized items)

VII. Future Agenda Items

VIII. Adjournment

Next Regular Meeting
Wednesday, March 9, 2022
10:30 a.m. – 12:00 p.m.
Location TBD

Action may be taken on any item

Agendas and Minutes may also be found at http://www.ESJGroundwater.org
Note: If you need disability-related modification or accommodation in order to participate in this meeting, please contact San Joaquin County Public Works Water Resources Staff at (209) 468-3089 at least 48 hours prior to the start of the meeting.

Important Notice Regarding COVID 19 and Closure of Board Chambers to the Public During Eastern San Joaquin Groundwater Authority Board of Directors Meetings

On March 18, 2020, Governor Gavin Newson issued Executive Order N-29-20 recognizing that COVID 19 continues to spread throughout our community resulting in serious and ongoing economic harm. Governor Newson has therefore waived certain requirements of the Ralph M. Brown Act relating to public participation and attendance at public meetings.

Based on guidance from the California Department of Public Health and the California Governor's Officer, ***effective immediately*** and while social distancing measures are imposed, Board chambers will be closed to the public during the Eastern San Joaquin Groundwater Board of Directors Meetings.

In order to minimize the spread of the COVID 19 virus, the following options are available to members of the public to listen to these meetings and provide comments to the Board of Directors before and during the meeting:

1. You are strongly encouraged to listen to the Eastern San Joaquin Groundwater Authority Board of Directors meetings by attending the teleconference:

Microsoft Teams meeting

Join on your computer or mobile app

Click here to join the meeting

Or call in (audio only)

+1 209-645-4071,,929131824# United States, Stockton

Phone Conference ID: 929 131 824#

Find a local number | Reset PIN

Learn More | Meeting options

2. If you wish to make a comment on a specific agenda item, please submit your comment via email by 5:00 p.m. on the Tuesday prior to the meeting. Please submit your comment to the Clerk/Secretary of the Board at kmsmith@sjgov.org. Your comment will be shared with the Board members and placed into the record at the meeting. Every effort will be made to read comments received during the meeting into the record, but some comments may not be read due to time limitations. Comments received after an agenda item will be made part of the record if received prior to the end of the meeting.

Eastern San Joaquin Water Resources Model (ESJWRM)

Version 2.0 Update

Prepared for:

Eastern San Joaquin Groundwater Authority

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

DRAFT

January 20, 2022

Woodard & Curran

Table of Contents

SECTION **PAGE NO.**

Tables

Figures

Appendices

1 Historical Calibration Update

The Eastern San Joaquin Water Resources Model (ESJWRM) was developed primarily to evaluate the current and recent historical groundwater conditions of the Eastern San Joaquin Groundwater Subbasin (ESJ Subbasin or Subbasin) and simulate various current and future condition scenarios as part of the Groundwater Sustainability Plan (GSP) preparation process under the Sustainable Groundwater Management Act (SGMA) (Woodard & Curran, 2018a). The fine geographic scale of the model provides the opportunity for individual Groundwater Sustainability Agencies (GSAs) to evaluate the effect of changing ESJ Subbasin conditions on smaller GSA areas. The Eastern San Joaquin Groundwater Authority (ESJGWA) was formed by a Joint Powers Agreement (JPA) and coordinates the SGMA activities for the Subbasin. The ESJGWA members include the 16 GSAs in the Subbasin.

ESJWRM uses the Integrated Water Flow Model (IWFM-2015) platform, has a finite element grid, includes data on a monthly time step, and covers the area of Cosumnes Subbasin, Eastern San Joaquin Subbasin, Modesto Subbasin, and the portion of the City of Lathrop east of San Joaquin River in the Tracy Subbasin. The original development of ESJWRM was from 2016 through 2018, with application of ESJWRM to GSP development occurring from 2018 through 2020 and resulting in a November 2019 GSP (ESJGWA, 2019). The GSP version of the ESJWRM (ESJWRM Version 1.1), which covers Water Years (WY) 1995 through 2015 (October 1994 through September 30, 2015), was documented in an August 2018 report (Woodard & Curran, 2018a) as well as a February 2018 technical memorandum (Woodard & Curran, 2018b). The earlier reports cover the development of the model, the model platform, the model framework, and all input data and results. This report serves as an update to the earlier model report (Woodard & Curran, 2018a) and only discusses portions of the model that were updated as part of the recent effort to develop ESJWRM Version 2.0, as well as a complete discussion of updated model results. This section includes all the updates made to ESJWRM Version 2.0.

1.1 Model Code and Data Updates Since the Groundwater Sustainability Plan

Since the ESJ Subbasin GSP was finalized in November 2019, the ESJWRM has undergone three updates:

1. Extension of Data from Water Year 2016 through Water Year 2019
2. Extension of Data through Water Year 2020
3. Full Model Update and Recalibration (resulting in ESJWRM Version 2.0)

The first two updates were completed as part of the preparation of ESJ Subbasin GSP annual reports to the Department of Water Resources (DWR). These updates only included an extension of model time series data (i.e., land use, surface water diversions, groundwater well pumping, and urban demand) and the model provided estimates of total surface water supplies, groundwater pumping, and change in groundwater storage for the water year covered by the model report. The third and major update is the focus of this report and the majority of the work was performed in 2021. Through discussions with GSAs near the completion of the GSP, several areas for update and refinement in the ESJWRM were identified. The goals of the 2021 model update to ESJWRM Version 2.0 were to:

1. Confirm the data in the ESJWRM is the latest hydrologic, water supply, and operations data available. This includes updating issues identified through discussions with the GSAs as part of the GSP process and including newer data and techniques that were unavailable in the development of the original model.

2. Refine the model calibration to ensure a reasonable representation of the hydrologic conditions in the ESJ Subbasin with the updated data and observation information.
3. Update the projected conditions baseline to estimate conditions in the ESJ Subbasin at buildout (approximately 2040) without GSP projects and potential climate change conditions. This update is discussed in Section 2.
4. Use the updated ESJWRM versions to develop water budgets at the GSA level to understand the water operations for each GSA to support a water accounting framework and assessment of benefits and impacts of sustainability actions at the GSA level. This is discussed in Section 3.

The data update was completed through extensive outreach to GSAs and Subbasin agencies and coordination with the ESJGWA Technical Advisory Committee (TAC), including meeting presentations and interaction with stakeholders. Data for the model update included a variety of agencies and GSAs. Below is a list of the agencies that provided data and input on the model update:

Agricultural Water Purveyors

- Calaveras County Water District (CCWD)
- Central San Joaquin Water Conservation District (CSJWCD)
- North San Joaquin Water Conservation District (NSJWCD)
- Oakdale Irrigation District (OID)
- South San Joaquin Irrigation District (SSJID)
- Stockton East Water District (SEWD)
- Woodbridge Irrigation District (WID)

Municipal Water Purveyors

- California Water Service Company Stockton District (Cal Water)
- City of Escalon
- City of Lodi
- City of Manteca
- City of Ripon
- City of Stockton
- Linden County Water District (LCWD)
- Lockeford Community Services District (LCSD)
- Stockton East Water District (SEWD)

For the update to ESJWRM Version 2.0, more extensive coordination was appreciated from the following people:

- Eric Houston (City of Stockton)
- Justin Hopkins (SEWD)
- Mike Henry (LCSD)

- Dave Fletcher (LCWD)
- Alan Nakanishi and Travis Kahrs (City of Lodi)
- Jennifer Spaletta (NSJWCD)
- Eric Thorburn and Emily Sheldon (OID)
- Brandon Nakagawa (SSJID)
- Matt Zidar and Glenn Prasad (San Joaquin County)

1.1.1 IWFM Version

The model platform, IWFM-2015, has had several updates since ESJWRM Version 1.1 was originally developed and the IWFM code has been updated to the latest release version (IWFM-2105 Version 1273) for ESJWRM Version 2.0. New IWFM versions typically include error fixes and larger code changes that may impact the underlying calculations and therefore model results. Changes between model versions are documented on DWR's IWFM website (https://water.ca.gov/Library/Modeling-and-Analysis/Modeling-Platforms/Integrated-Water-Flow-Model) and the latest IWFM technical memorandums are available online (Dogrul and Kadir, 2021a and 2021b).

1.1.2 Updated Data from the ESJWRM version used in the Stanislaus River Basin Plan

A modified version of ESJWRM Version 1.1 was prepared as part of the Stanislaus River Basin Plan. The Stanislaus River Basin Plan, a collaborative effort by Oakdale Irrigation District (OID) and South San Joaquin Irrigation District (SSJID), is still in draft format and is discussed in the respective agricultural water management plans (AWMP) (OID, 2021) (SSJID, 2021). The changes made to the modified version of ESJWRM Version 1.1 were incorporated into the 2021 update to ESJWRM Version 2.0. The changes were focused on Modesto Subbasin and OID, both in ESJ Subbasin and in Modesto Subbasin. Changes included updating agricultural and urban pumping in Modesto Subbasin, surface water diversion and groundwater pumping time series, surface water diversion and groundwater pumping delivery areas for OID and Modesto Subbasin agencies, target soil moisture percentage, agricultural return flow fraction, and Modesto Reservoir seepage. Changes to the Modesto Subbasin are not discussed in detail in the sections below.

1.1.3 Hydrologic Period

The updated ESJWRM Version 2.0 simulates water years 1995 through 2020 (October 1, 1994 through September 30, 2020). It was extended five water years from ESJWRM Version 1.1. Due to the extension of the period covered by the model, all model data with monthly or annual values had to be extended. These updates are listed in the sections below.

1.1.4 Precipitation

As with ESJWRM Version 1.1, rainfall data for the model area is derived from the PRISM (Precipitation-Elevation Regressions on Independent Slopes Model) database used in the DWR's CALSIMETAW (California Simulation of Evapotranspiration of Applied Water) model. The database contains daily precipitation data from October 1, 1921 on a 4-kilometer grid throughout the model area (OSU, 2021). ESJWRM has monthly rainfall data defined for every model element and adjacent foothill watershed in order to preserve the spatial distribution of the monthly rainfall. Each of the model elements was mapped to the nearest of 364 available

PRISM reference nodes, uniformly distributed across the model domain. ESJWRM Version 2.0 includes the mapped precipitation time series for water years 2016 through 2020.

1.1.5 Land Use and Cropping Patterns

ESJWRM Version 2.0 utilizes the same land use categories as ESJWRM Version 1.1 as documented in the earlier reports (Woodard & Curran, 2018a and 2018b). The data through water year 2015 is the same as ESJWRM Version 1.1, except for minor tweaks to land use around the Subbasin's two smallest GSAs, Lockeford Community Services District (LCSD) and Linden County Water District (LCWD). Due to the small size of these GSAs, model elements did not exactly align with GSA boundaries, so agricultural land use associated with the surrounding districts, North San Joaquin Water Conservation District (NSJWCD) for LCSD and Stockton East Water District (SEWD) for LCWD, was included in elements representing these two small urban communities. In discussions with the GSAs, it was agreed that the agricultural land use would be removed from model elements assigned to LCSD (15 elements) and LCWD (5 elements). In total, this edit impacted an average of 250 acres per year.

DWR released a statewide crop mapping for 2016 that was completed using remote sensing methods to collect and process the data at the parcel scale and was then ground truthed for a high overall accuracy (DWR, 2016). This spatial land use data was mapped to ESJWRM model elements and assumed to represent land use for all extended water years (2016 through 2020). Based on discussions with SSJID and comparison with the most recent AWMP (SSJID, 2021), the 2016 land use for SSJID was replaced with the data for 2015 from ESJWRM Version 1.1.

Figure 1: 2016 Land Use

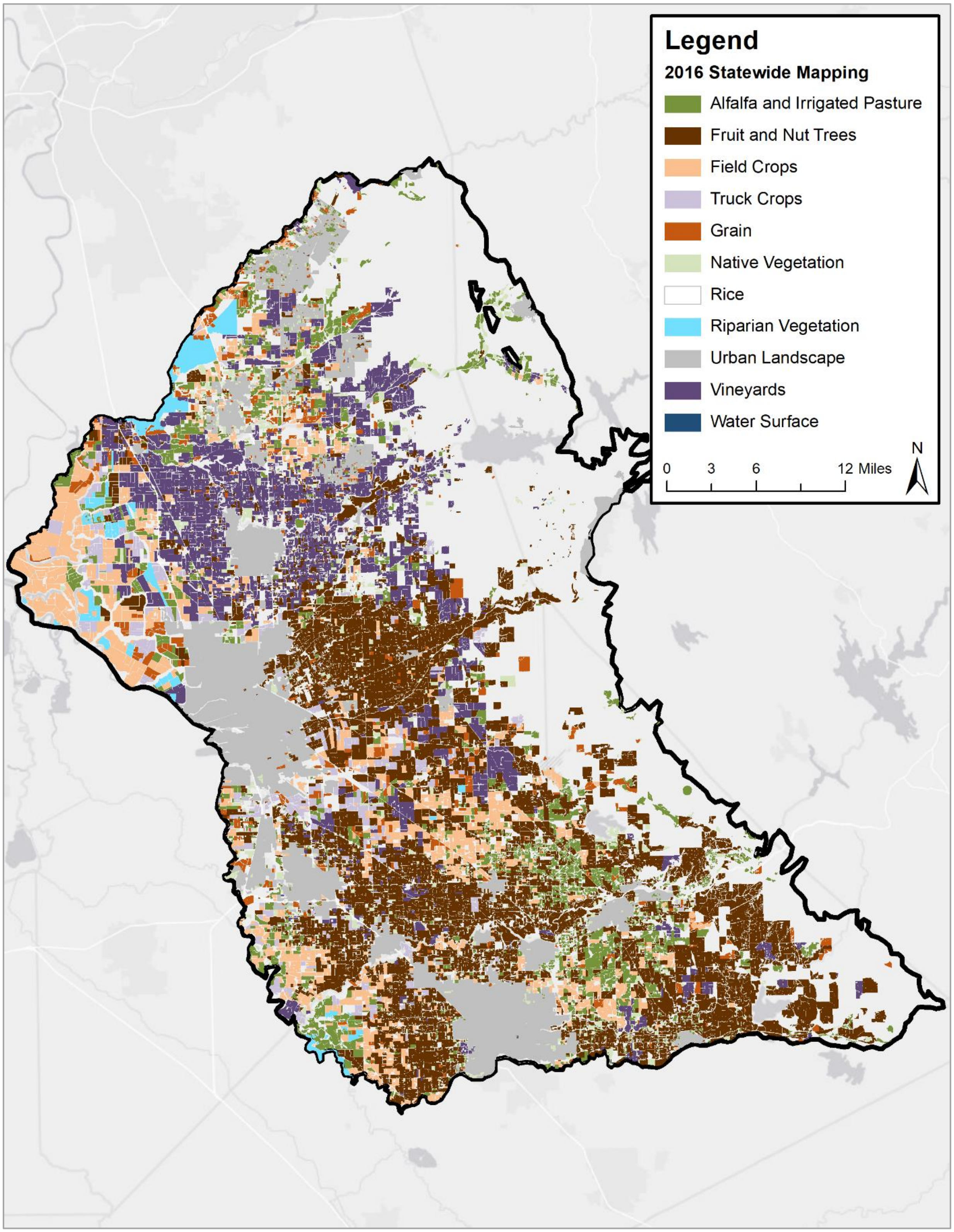
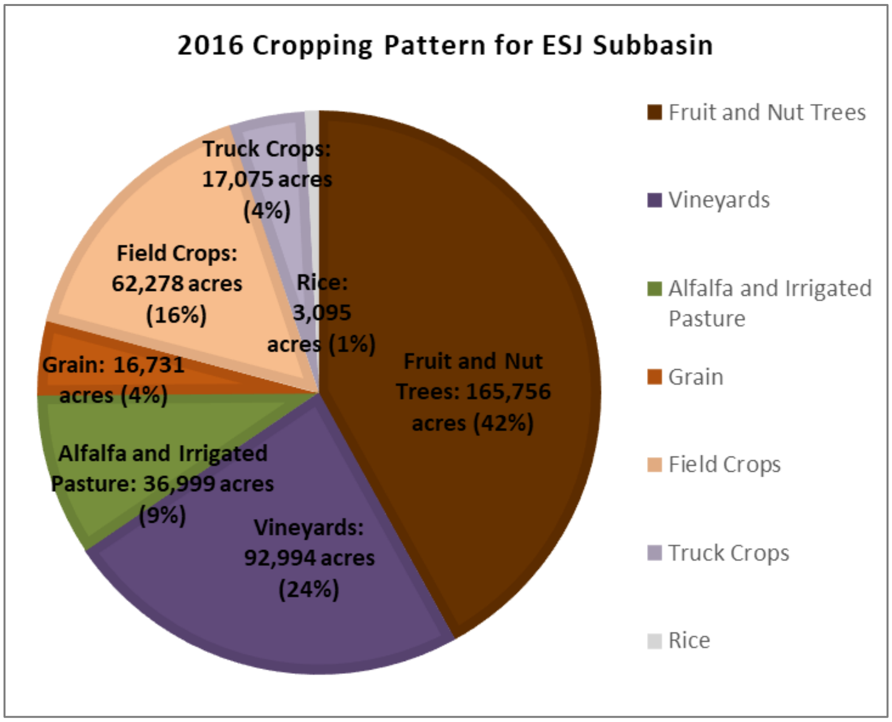


Figure 2: 2016 Cropping Pattern for ESJ Subbasin



1.1.6 Stream Inflow

Stream inflows to the model were extended using updated data from United States Geological Survey (USGS) stream gages and the United States Army Corps of Engineers (USACE) reservoir releases. Dry Creek, with data estimated using a regression after January 1998, was updated using recent monthly averages for similar water year types. A column was added for SSJID system outflows to Stanislaus River, discussed further in Section 1.1.11 below. A table of stream input data may be found in Table 1.

Table 1: Summary of ESJWRM Stream Inflow Data

Stream	Stream Node	Source	Gage Name	Period of Record	Average Annual Streamflow (acre-feet)
Cosumnes River	1	USGS	USGS 11335000: Cosumnes River at Michigan Bar, CA	October 1907 to present/ongoing	397,000
Dry Creek	140	USGS	Estimated in C2VSim by correlation with USGS 11329500: Dry Creek near Galt, CA	Not continuous October 1926 to December 1997	29,000
		USGS	Estimated in C2VSim by correlation with USGS 11335000: Cosumnes River at Michigan Bar, CA	Used October 1987 to September 1995 and January 1998 to September 2015	

Stream	Stream Node	Source	Gage Name	Period of Record	Average Annual Streamflow (acre-feet)
		n/a	Average of Historical Data by Month and Water Year Type	Used October 2015 to present/ongoing	
Mokelumne River	290	USGS	USGS 11323500: Mokelumne River below Camanche Dam, CA	October 1904 to present/ongoing	562,000
Calaveras River	758	USGS	USGS 11308900: Calaveras River below New Hogan Dam near Valley Springs, CA	February 1961 to September 1990	160,000
		USACE	New Hogan Dam releases	October 1990 to present/ongoing	
Stanislaus River	1033	USGS	USGS 11302000: Stanislaus River below Goodwin Dam near Knights Ferry, CA	February 1957 to present/ongoing	576,000
Tuolumne River	1248	USGS	USGS 11289650: Tuolumne River below Lagrange Dam near Lagrange, CA	October 1970 to present/ongoing	905,000
San Joaquin River	1497	USGS	USGS 11303500: San Joaquin River near Vernalis, CA	October 1923 to present/ongoing	3,162,000
SSJID System Outflows to Stanislaus River	1212	SSJID	n/a	n/a	24,000

1.1.7 Boundary Conditions

The boundary conditions in the model remain the same as ESJWRM Version 1.1, with eastern flows from the Sierra Nevada Mountains simulated in the model as small watersheds, Camanche Reservoir seepage estimated using a constrained general head boundary condition, Woodward Reservoir and Modesto Reservoir seepage represented as stream diversions, flows from outside of the model area represented with general head boundary conditions, and groundwater levels at or near zero near the edges of the Sacramento-San Joaquin Delta are represented using specified head boundary conditions.

Data was extended through water year 2020 using a monthly average by water year type. Data for water years 2010 through 2015 were recalculated and updated in the model. The heads near the Delta were adjusted based on analysis of nearby observed groundwater levels.

1.1.8 Urban Demand

Urban demand, comprised of annual population and monthly per capita water use (PCWU), is specified for incorporated urban areas or communities and estimated for rural urban demand. Changes to ESJWRM Version 1.1 were to add specified urban areas for Jenny Lind (in Calaveras County with a portion of the city outside of ESJ Subbasin) and in Modesto Subbasin (Oakdale, Riverbank, Waterford, and Modesto). City of Stockton, which was previously separated into portions for City of Stockton and California Water Service Company Stockton District (Cal Water), was updated to separate out the areas of unincorporated San Joaquin County land from City of Stockton. All urban areas were reviewed and updated to match areas where urban surface water deliveries and urban groundwater pumping was supplied.

Updated population for water years 2016 through 2020 using data from the California Department of Finance (DOF, 2021). The population for the entire Stockton area was updated for the entire model simulation period to data from the California Department of Finance. Based on review by LCSD, LCSD population for the entire model simulation period was updated using historical population and population projections in the 2016 LCSD Municipal Services Review (LCSD, 2016). The rural population, or people not in incorporated areas, was estimated by calculating an estimate of the rural population per acre in San Joaquin County and applying that population estimate to the unincorporated acreage of the model.

Urban demand was calculated for each area as the sum of the surface water (if the agency received surface water) and the groundwater pumping. The updated water supply is discussed in the sections below for surface water (Section 1.1.9) and groundwater (Section 1.1.1). The PCWU was then calculated for each agency as the monthly calculated demand divided by the annual population. Calculating the PCWU directly from the supplied water mitigates issues with urban surplus or shortage in the land and water use budget.

1.1.9 Surface Water Diversions

Surface water diversions were fully reorganized and renumbered in ESJWRM Version 2.0 and many additional diversions were included that were not in ESJWRM Version 1.1. Diversion edits included splitting NSJWCD's agricultural diversion from Mokelumne River into two time series for the NSJWCD north and south service areas; including NSJWCD recharge projects; refinement of NSJWCD recharge and irrigation schedules; adjustments to Lodi's data; adding the urban delivery of Calaveras River water from Calaveras County Water District (CCWD) to Jenny Lind (assuming 43% of Jenny Lind lies within ESJ Subbasin); updating OID north and south and SSJID deliveries to better represent what the AWMPs report for farm deliveries, recycled water deliveries, annual contract deliveries, and canal and drain seepage; separating urban deliveries to City of Stockton area into separate time series for City of Stockton, Cal Water, and San Joaquin County users in City of Stockton; separating SEWD diversion losses from Calaveras and Stanislaus Rivers into separate time series; additional diversions to Modesto Subbasin included as part of model refinements for the Stanislaus River Basin Plan; and the update of surface water delivery estimates for areas of the Delta and riparian user areas along the rivers.

All GSAs were provided all model historical supply data to review and update during the development of ESJWRM Version 2.0. Additionally, all surface water diversion delivery groups were reviewed and updated to reflect a more recent understanding of Subbasin surface water operations. A summary of diversions simulated in the model is provided in Table 2, along with fractions for recoverable loss (i.e., percolation or canal seepage), non-recoverable loss (i.e., evaporation), and delivery (i.e., amount delivered is equal to the total amount minus the recoverable and non-recoverable losses).

Table 2: Summary of ESJWRM Surface Water Deliveries

ID	Description	Diversion Location	Delivery Area	Primary Use	Fraction			Average Annual Diversion*** (acre-feet)	Data Source
					RL*	NL**	Delivery		
1	Mokelumne River to North San Joaquin WCD North System for Ag	Mokelumne River	North San Joaquin WCD North System	Ag	50%	0%	50%	360	NSJWCD
2	Mokelumne River to North San Joaquin WCD South System for Ag	Mokelumne River	North San Joaquin WCD South System	Ag	50%	0%	50%	1,900	NSJWCD
3	Mokelumne River to North San Joaquin WCD for CALFED GW Recharge Project	Mokelumne River	CALFED GW Recharge Project	Recharge	100%	0%	0%	260	NSJWCD
4	Mokelumne River to North San Joaquin WCD For Tracy Lake Recharge Project	Mokelumne River	Tracy Lake Recharge Project	Recharge	50%	0%	50%	320	NSJWCD
5	Mokelumne River to City of Lodi (by agreement with Woodbridge ID) for M&I	Mokelumne River	City of Lodi	Urban	0%	0%	100%	5,500	Lodi
6	Mokelumne River to City of Lodi (by agreement with NSJWCD) for M&I	Mokelumne River	City of Lodi	Urban	0%	0%	100%	370	Lodi
7	Mokelumne River to City of Lodi (banked from agreement with WID) for M&I	Mokelumne River	City of Lodi	Urban	0%	0%	100%	560	Lodi
8	Mokelumne River to Woodbridge ID for Ag	Mokelumne River	Woodbridge Irrigation District	Ag	30%	2%	68%	58,800	WID
9	Mokelumne River Export to Contra Costa WD (by agreement with Woodbridge ID)	Mokelumne River	Export out of model	Urban	0%	0%	100%	2,000 (one year only)	WID

ID	Description	Diversion Location	Delivery Area	Primary Use	Fraction			Average Annual Diversion*** (acre-feet)	Data Source
					RL*	NL**	Delivery		
10	Mokelumne River to City of Stockton for Delta Water Supply Project (by agreement with Woodbridge ID) for M&I	Mokelumne River	City of Stockton	Urban	0%	0%	100%	7,700	City of Stockton
11	San Joaquin River at Empire Tract to City of Stockton for Delta Water Supply Project for M&I	San Joaquin River	City of Stockton	Urban	0%	0%	100%	8,500	City of Stockton
12	Calaveras River to Bellota Pipeline to Stockton East WD WTP for M&I	Calaveras River	Export out of model (imported in Diversions 14, 15, and 16)	Urban	0%	0%	100%	13,800	SEWD
13	Stanislaus River at Goodwin Dam to Farmington Flood Control Basin to Lower Farmington Canal to Peters Pipeline to Stockton East WD WTP for M&I	Import (outside of ESJWRM)	Export out of model (imported in Diversions 14, 15, and 16)	Urban	0%	0%	100%	29,400	SEWD
14	Stockton East WD WTP to City of Stockton for M&I	Import (exported in Diversions 12 and 13)	City of Stockton	Urban	0%	0%	100%	18,800	UWMP
15	Stockton East WD WTP to Cal Water for M&I	Import (exported in Diversions 12 and 13)	Cal Water	Urban	0%	0%	100%	21,800	UWMP
16	Stockton East WD WTP to San Joaquin County in Stockton for M&I	Import (exported in Diversions 12 and 13)	San Joaquin County in Stockton	Urban	0%	0%	100%	1,400	UWMP

ID	Description	Diversion Location	Delivery Area	Primary Use	Fraction			Average Annual Diversion*** (acre-feet)	Data Source
					RL*	NL**	Delivery		
17	Calaveras River to Calaveras County WD for Ag	Import (outside of ESJWRM)	Calaveras County WD	Ag	9%	1%	90%	1,100	CCWD
18	Calaveras River to Jenny Lind for M&I	Import (outside of ESJWRM)	Jenny Lind	Urban	0%	0%	43%	1,800	CCWD
19	Calaveras River to Stockton East WD for Ag	Calaveras River	Stockton East Water District	Ag	0%	0%	100%	23,600	SEWD
20	Calaveras River to Stockton East WD Losses	Calaveras River	Stockton East Water District, including canals	Recharge	89%	11%	0%	19,300	SEWD
21	Calaveras River to Farmington Groundwater Recharge Program	Calaveras River	Farmington Groundwater Recharge Program	Recharge	100%	0%	0%	1,400	SEWD
22	San Joaquin River to North Delta for Ag	San Joaquin River	North Delta Subregion	Ag	5%	1%	94%	139,600	Estimated by model
23	San Joaquin River to South Delta for Ag	San Joaquin River	South Delta Subregion	Ag	5%	1%	94%	26,700	Estimated by model
24	Stanislaus River at Goodwin Dam to Farmington Flood Control Basin to Lower Farmington Canal to Stockton East WD for Ag	Import (outside of ESJWRM)	Stockton East Water District	Ag	0%	0%	100%	4,400	SEWD
25	Stanislaus River to Stockton East WD Losses	Import (outside of ESJWRM)	Stockton East Water District, including canals	#N/A	88%	12%	0%	900	SEWD

ID	Description	Diversion Location	Delivery Area	Primary Use	Fraction			Average Annual Diversion*** (acre-feet)	Data Source
					RL*	NL**	Delivery		
26	Stanislaus River at Goodwin Dam to Farmington Flood Control Basin via Little Johns Creek and Lower Farmington Canal to Central San Joaquin WCD for Ag	Import (outside of ESJWRM)	Central San Joaquin WCD	Ag	15%	2%	83%	30,000	SEWD
27	Stanislaus River to Farmington Groundwater Recharge Program	Import (outside of ESJWRM)	Farmington Groundwater Recharge Program	Recharge	100%	0%	0%	3,300	SEWD
28	Stanislaus River at Goodwin Dam to Oakdale ID North for Ag	Import (outside of ESJWRM)	Export out of model (imported in Diversions 52, 55, and 57)	Ag	0%	0%	0%	98,800	OID
29	Stanislaus River at Goodwin Dam to Oakdale ID South for Ag [Modesto Subbasin]	Import (outside of ESJWRM)	Export out of model (imported in Diversions 53, 54, 56, and 58)	Ag	0%	0%	0%	136,400	OID
30	Stanislaus River to Woodward Reservoir to South San Joaquin ID for Ag	Import (outside of ESJWRM)	Export out of model (imported in Diversions 59, 60, and 61)	Ag	0%	0%	0%	189,500	SSJID
31	Stanislaus River to Woodward Reservoir to South San Joaquin ID Division 6 for Ag	Import (outside of ESJWRM)	Export out of model (imported in Diversions 59, 60, and 61)	Ag	0%	0%	0%	5,200	SSJID

ID	Description	Diversion Location	Delivery Area	Primary Use	Fraction			Average Annual Diversion*** (acre-feet)	Data Source
					RL*	NL**	Delivery		
32	Woodward Reservoir Seepage	Import (outside of ESJWRM)	Woodward Reservoir	Recharge	100%	0%	0%	17,100	SSJID
33	Stanislaus River to Woodward Reservoir to Nick C. DeGroot WTP to City of Manteca for M&I	Import (outside of ESJWRM)	City of Manteca	Urban	0%	0%	100%	6,800	UWMP
34	Stanislaus River to Woodward Reservoir to Nick C. DeGroot WTP to City of Escalon for M&I	Import (outside of ESJWRM)	City of Escalon	Urban	0%	0%	100%	0	UWMP
35	Stanislaus River to Woodward Reservoir to Nick C. DeGroot WTP to City of Lathrop for M&I [Tracy Subbasin]	Import (outside of ESJWRM)	City of Lathrop	Urban	0%	0%	100%	1,400	UWMP
36	Stanislaus River to Woodward Reservoir to Nick C. DeGroot WTP to City of Ripon for M&I	Import (outside of ESJWRM)	City of Ripon	Urban	0%	0%	100%	0	UWMP
37	Tuolumne River to Modesto ID for Ag [Modesto Subbasin]	Import (outside of ESJWRM)	Modesto ID	Ag	3%	19%	78%	232,500	Stanislaus River Basin Plan ESJWRM Update
38	Tuolumne River to City of Modesto (via Modesto ID) for M&I [Modesto Subbasin]	Import (outside of ESJWRM)	Element group representing City of Modesto	Urban	3%	1%	96%	30,700	Stanislaus River Basin Plan ESJWRM Update
39	Cosumnes River to Riparian for Ag [Cosumnes Subbasin]	Cosumnes River	Riparian diverters along river	Ag	10%	2%	88%	2,800	C2VSim

ID	Description	Diversion Location	Delivery Area	Primary Use	Fraction			Average Annual Diversion*** (acre-feet)	Data Source
					RL*	NL**	Delivery		
40	Dry Creek to Riparian for Ag [Split Across Subbasins]	Dry Creek	Riparian diverters along river	Ag	10%	2%	88%	5,600	C2VSim
41	Mokelumne River to Riparian for Ag	Mokelumne River	Riparian diverters along river	Ag	10%	2%	88%	9,600	C2VSim
42	Calaveras River to Riparian for Ag	Calaveras River	Riparian diverters along river	Ag	10%	2%	88%	11,400	C2VSim
43	Stanislaus River to Riparian for Ag [Split Across Subbasins]	Stanislaus River	Riparian diverters along river	Ag	15%	3%	82%	30,600	C2VSim
44	Tuolumne River to Riparian for Ag [Modesto Subbasin]	Tuolumne River	Riparian diverters along river	Ag	15%	3%	82%	6,100	C2VSim
45	San Joaquin River to Riparian for Ag [Split Across Subbasins]	San Joaquin River	Riparian diverters along river	Ag	15%	3%	82%	5,800	C2VSim
46	Modesto ID Groundwater Pumping Deliveries [Modesto Subbasin]	Import (outside of ESJWRM)	Modesto ID	Ag	0%	0%	100%	21,500	Stanislaus River Basin Plan ESJWRM Update
47	Tuolumne River to Modesto Reservoir Seepage [Modesto Subbasin]	Import (outside of ESJWRM)	Modesto Reservoir	Recharge	100%	0%	0%	23,000	Stanislaus River Basin Plan ESJWRM Update

ID	Description	Diversion Location	Delivery Area	Primary Use	Fraction			Average Annual Diversion*** (acre-feet)	Data Source
					RL*	NL**	Delivery		
48	City of Modesto GW Pumping Deliveries [Modesto Subbasin]	Import (outside of ESJWRM)	City of Modesto	Urban	3%	1%	96%	33,100	Stanislaus River Basin Plan ESJWRM Update
49	City of Oakdale GW Pumping Deliveries [Modesto Subbasin]	Import (outside of ESJWRM)	City of Oakdale	Urban	3%	1%	96%	4,600	Stanislaus River Basin Plan ESJWRM Update
50	City of Waterford GW Pumping Deliveries [Modesto Subbasin]	Import (outside of ESJWRM)	City of Waterford	Urban	3%	1%	96%	1,700	Stanislaus River Basin Plan ESJWRM Update
51	City of Riverbank GW Pumping Deliveries [Modesto Subbasin]	Import (outside of ESJWRM)	City of Riverbank	Urban	3%	1%	96%	4,500	Stanislaus River Basin Plan ESJWRM Update
52	Farm Deliveries to Oakdale ID North for Ag	Import (exported in Diversion 28)	Oakdale ID in ESJ Subbasin	Ag	0%	0%	100%	78,900	OID AWMP
53	Farm Deliveries to Oakdale ID South for Ag [Modesto Subbasin]	Import (exported in Diversion 29)	Oakdale ID in Modesto Subbasin	Ag	0%	0%	100%	121,000	OID AWMP
54	Recycled Water to Oakdale ID South for Ag [Modesto Subbasin]	Import (exported in Diversion 29)	Oakdale ID in Modesto Subbasin	Ag	0%	0%	100%	3,300	OID AWMP

ID	Description	Diversion Location	Delivery Area	Primary Use	Fraction			Average Annual Diversion*** (acre-feet)	Data Source
					RL*	NL**	Delivery		
55	Deliveries to Annual Contracts by Oakdale ID North for Ag	Import (exported in Diversion 28)	Oakdale ID in ESJ Subbasin	Ag	0%	0%	100%	2,100	OID AWMP
56	Deliveries to Annual Contracts by Oakdale ID South for Ag [Modesto Subbasin]	Import (exported in Diversion 29)	Oakdale ID in Modesto Subbasin	Ag	0%	0%	100%	2,300	OID AWMP
57	Canal and Drain Seepage in Oakdale ID North	Import (exported in Diversion 28)	Oakdale ID in ESJ Subbasin	Recharge	100%	0%	0%	17,800	OID AWMP
58	Canal and Drain Seepage in Oakdale ID South [Modesto Subbasin]	Import (exported in Diversion 29)	Oakdale ID in Modesto Subbasin	Recharge	100%	0%	0%	18,300	OID AWMP
59	Farm Deliveries to South San Joaquin ID for Ag	Import (exported in Diversions 30 and 31)	South San Joaquin ID	Ag	0%	0%	100%	144,000	SSJID AWMP
60	Direct Diversion from Main Distributary Canal to South San Joaquin ID for Ag	Import (exported in Diversions 30 and 31)	South San Joaquin ID	Ag	0%	0%	100%	1,400	SSJID AWMP
61	Main Distributary Canal and Lateral Seepage in South San Joaquin ID	Import (exported in Diversions 30 and 31)	South San Joaquin ID	Recharge	90%	10%	0%	33,200	SSJID AWMP

*RL = Recoverable Loss (canal seepage or recharge)

**NL = Non-Recoverable Loss (evaporation)

*** Averages calculated only for years with diversions occurring (i.e., non-zero average)

1.1.10 Groundwater Pumping

Groundwater pumping within ESJWRM is separated into well- or element-based pumping. The former largely includes district-operated wells that feed into the surface water supply network, while the latter includes estimated private groundwater pumping.

Updates to ESJWRM Version 2.0 for well pumping was the addition of Modesto Subbasin wells included in the model updates made for the Stanislaus River Basin Plan and the addition of two OID wells. OID and SSJID district wells were updated to export water out of the model since the district groundwater pumping is included in the farm deliveries to SSJID, OID North, and OID South included as surface water deliveries. Additionally, all groundwater pumping delivery groups were reviewed and updated to reflect a more recent understanding of Subbasin operations. Table 3 lists the number of wells by type and agency included in ESJWRM.

Element pumping is estimated by IWFM within the model simulation. Element pumping in ESJWRM Version 2.0 was updated to remove all model-calculated groundwater pumping for urban uses in urban areas.

Table 3: Summary of ESJWRM Well Pumping

Agency	Number of Urban Pumping Wells	Number of Agricultural Pumping Wells	Average Annual Urban Pumping (acre-feet)	Average Annual Agricultural Pumping (acre-feet)
Cal Water	56	---	8,200	0
Escalon	4	---	1,400	0
Lathrop	6	---	2,200	0
Linden County WD	4	---	440	0
Lockeford CSD	4	---	510	0
Lodi	29	---	13,600	0
Manteca	15	31	9,300	1,300
Oakdale ID*	---	26	0	6,700
Ripon	9	9	3,900	1,000
SEWD	5	---	590**	0
SSJID	---	28	0	5,200
Stockton	37	---	8,500	0
Other Modesto Subbasin Wells	---	246	0	68,000
Total Average Annual Pumping (acre-feet)			48,640	82,200

* Includes wells located both in ESJ Subbasin and Modesto Subbasin

** Average only when wells were active (WY 2015-2020)

1.1.11 Agricultural Operations

Factors that apply to the agricultural operations represented in the model include agricultural return flow fractions, agricultural reuse fractions, and target soil moisture content.

Both SSJID and OID report large amounts of tailwater as outflow from the districts' drainage systems in their respective AWMPs (SSJID, 2021) (OID, 2021). For OID, the amount of tailwater from the district lands is represented through adjustments to the return flow fraction, which controls how much of applied water ultimately ends up as drainage to model stream nodes. For SSJID, since the majority of the tailwater ends up back in Stanislaus River the reported system outflows are included as a stream inflow to Stanislaus River below SSJID. The return flow fraction was likewise adjusted for SSJID's area.

The reuse fraction is the percent of applied water that can be reused as irrigation to meet demand. Based on analysis of the OID 2020 AWMP (OID, 2021), the reuse fraction for OID model elements was set to 2%.

The target soil moisture specifies the fraction of field capacity that IWFM will iterate to and was utilized to adjust OID demand, first in the adjusted version of ESJWRM Version 1.1 prepared for the Stanislaus River Basin Plan and then adjusted based on analysis of the OID 2020 AWMP (OID, 2021).

Canal and drain seepage for the agricultural agencies is included in surface water diversion information and discussed in Section 1.1.9 above. For agencies that may have surface water agreements where a portion of the delivery losses is assumed to occur in the river (e.g., NSJWCD), the interaction between the stream and the groundwater system is simulated separately in ESJWRM and assumed to account for the conveyance losses. This is considered a special case in the operational water budget discussed in Section 3.

All other files that control agricultural operations were extended through water year 2020 by repeating the recent historical data.

1.2 Calibration Updates and Results

The goals of model calibration are (1) to achieve a reasonable water budget for each component of the hydrologic cycle modeled (i.e., land and water use, soil moisture, stream flow, and groundwater) and (2) to maximize the agreement between simulated and observed groundwater levels at selected well locations and simulated and observed streamflow hydrographs at selected gaging stations. These objectives are achieved through verification of the model input data and adjustment of model parameters.

Due to uncertainty in the model initial conditions, a one year "ramp up" period is included to allow groundwater levels to stabilize. Thus, the model calibration period for the ESJWRM is October 1995 through September 2020 or water years 1996 through 2020 (25 years).

1.2.1 Calibration Process

Model calibration begins after data analysis and input data file development is completed. The calibration effort can be broken down into subsets that align with packages within the IWFM platform. As an integrated groundwater model, the results of each part of the simulation are dependent on one another. The model calibration can be considered a systematic process that includes the following activities:

- Collect data and set calibration targets
- Calibrate land and water use
- Calibrate groundwater system
- Calibrate stream system
- Refine groundwater level calibration using PEST

- Perform sensitivity analysis
- Conduct additional refinements to model as necessary

1.2.1.1 Root Zone Calibration

As part of the calibration of the land and water use budget, root zone parameters are adjusted as needed to achieve reasonable estimates of agricultural demand and to develop the components of a balanced root zone budget. Demand calibration serves as the foundation of the IWFM calibration for agricultural areas, as demand estimated often translates directly to groundwater pumping, which is the primary stress on the groundwater system. To adjust agricultural demand, element-level root zone parameters, particularly the soil hydraulic conductivity, were adjusted in accordance with the hydrologic soil group and area of the model. Soil hydraulic conductivity was adjusted in the areas of the model representing OID North, NSJWCD, and SSJID to better match reported groundwater pumping, demand, and per unit water use.

During root zone calibration, the curve numbers assigned to different land uses were also reviewed. Based on review of percolation of precipitation occurring in different areas of the model, the curve numbers for native and riparian land uses were adjusted. Additionally, refinements were made to the unsaturated zone initial soil moisture to standardize the amount of water in the unsaturated zone from year to year.

1.2.1.2 PEST-Assisted Aquifer Calibration

Aquifer parameter calibration of ESJWRM utilized a parametric grid covering the model area that reflected the scale at which parameters were adjusted throughout the calibration process. The parametric grid, originally adopted from DWR's California Central Valley Groundwater-Surface Water Simulation Model with coarse grid (C2VSimCG) nodes, was slightly modified to cover the entire ESJWRM model along the boundaries and additional nodes were added or moved within areas of the model to provide better control. Aquifer parameters included in ESJWRM are horizontal hydraulic conductivity, vertical hydraulic conductivity, specific storage, and specific yield.

Due to the complexities of calibrating an integrated water resources model, a hybrid approach for calibration was utilized to perform a manual calibration on initial water budgets and regional groundwater conditions and a PEST-assisted calibration using PEST (Doherty, 2015) to achieve a refinement of the calibrated parameters that would result in a more accurate simulation. The use of the PEST software package is discussed further in Section 1.2.2.2.

1.2.2 Calibration Verification

ESJWRM was calibrated to local data and information, surface water flows, groundwater hydrographs, and groundwater contours. The sources used to check model results include local knowledge (mainly gathered during TAC meetings), agricultural water management plans, urban water management plans, other local planning efforts, measured groundwater levels, and observed streamflow data.

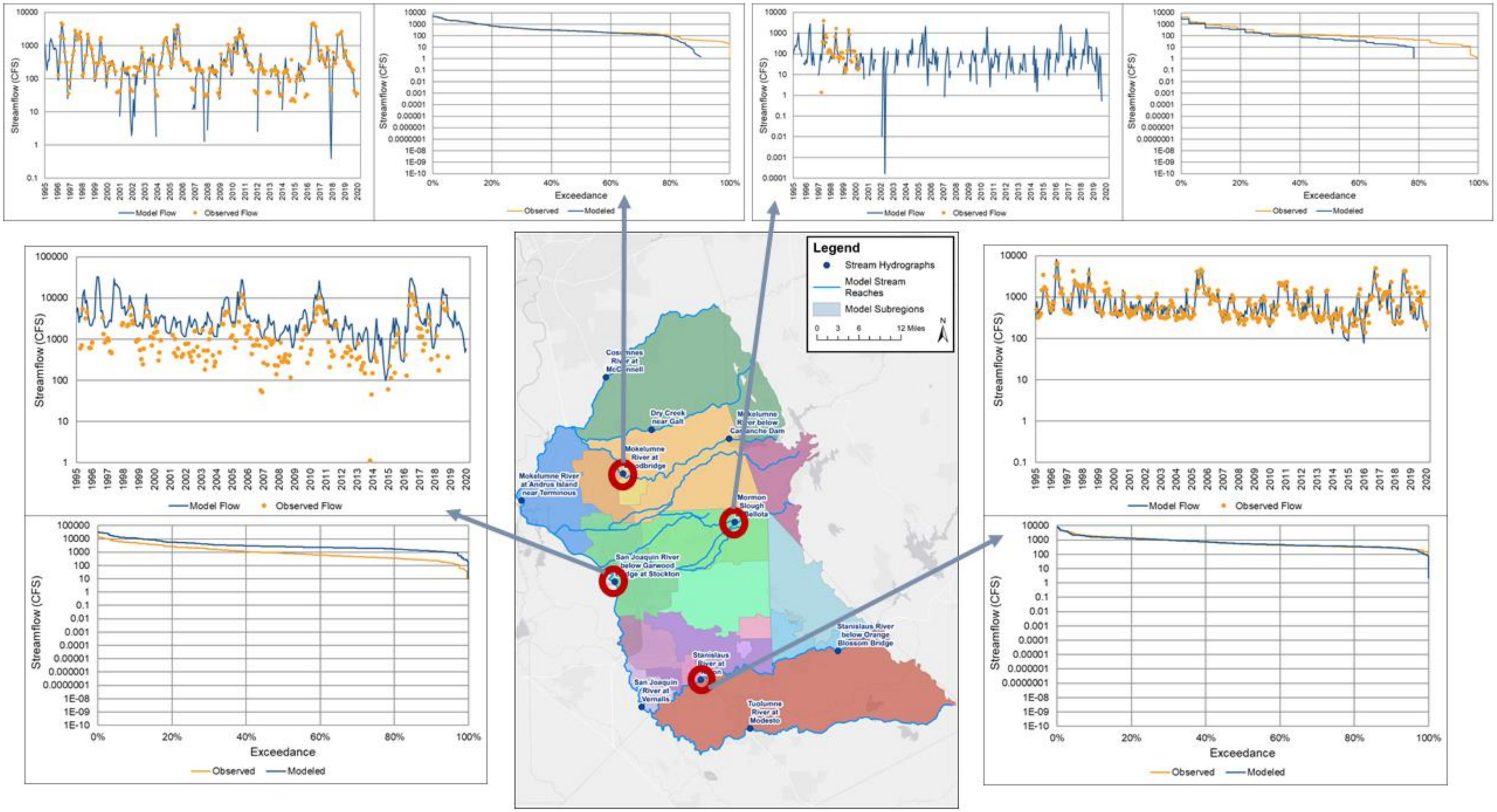
1.2.2.1 Streamflow Calibration

Streamflow calibration is primarily performed by comparing the simulated streamflow with local observation data for 11 stream gages located on major streams. Data for these gages came from USGS, USACE, or the California Data Exchange Center (CDEC). Two of these stream gages (Mokelumne River below Camanche Dam and San Joaquin River near Vernalis) are duplicates of gages used to estimate stream inflow into the model area and were not referenced for streamflow calibration and only included as verification of the model setup.

Streambed hydraulic conductivity was adjusted during model calibration based on examination of stream flow hydrographs and stream reach water budgets. The portion of Mokelumne River through Camanche Reservoir (Reach 3) was assigned a streambed hydraulic conductivity of zero since all the surface water-groundwater interaction is already represented by the constrained general head boundary condition representing Camanche Reservoir. Additionally, streambed hydraulic conductivities were examined in the overlapping models of DWR's California Central Valley Groundwater-Surface Water Simulation Model with fine grid (C2VSimFG) and the Cosumnes-South American-North American Integrated Water Resources Model (CoSANA) and adjusted for some corresponding streams.

Simulated stream flows were compared with observed records and exceedance charts were also used to check the model performance when simulating high and low flows at each gage location. Calibration results for select stream gages are included in Figure 3.

Figure 3: Streamflow Calibration



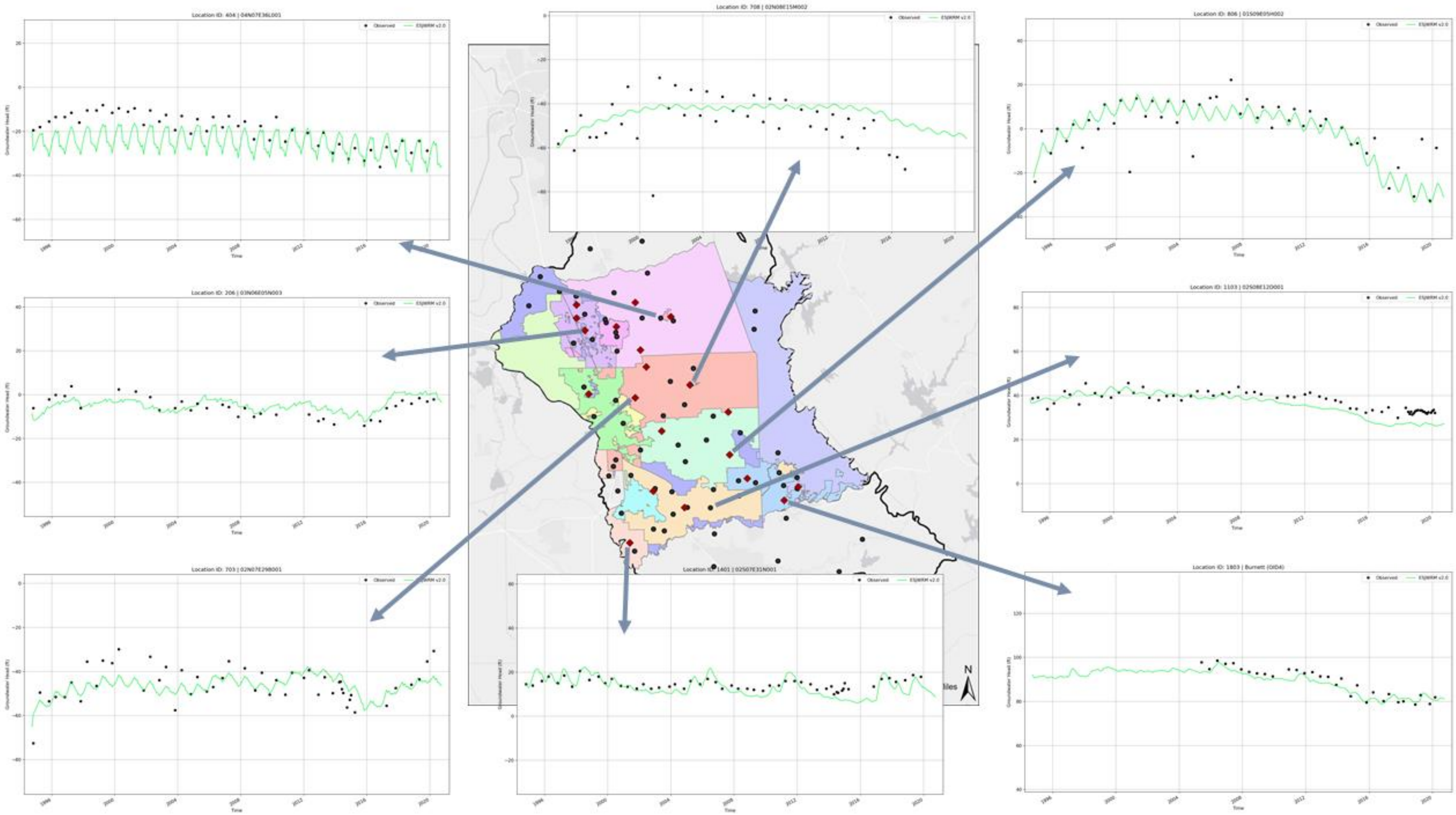
1.2.2.2 Groundwater Level Calibration

The goal of groundwater level calibration is to achieve the maximum agreement between simulated and observed groundwater elevations at calibration wells while maintaining reasonable values for aquifer parameters. During the calibration of ESJWRM Version 1.1, 70 wells were ultimately selected that were representative of the long-term conditions of groundwater levels both at a local and regional scale in ESJWRM. This same set of calibration points was kept for ESJWRM Version 2.0, with the addition of GSP Representative Monitoring Network wells if they were not already included.

Simulated groundwater levels are calibrated to observed levels through adjustments to hydrogeologic parameters or aquifer parameters including hydraulic conductivity, specific storage, and specific yield. The automated parameter estimation tool, PEST, was used to assist in refinement of aquifer parameters to improve model calibration. PEST-assisted calibration is performed to interact with ESJWRM via input and output files and iteratively modifies parameter values to reduce an objective function representative of the model residual error. These modifications are made within identified bounds of reasonable values for each parameter. PEST-assisted calibration focused on the aquifer parameters such as horizontal and vertical conductivities and storage parameters. Between PEST-assisted calibration iterations, the modeling team revisited the land system and small watershed budgets and made manual adjustments where needed, until calibration goals were met.

The results of the groundwater level calibration indicate that the ESJWRM reasonably simulates the long-term hydrologic responses under various hydrologic conditions. Figure 4 shows a selection of calibration wells with their resulting groundwater level hydrographs showing the updated calibration of ESJWRM Version 2.0. All ESJWRM Version 2.0 groundwater level hydrographs may be downloaded as a Google Earth KMZ file at (Link to be provided).

Figure 4: Groundwater Level Calibration



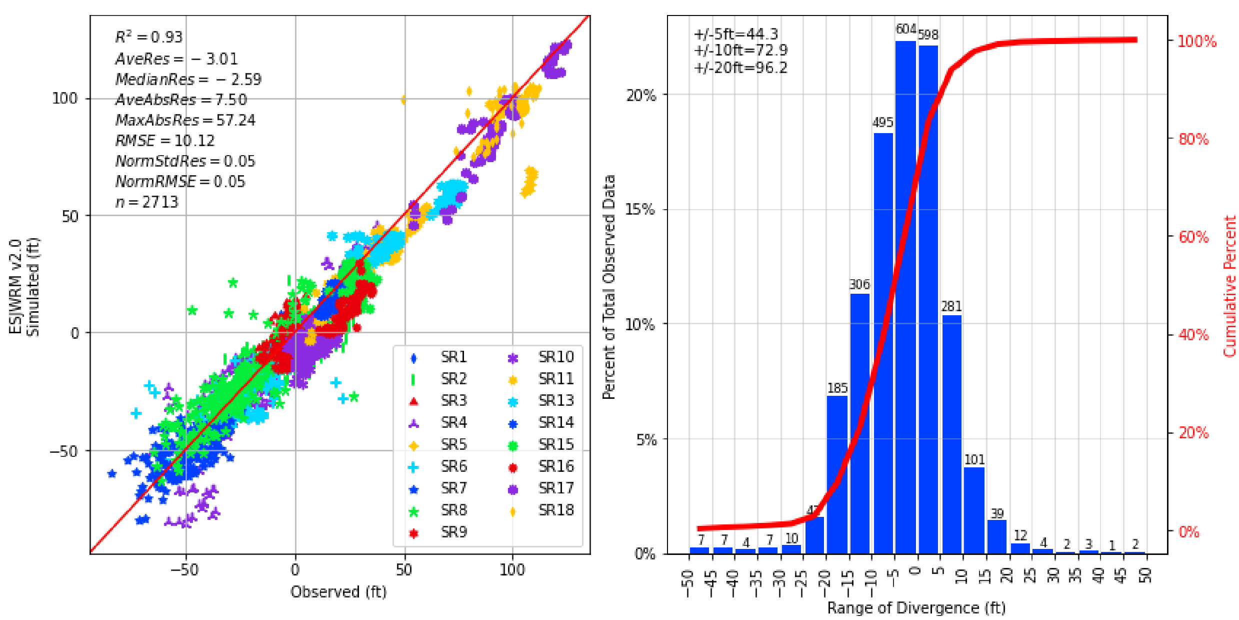
The ESJWRM calibration status was measured using two metrics: the groundwater level trend and the relationship between simulated and observed groundwater levels. The statistics were evaluated to meet the American Standard Testing Method (ASTM) standard. In addition to quantifiable metrics, the ESJWRM calibration was evaluated by generating reasonable regional groundwater flow directions and producing realistic water budgets.

The "Standard Guide for Calibrating a Groundwater Flow Model Application" (ASTM D5981) states that "the acceptable residual should be a small fraction of the head difference between the highest and lowest heads across the site." The residual is defined as the simulated head minus the observed head. An analysis of all calibration water levels within the model indicated the presence of 200+ feet of water level changes. Using 10 percent as the "small fraction", the acceptable residual level would be 20 feet. Calibration goals for the groundwater level residuals were set such that no more than 10 percent of the observed groundwater levels would exceed the acceptable residual level of 20 feet.

- 44% of observed groundwater levels are within +/- 5 feet of its respective simulated values
- 73% of observed groundwater levels are within +/- 10 feet of its respective simulated values
- 96% of observed groundwater levels are within +/- 20 feet of its respective simulated values

The residual histogram and scatter plot of simulated versus observed values for the ESJ Subbasin original calibration wells for the calibration period is shown in Figure 5. The scatter plot colors points by input data subregion. The highest elevations are seen in model subregions closer to the foothills (e.g., Subregion 5 and 17).

Figure 5: Calibration Statistics



1.2.3 Sensitivity Analysis

Sensitivity analysis is a way of investigating how sensitive certain model results are to changes in certain model parameters. A sensitive parameter is when the simulation results are greatly affected by changes in that parameter within its valid range. Conversely, an insensitive parameter means the changes in that parameter within its valid range do not affect the simulation results greatly.

Model parameters that are sensitive can be the largest sources of error and uncertainty when not precisely measured and well understood. For this reason, sensitivity analysis is an important step of the model calibration process. The sensitivity analysis serves the following purposes:

- To improve the understanding of input-output relationships
- To quantify the impact of inaccuracies in model parameters
- To evaluate the stability and robustness of the model
- To understand the overall range of accuracy of the model results

For these purposes, the following set of calibration parameters were selected for investigation under ESJWRM sensitivity analysis:

- Aquifer horizontal hydraulic conductivity (Kh) changed globally by factors of 0.5, 0.67, 1.5, 2.0
- Aquifer vertical hydraulic conductivity (Kv) changed globally by factors of 0.5, 0.67, 1.5, 2.0
- Aquitard vertical hydraulic conductivity (Kaqt) changed globally by factors of 0.5, 0.67, 1.5, 2.0
- Specific yield (Sy) changed globally by factors of 0.8, 1.2
- Specific storage (Ss) changed globally by factors of 0.1, 0.2, 5, 10
- Streambed hydraulic conductivity (Kstr) changed globally by factors of 0.2, 0.5, 2.0, 5.0
- Boundary condition conductance for both general and constrained general head (BC_Cond) changed globally by factors of 0.5, 0.67, 1.5, 2.0
- Saturated soil hydraulic conductivity (Ksoil) changed globally by factors of 0.2, 0.5, 2.0, 5.0
- Target soil moisture (TSM) changed globally by setting all values to 0.6 or 0.8

In the process of evaluating the sensitivity of model results to certain parameter changes, the results from the 32 sensitivity runs were analyzed for the ESJ Subbasin and model as a whole and compared to the calibrated model in terms of the groundwater residual statistics. As the changes to the input parameters for sensitivity analysis were made globally, the changes in the model performance were also considered on a global or subregional scale. An improvement in the model performance based on changes in one parameter at a global scale does not necessarily mean improvements in the overall model performance and/or calibration, as the model is calibrated to a number of target parameters, only some of which may be included in the performance assessment during the sensitivity analysis.

Figure 6 presents the relative change in the three groundwater level residual statistics used in the evaluation of model calibration performance for 10 parameters in the entire EJSWRM for the calibration period. These three groundwater level residual statistics are:

- Root mean square error (RMSE): This statistic is a measure of how spread out the residuals are.
- Average residual: This statistic measures how inaccurate simulation results are with respect to the corresponding observations on average.
- Correlation coefficient (R^2): This statistic is a measure of the strength of the linear relationship between the simulated and observed pairs.

In the calibrated model residual statistics shown in Figure 5, the RMSE is 10.12 feet, the average residual is -3.01 feet, and the R^2 is 0.93. In Figure 6, the impact of the parameter sensitivity on the average residual from the calibration value of -3.01 feet is always too much of an increase or almost no change. In all the runs, the R^2 of 0.93, which ideally would increase in a better calibrated model, either decreases or remains about the same as the calibrated model. Similarly, the RMSE of 10.12 feet would decrease in a better calibrated model; however, all the sensitivity runs either increase or have no impact on the RMSE.

Figure 7 and Figure 8 look at the change in calibration period average ESJ Subbasin change in storage and deep percolation (both parameters from the hydrologic groundwater budget). Both figures show how sensitive change in storage and deep percolation are to changes in parameters, notably aquifer horizontal hydraulic conductivity (Kh), streambed hydraulic conductivity (Kstr), saturated soil hydraulic conductivity (Ksoil), and target soil moisture (TSM). Even relatively minor changes to those parameters can have large impacts on the ultimate model results.

None of the sensitivity runs resulted in a significant improvement in statistics or results. This means that the model is stable and that the calibration is at or near an optimal point when global parameter changes are considered.

Figure 6: Sensitivity of Groundwater Level Residual Statistics in Entire ESJWRM

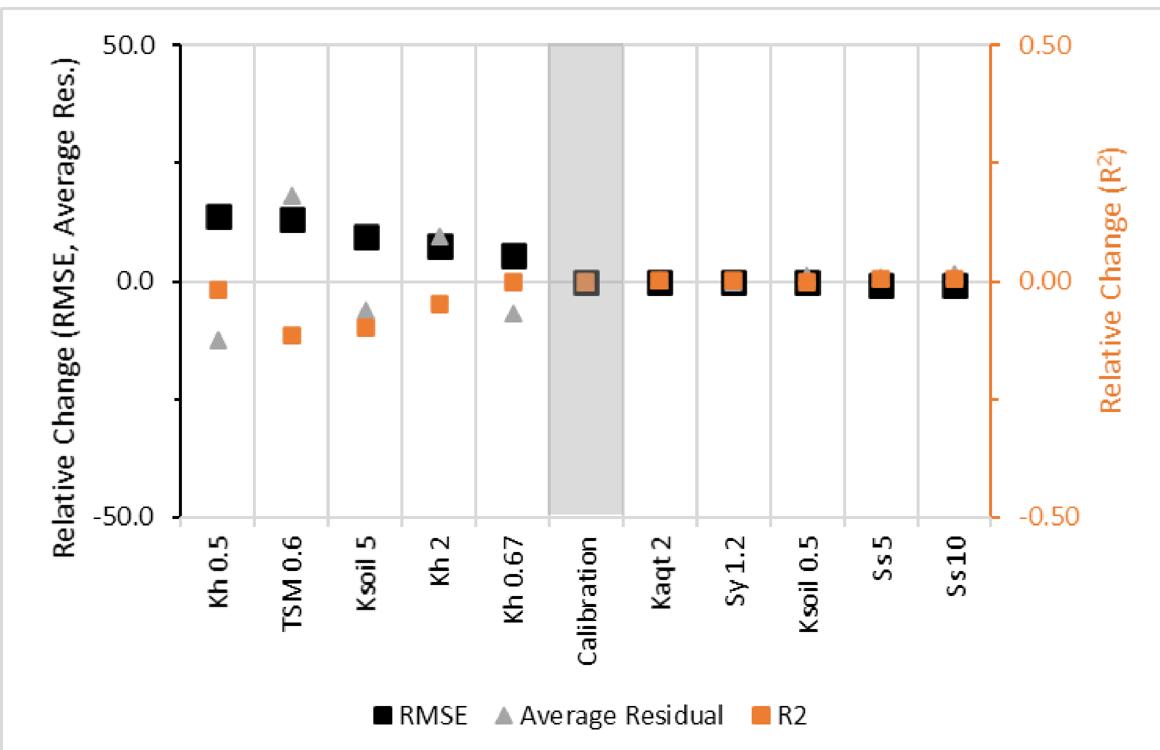


Figure 7: Sensitivity of Change in Groundwater Storage in ESJ Subbasin

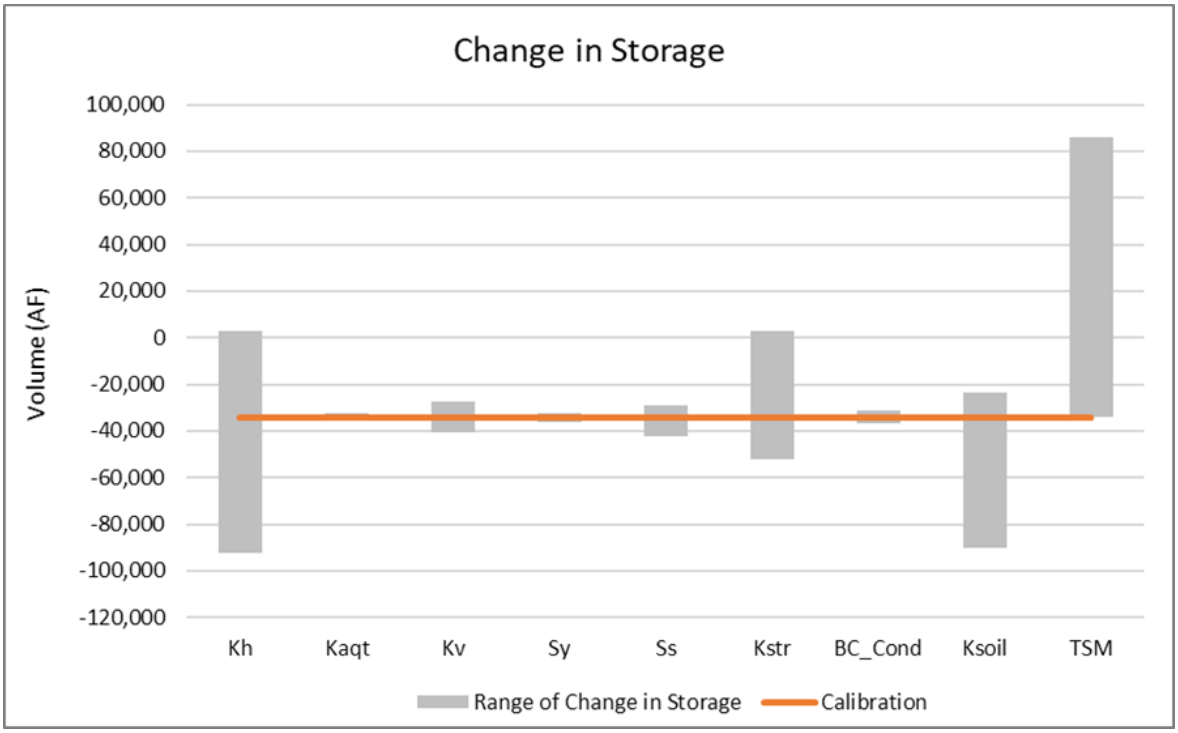
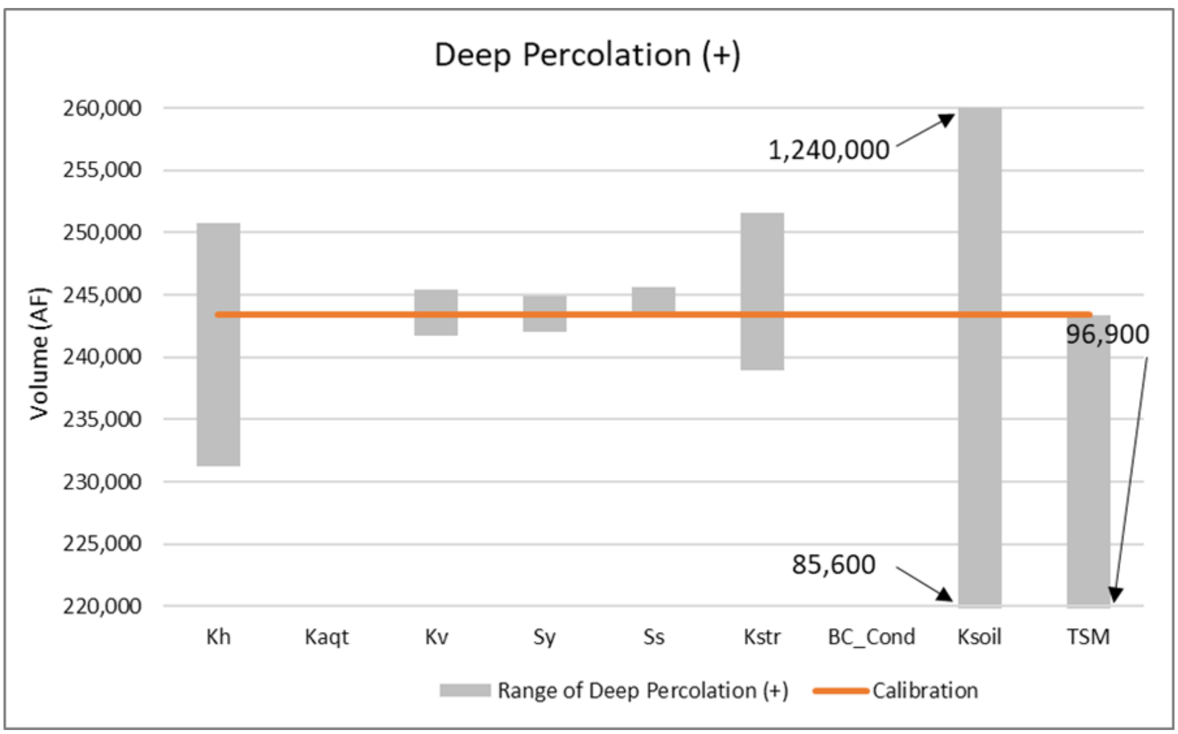


Figure 8: Sensitivity of Deep Percolation in ESJ Subbasin



1.3 Historical Model Results

A water budget balances supplies, demands, and any subsequent change in storage occurring within the specific portion of the hydrologic cycle. IWFM automatically outputs budgets at the subregion scale for processes involving groundwater, land surface, streams, root zone, small watersheds, and unsaturated zone. IWFM can output budgets down to a single element or any specific grouping of elements.

During this step of the calibration process, model results are reviewed and summarized into monthly and annual (by water year) budgets. The primary budgets reviewed for calibration are the land and water use budget and the groundwater budget. After extensive budget analysis, key model datasets and parameters are adjusted, particularly groundwater aquifer parameters, to better match local budgets from local agricultural water purveyors and local planning efforts. The ESJWRM Version 2.0 water budget results are summarized in the following sections.

1.3.1 Land and Water Use Budget

The land and water use budget includes two different versions, agricultural and urban, and represents the balance of the model-calculated water demands with the water supplied. Both the agricultural and urban versions include the same components that make up the water balance:

- Inflows:
    - Groundwater pumping
    - Surface water deliveries
    - Shortage (if applicable)
- Outflows:
    - Demand (either agricultural or urban)
    - Surplus (if applicable)

The average annual water demand for the Subbasin within the calibration period was 1,262 thousand acre-feet (TAF), consisting of 1,145 TAF agricultural demand and 117 TAF urban demand. This demand was met by an annual average of 567 TAF of surface water deliveries (512 TAF of agricultural and 55 TAF of urban deliveries) and was supplemented by 699 TAF of groundwater production (638 TAF of agricultural and 62 TAF of urban pumping). The average annual water shortage for the Subbasin within the calibration period was 5 TAF. Of this annual average, all of the surplus is from agricultural excess and the urban shortage is extremely minor at 0.15 TAF. Shortage and surplus represent a misalignment between the reported, estimated, or assumed water supply (groundwater pumping and surface water deliveries) and the calculated demands. In the historical model, this can occur when there are inaccuracies in the reported water supplies or uncertainties in the methodology and/or parameters used to calculate the demand. The small agricultural surplus indicates a minor misalignment of demands and supplies likely due to the timing, volume, or delivery location of the supplies. The annual simulated land and water use budgets for the calibration period are presented in Figure 9 and Figure 10 for the Subbasin as a whole, showing the agricultural and urban, respectively, demands and water supplies. If supply and demand do not balance, there is a surplus or shortage indicated on the land and water use budget.

Table 4 shows the annual averages described above for ESJWRM Version 2.0's calibration period. Compared to ESJWRM Version 1.1 ESJ Subbasin averages, which had a calibration period through 2015 instead of 2020, the biggest differences in ESJWRM Version 2.0 for the comparable calibration period are in the agricultural land and water use budget. Due to refinements to the agricultural surface water diversions (primarily due to OID, but also due to changes to SSJID, Delta, and riparian diversions), the surface water deliveries increased by 70 TAF compared to ESJWRM Version 1.1. Additional root zone calibration adjusted agricultural demand for several agencies (OID North, NSJWCD, and SSJID), resulting in ESJWRM Version 2.0 having more demand than ESJWRM Version 1.1. The refinement of delivery groups and estimated diversions reduced the surplus in ESJWRM Version 1.1 by 11 TAF, which resulted in less element pumping in ESJWRM Version 2.0. For the urban budget, the refinement of delivery groups (especially for Stockton area urban users), how demand was input into the model, and diversion amounts eliminated the surplus in ESJWRM Version 1.1.

The corresponding land and water use budgets for both agricultural and urban water demands are included for each GSA in Appendix A. OID is separated out into two separate water budgets: North and South. OID North is a GSA and OID South (not a GSA) is part of Modesto Subbasin. LCSD and LCWD do not have any agricultural demand and therefore a figure is not included.

Table 4: Eastern San Joaquin Subbasin Land and Water Use Budget Annual Averages

Land and Water Use Budget Component	ESJWRM Version 2.0 Annual Average for WY 1996-2020
Agricultural Area (acres)	385
Agricultural Demand (TAF)	1,145
Agricultural Groundwater Pumping (TAF)	638
Agricultural Surface Water Deliveries (TAF)	512
Agricultural Surplus (TAF)[1]	5
Urban Area (acres)	96
Urban Demand (TAF)	117
Urban Groundwater Pumping (TAF)	62
Urban Surface Water Deliveries (TAF)	55
Urban Shortage (TAF)[1]	0

[1] Shortage and surplus represent a misalignment between the reported, estimated or assumed water supply (groundwater pumping and surface water deliveries) and the calculated demands. In the historical model, this can occur when there are inaccuracies in the reported water supplies or uncertainties in the methodology and/or parameters used to calculate the demand. In the projected conditions, there are uncertainties in the assumptions and parameters used for both monthly supply and demand estimates and/or calculations, resulting in misalignments, which is reported as shortage or surplus.

Figure 9: Eastern San Joaquin Subbasin Agricultural Demand

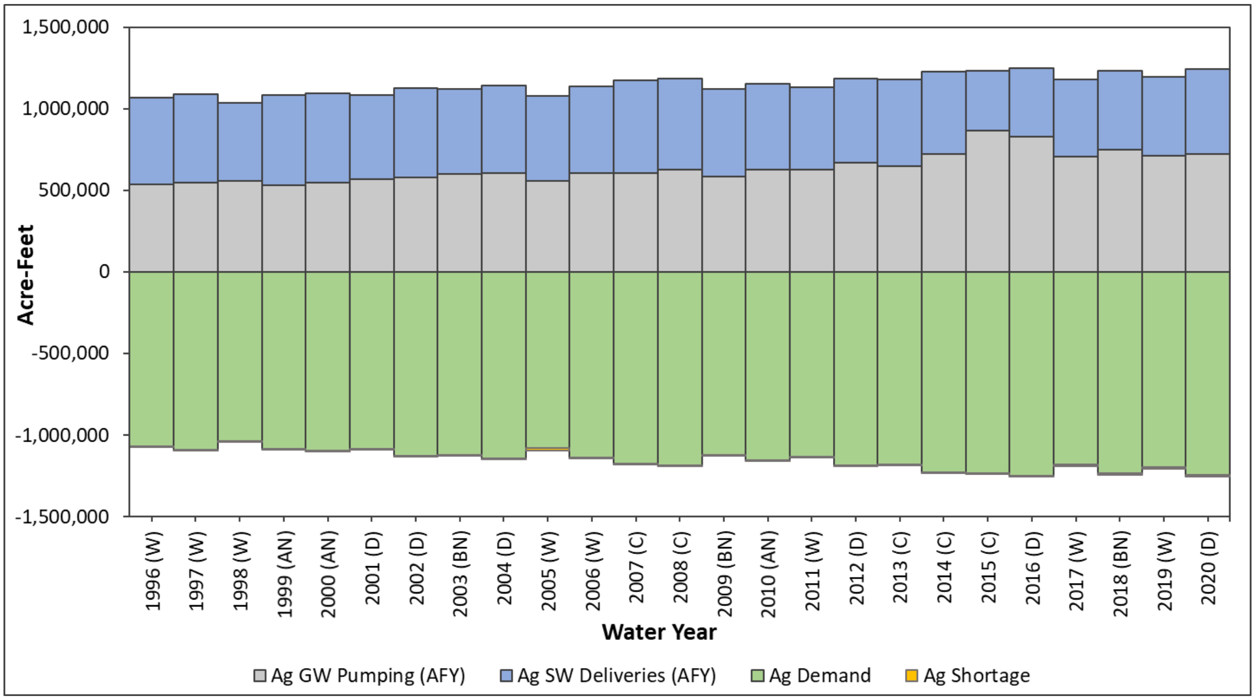
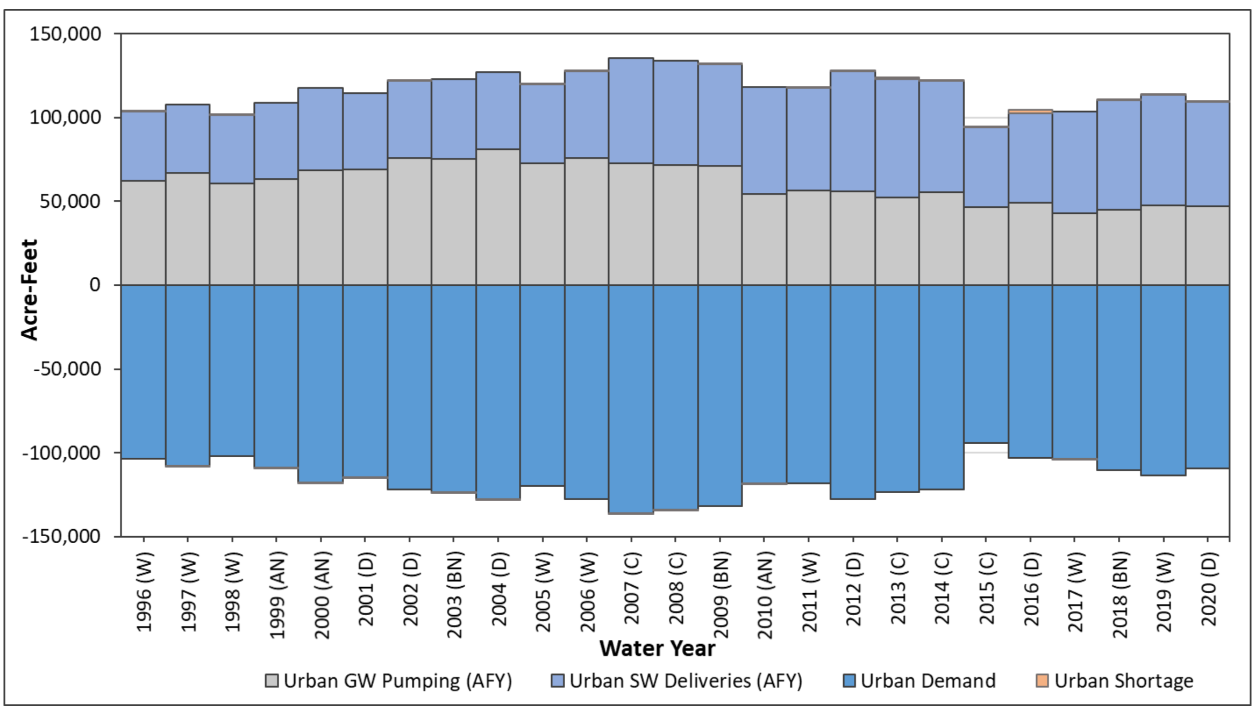


Figure 10: Eastern San Joaquin Subbasin Urban Demand



1.3.2 Hydrologic Groundwater Budget

The primary components of the groundwater budget, corresponding to the major hydrologic processes affecting groundwater flow in the ESJ Subbasin, are:

- Inflows:
  - Deep percolation (from rainfall and irrigation applied water)
  - Gain from stream (or recharge due to stream seepage)
  - Boundary inflow (from surrounding groundwater subbasins and the Sierra Nevada Mountains)
  - Other Recharge (from other sources such as irrigation canal seepage, managed aquifer recharge projects, and reservoir seepage)
- Outflows:
  - Groundwater pumping
  - Loss to stream (or outflow to streams and rivers)
  - Boundary outflow (to surrounding groundwater subbasins)
  - Change in groundwater storage (can be either an inflow or outflow)

The largest component in the groundwater budget is an average annual 709 TAF of pumping, offset by 262 TAF of deep percolation, a net gain from stream of 129 TAF, 169 TAF of other recharge, and a net boundary inflow of 113 TAF annually. The cumulative change in groundwater storage can be calculated from the change in groundwater storage. The groundwater storage in ESJ Subbasin during the calibration period was an average of 37 TAFY. These averages are shown in Table 5 and the Subbasin annual groundwater budget is shown in Figure 11.

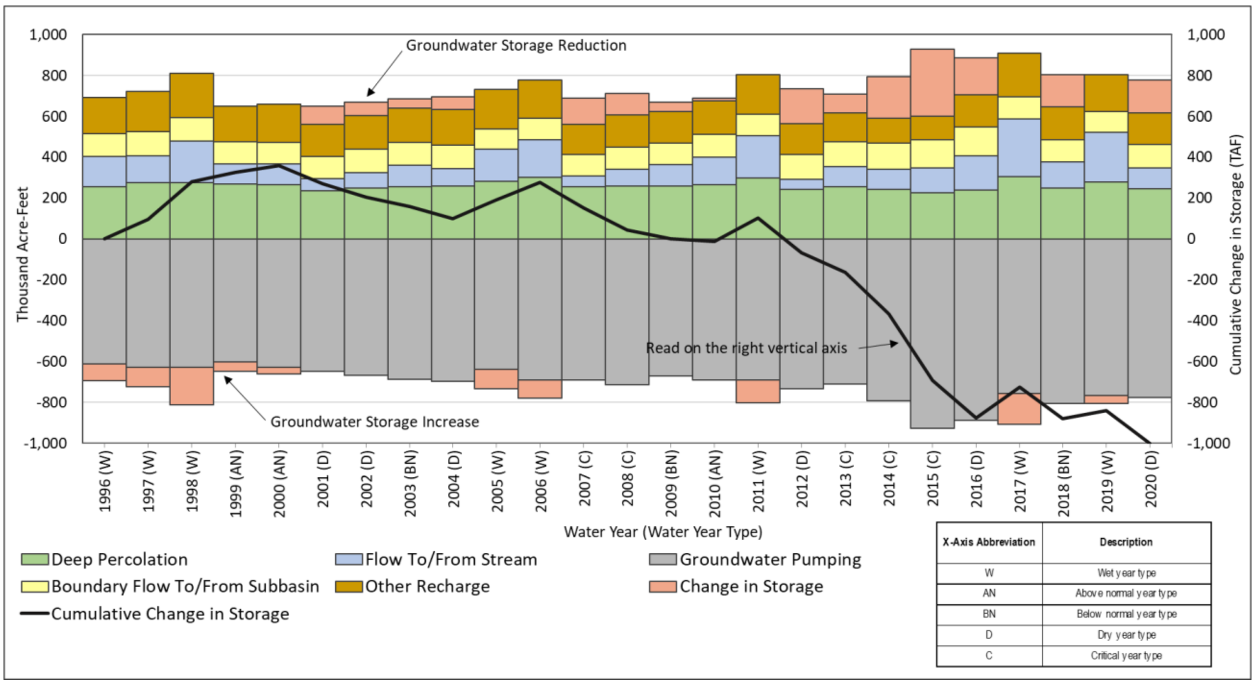
Table 5 shows the annual averages described above for ESJWRM Version 2.0's calibration period. The average annual change in storage estimation determined using ESJWRM Version 1.1 was 41 TAF. The latest update and calibration of the model to ESJWRM Version 2.0 has refined this estimate to an average annual change in storage of 37 TAF over the extended calibration period through 2020. The difference in these estimates is due in large part to the difference in the calibration period, as well as the overhaul of surface water data, especially with regards to OID, and the update to the overall model calibration. This difference in change in storage is well within the ranges observed in the sensitivity analysis discussed in Section 1.2.3.

Other differences observed in the groundwater budget between ESJWRM Version 2.0 and ESJWRM Version 1.1, using the comparable calibration period, are an increase in deep percolation in ESJWRM Version 2.0, most likely caused by increased applied surface water and changes to the root zone calibration, and a decrease in net stream seepage in ESJWRM Version 2.0 due to changes in groundwater levels near streams caused by other groundwater budget components.

Table 5: Eastern San Joaquin Subbasin Hydrologic Groundwater Budget Annual Averages

Hydrologic Groundwater Budget Component	ESJWRM Version 2.0 Annual Average for WY 1996-2020
Deep Percolation (TAF)	262
Other Recharge (TAF)	169
Net Stream Seepage (TAF)	129
Net Boundary Inflow (TAF)	113
Groundwater Pumping (TAF)	709
Change in Groundwater Storage (TAF)	37

Figure 11: Eastern San Joaquin Subbasin Hydrologic Groundwater Budget



2 Projected Conditions Baseline Update

The refinements and enhancements made to the historical data for the updated historical calibration ESJWRM (ESJWRM Version 2.0) required an update to the projected conditions baseline ESJWRM. The version of the Projected Conditions Baseline (PCBL) presented in the GSP finalized in November 2019 is called PCBL Version 1.0. The updated version of the PCBL using ESJWRM Version 2.0 extended dataset and calibration results is referred to as PCBL Version 2.0. This section presents the key data sources and assumptions used to develop the PCBL Version 2.0 and provides the model results.

The PCBL used to develop the projected water budgets represents estimated long-term hydrologic conditions of the Subbasin under the foreseeable future level of development. The future level of development represents approximately water year 2040 or the closest information available from planning documents.

2.1 Assumptions Used to Develop Projected Conditions Baseline Update

This section discusses the assumptions made in converting PCBL Version 1.0 to PCBL Version 2.0. The data and calibration parameters were updated to be consistent with the historical ESJWRM Version 2.0. Initial groundwater levels and soil conditions in the PCBL represent those at the end of the simulation period of the historical ESJWRM Version 2.0 (September 30, 2020).

2.1.1 Hydrology

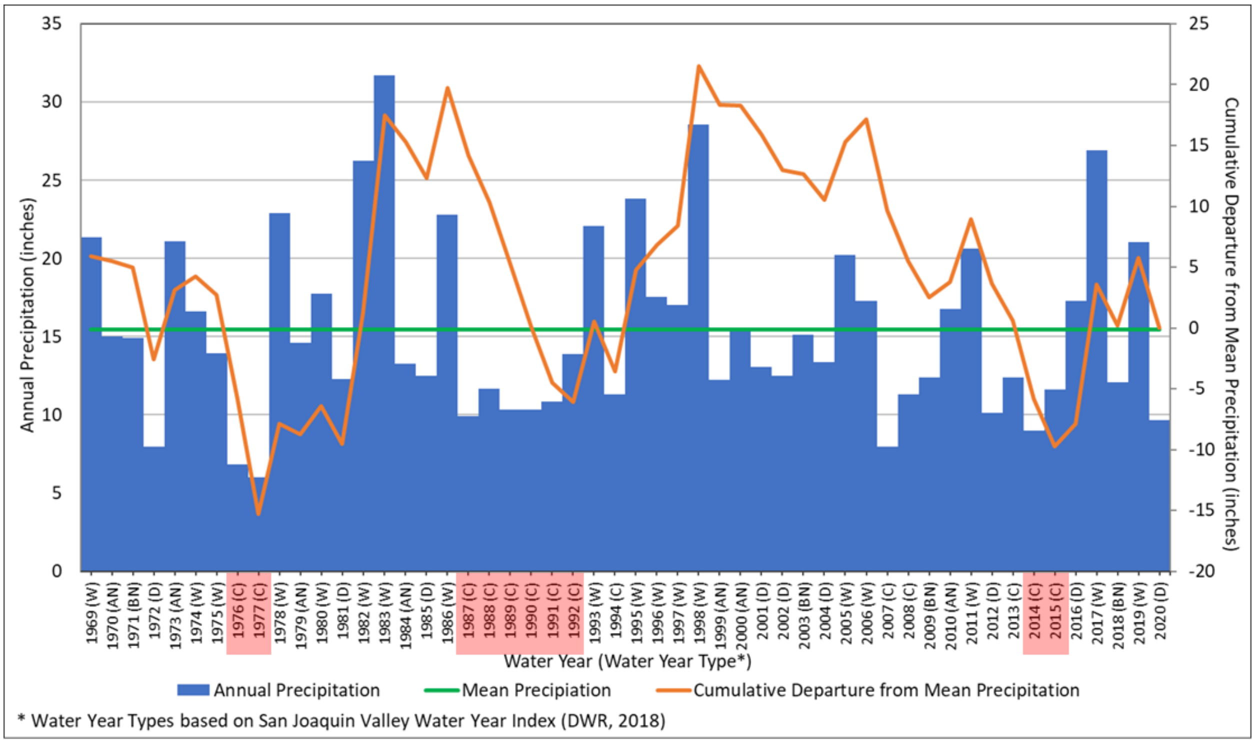
The GSP version of PCBL Version 1.0 included 50 years of hydrology data from water years 1969 through 2018 (October 1968 through September 30, 2018) and was documented in the ESJ Subbasin GSP (ESJGWA, 2019). The updated version PCBL Version 2.0 uses 52 years of hydrology data from water years 1969 through 2020 (October 1968 through September 30, 2020). The projected 52 years of hydrology used in PCBL Version 2.0 was maintained and extended to meet the SGMA requirements to evaluate how the Subbasin's surface and groundwater systems may react under representative hydrologic conditions.

2.1.1.1 Precipitation and Hydrologic Water Year Types

Historical precipitation or rainfall in the ESJ Subbasin was used to identify the hydrologic period that would provide a representation of wet, dry, and extreme periods needed for PCBL Version 2.0. Figure 12 shows the Subbasin annual precipitation (blue columns), average precipitation (green line) of approximately 15 inches, and cumulative departure from mean precipitation (orange line) for each water year from 1969 through 2020. This plot represents the spatially-averaged precipitation across ESJ Subbasin elements developed from PRISM precipitation data. The long-term average precipitation is subtracted from annual precipitation within each water year to develop the departure from average precipitation for each water year. Starting at the first year analyzed, the departures are added cumulatively for each subsequent year. Wet years have a positive departure and upward slopes, dry years have a negative departure and downward slopes, and a year with exactly average precipitation would have zero departure. More severe events are shown by steeper slopes and greater changes.

Each year on the x-axis in Figure 12 is indicated with the San Joaquin Valley Water Year Hydrologic Classification Index published by DWR. The 52 years of the PCBL, from WY 1969 through 2020, represent a range of hydrologic conditions, as identified by the water year types in the San Joaquin Valley Water Year Hydrologic Classification, which classifies water years 1901 through 2020 as Wet (W), Above Normal (AN), Below Normal (BN), Dry (D), and Critical (C) based on inflows to major reservoirs or lakes. A description of how this index is calculated and the specific data used to calculate this index is available online from CDEC at http://cdec.water.ca.gov/cgi-progs/iodir/WSIHIST. In the 52 years of hydrology used in the PCBL Version 2.0, there are 14 Critical years, 9 Dry years, 4 Below Normal years, 7 Above Normal years, and 18 Wet years.

Figure 12: Historical Precipitation in Eastern San Joaquin Subbasin



To facilitate assumptions for baseline water supplies and demands, the five San Joaquin Valley water year types were aggregated into three water year type groups. Critical and Dry years are combined into one category in the baseline water year types (called Dry years), Above Normal and Below Normal years are also combined into one category (Normal years), and Wet years remain in one category (called Wet years). With this breakdown, the three baseline water year types have a distribution of 23 Dry years, 11 Normal years, and 18 Wet years. These baseline water year types (Table 6) are used in the remainder of the PCBL data development and results discussion.

As evident in Figure 12, there are three periods of extreme drought in which there are sequences of critical years where the cumulative departure from mean precipitation drops significantly in a steep slope. To capture future extreme dry year periods that may occur in the PCBL, the following 10 water years were designated as Drought periods: 1976-1977, 1987-1992, and 2014-2015. Drought years are highlighted in red on the x-axis of Figure 12 and distinguished in Table 6. Though the most recent drought lasted from 2012 through 2015, the selected baseline drought years only included 2014 and 2015 as those were the most critical years in which supplies and demands were most impacted.

An 11-year period (WY 2010-2020) of historical hydrology was selected to form the basis of projected data developed by averaging recent historical data. This period was selected because of the reliability of the historical data in ESJWRM Version 2.0 during these years and because the distribution of water year types was relatively consistent with the overall PCBL hydrology.

Table 6: Baseline Hydrologic Water Year Types

Baseline Year	Water Year	San Joaquin Valley Water Year Hydrologic Classification	Baseline Year Type		Baseline Year	Water Year	San Joaquin Valley Water Year Hydrologic Classification	Baseline Year Type
1	1969	Wet	Wet		27	1995	Wet	Wet
2	1970	Above Normal	Normal		28	1996	Wet	Wet
3	1971	Below Normal	Normal		29	1997	Wet	Wet
4	1972	Dry	Dry		30	1998	Wet	Wet
5	1973	Above Normal	Normal		31	1999	Above Normal	Normal
6	1974	Wet	Wet		32	2000	Above Normal	Normal
7	1975	Wet	Wet		33	2001	Dry	Dry
8	1976	Critical	Drought		34	2002	Dry	Dry
9	1977	Critical	Drought		35	2003	Below Normal	Normal
10	1978	Wet	Wet		36	2004	Dry	Dry
11	1979	Above Normal	Normal		37	2005	Wet	Wet
12	1980	Wet	Wet		38	2006	Wet	Wet
13	1981	Dry	Dry		39	2007	Critical	Dry
14	1982	Wet	Wet		40	2008	Critical	Dry
15	1983	Wet	Wet		41	2009	Below Normal	Normal
16	1984	Above Normal	Normal		42	2010	Above Normal	Normal
17	1985	Dry	Dry		43	2011	Wet	Wet
18	1986	Wet	Wet		44	2012	Dry	Dry
19	1987	Critical	Drought		45	2013	Critical	Dry
20	1988	Critical	Drought		46	2014	Critical	Drought
21	1989	Critical	Drought		47	2015	Critical	Drought
22	1990	Critical	Drought		48	2016	Dry	Dry
23	1991	Critical	Drought		49	2017	Wet	Wet
24	1992	Critical	Drought		50	2018	Below Normal	Normal
25	1993	Wet	Wet		51	2019	Wet	Wet
26	1994	Critical	Dry		52	2020	Dry	Dry

2.1.1.2 Evapotranspiration

No changes to evapotranspiration in ESJ Subbasin were implemented in PCBL Version 2.0. ESJWM Version 2.0 evapotranspiration by land use type and by model subregion is assumed to be consistent into the future.

2.1.1.3 Streamflow

No change was assumed in PCBL Version 2.0 to all stream inflows. SSJID system outflows were calculated based on the 11-year aggregated water year type average of historical data for WY 2010-2020.

2.1.2 Land Use and Cropping Patterns

PCBL Version 2.0 used the latest land use dataset available and incorporated urban buildout to reflect the 2040 land use conditions. Land use and cropping patterns are based on the most recent, comprehensive, and model-wide land use survey from DWR (DWR, 2018), with adjustments based on local information and input. This spatial land use data was mapped to ESJWRM model elements and is used as the basis of the PCBL as the latest source of reliable land use data covering the entire model domain. The same edits were made to elements representing LCSD and LCWD to remove agricultural land, as described above for ESJWRM Version 2.0 discussed in Section 1.1.5. The land use data for OID area is adjusted to reflect the information consistent with the OID AWMP.

To represent the extent of urban buildout in 2040, the urban areas in 2018 land use dataset were expanded to either the sphere of influence or general plan boundaries and are held constant during the simulation. The areas with urban buildout are shown in Figure 13 and include Lodi, Stockton, Lathrop, Manteca, Ripon, and Escalon. No growth was assumed for the Jenny Lind urban area. While there is agricultural growth anticipated in the eastern areas of the Subbasin and potential conversion of existing agricultural land to permanent irrigated crops, no reliable projections were available to include in the simulation; therefore, no additional agricultural land growth was added to the PCBL. Thus, cropping acreage is reduced only where urban expansion occurs. This means that due to projected urban growth of over 48,000 acres, agricultural acreage is expected to decrease by approximately 34,000 acres and undeveloped acreage decreases by under 15,000 acres. Table 7 shows the differences between the DWR 2018 data and the ultimate baseline acreage once urban buildout was incorporated. Figure 14 is a pie chart of the PCBL Version 2.0 cropping pattern.

Figure 13: 2018 Land Use with Urban Sphere of Influence Boundaries

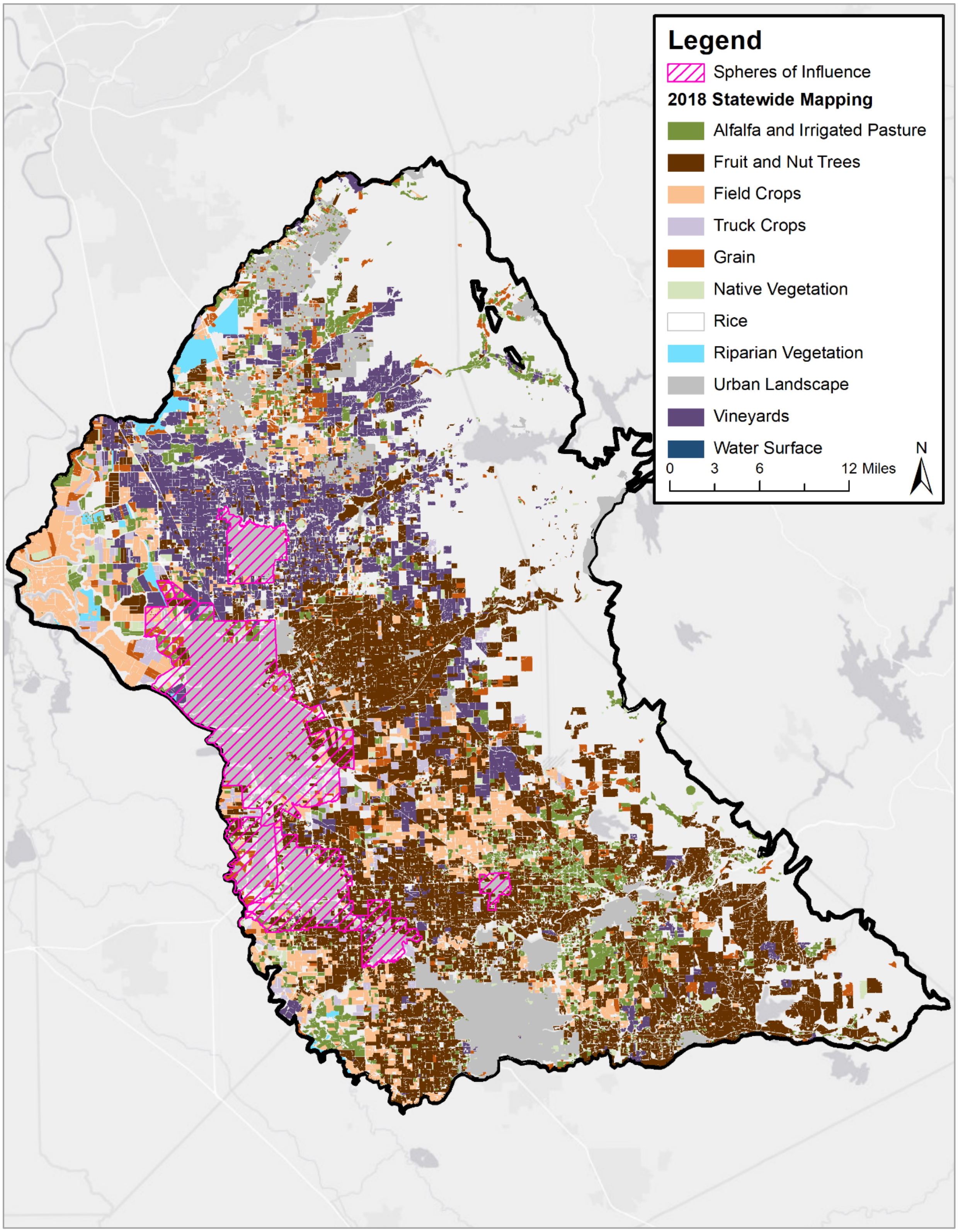
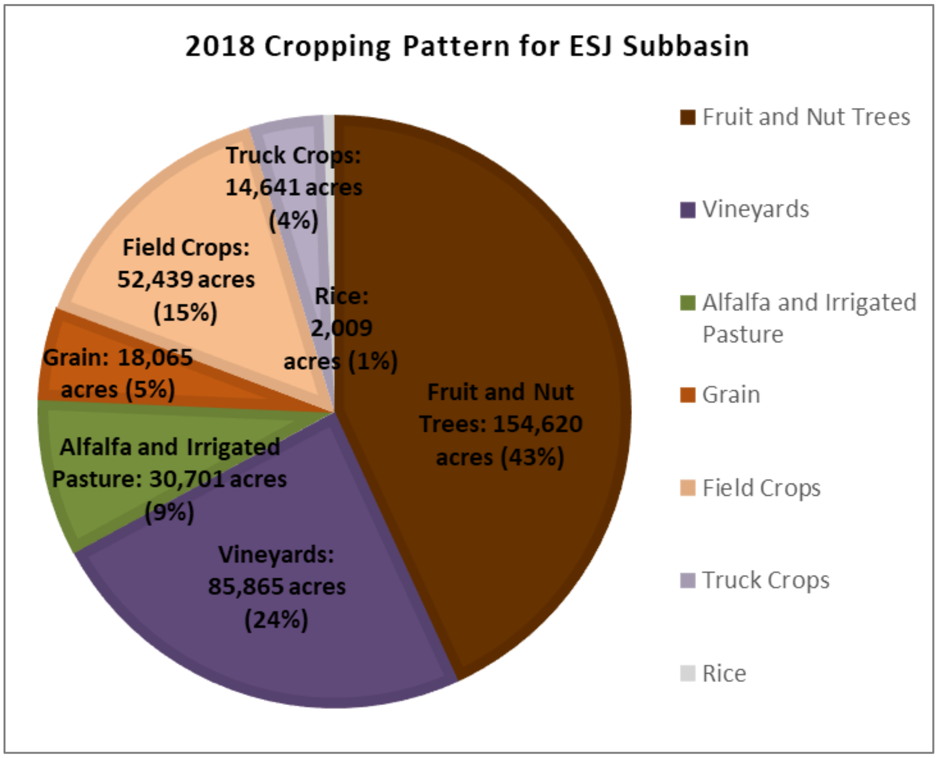


Table 7: ESJ Subbasin Land Use Acreages by Land Use Type

Land Use Type	DWR 2018 Survey	Baseline Model	Change from DWR 2018 Survey
Ag Acreage	392,112	358,340	-33,772
Urban Acreage	104,858	153,484	48,625
Undeveloped Acreage	255,143	240,289	-14,853
Riparian	12,579	12,579	0

Figure 14: 2018 Cropping Pattern for ESJ Subbasin



2.1.3 Water Supply and Demand

Urban water demand in the PCBL Version 2.0 is generally reflective of 2040 conditions. Demand and supply projections were generally available for 2040 or 2045 conditions from urban water management plans (UWMPs). Water demand and supply assumptions are based on the 2020 UWMPs, other planning documents, and the most current information provided by purveyors. Urban demand and supply projections were estimated for three water year types for wet, normal, and dry conditions, with drought periods assumed of critical water supply. Projections for wet years were assumed to be the same as normal conditions when wet year projections were unavailable. After the projected surface water supply and demand were pulled from the planning documents, the projected municipal pumping was calculated as the difference between surface water supply and demand. For the purpose of the modeling, supply was assumed to meet the demand with no surplus.

Agricultural water supply largely used the 11-year averages of grouped water year types from the recent historical data (WY 2010-2020).

In each of the drought period years in the PCBL, it was assumed that the surface water supply delivered was at the 2015 level of supply, if lower than the dry year supply. Pumping was increased accordingly if not calculated within the model. In this way, the PCBL is based on the most recent critical year actual historical delivery data and simulates periods of extreme stress on the groundwater system.

2.2 Projected Conditions Baseline Results

This section provides a summary of the ESJWRM PCBL Version 2.0 results.

2.2.1 Land and Water Use Water Budget

The land and water use budget includes two different versions, agricultural and urban, and represents the balance of the model-calculated water demands with the water supplied. Both the agricultural and urban versions include the same components that make up the water balance:

- Inflows:
    - Groundwater pumping
    - Surface water deliveries
    - Shortage (if applicable)
- Outflows:
    - Demand (either agricultural or urban)
    - Surplus (if applicable)

The average annual projected water demand for the Subbasin within the 52-year simulation period is 1,258 thousand acre-feet (TAF), consisting of approximately 1,100 TAF expected agricultural demand and 158 TAF expected urban demand. This demand is met by an annual average of 528 TAF of surface water deliveries (453 TAF of agricultural and 76 TAF of urban deliveries) and is supplemented by 743 TAF of groundwater production (661 TAF of agricultural and 82 TAF of urban pumping). Due to uncertainties in the estimation of projected agricultural demand and historical supply records, there is 13 TAF of surplus in the Subbasin scale agricultural water use budget, which is insignificant relative to the total volume of water use. Shortage and surplus represent a misalignment between the reported, estimated, or assumed water supply (groundwater pumping and surface water deliveries) and the calculated demands. In the projected conditions, there are uncertainties in the assumptions and parameters used for both monthly supply and demand estimates and/or calculations, resulting in misalignments, which is reported as shortage or surplus. These annual averages are shown in Table 8. The annual land and water use budgets across the ESJ Subbasin are shown in Figure 15 and Figure 16 for the Subbasin as a whole, showing the agricultural and urban, respectively, demands plotted with water supplies.

The corresponding average annual agricultural and urban demand figures for the projected conditions baseline are included for each GSA in Appendix B. As in the historical model LCSD and LCWD do not have projected agricultural demand and therefore the figure is not included. At full buildout to the sphere of influence boundaries, City of Stockton GSA, San Joaquin County #2, and City of Manteca GSA do not have agricultural demand and therefore figures for those GSAs are also not included.

Table 8: Eastern San Joaquin Subbasin Land and Water Use Budget Annual Average

Land and Water Use Budget Component	PCBL Version 2.0 Annual Average
Agricultural Area (acres)	359
Agricultural Demand (TAF)	1,100
Agricultural Groundwater Pumping (TAF)	661
Agricultural Surface Water Deliveries (TAF)	453
Agricultural Surplus (TAF)[1]	13
Urban Area (acres)	153
Urban Demand (TAF)	158
Urban Groundwater Pumping (TAF)	82
Urban Surface Water Deliveries (TAF)	76
Urban Shortage (TAF)[1]	0

[1] Shortage and surplus represent a misalignment between the reported, estimated or assumed water supply (groundwater pumping and surface water deliveries) and the calculated demands. In the historical model, this can occur when there are inaccuracies in the reported water supplies or uncertainties in the methodology and/or parameters used to calculate the demand. In the projected conditions, there are uncertainties in the assumptions and parameters used for both monthly supply and demand estimates and/or calculations, resulting in misalignments, which is reported as shortage or surplus.

Figure 15: Eastern San Joaquin Subbasin Projected Agricultural Demand

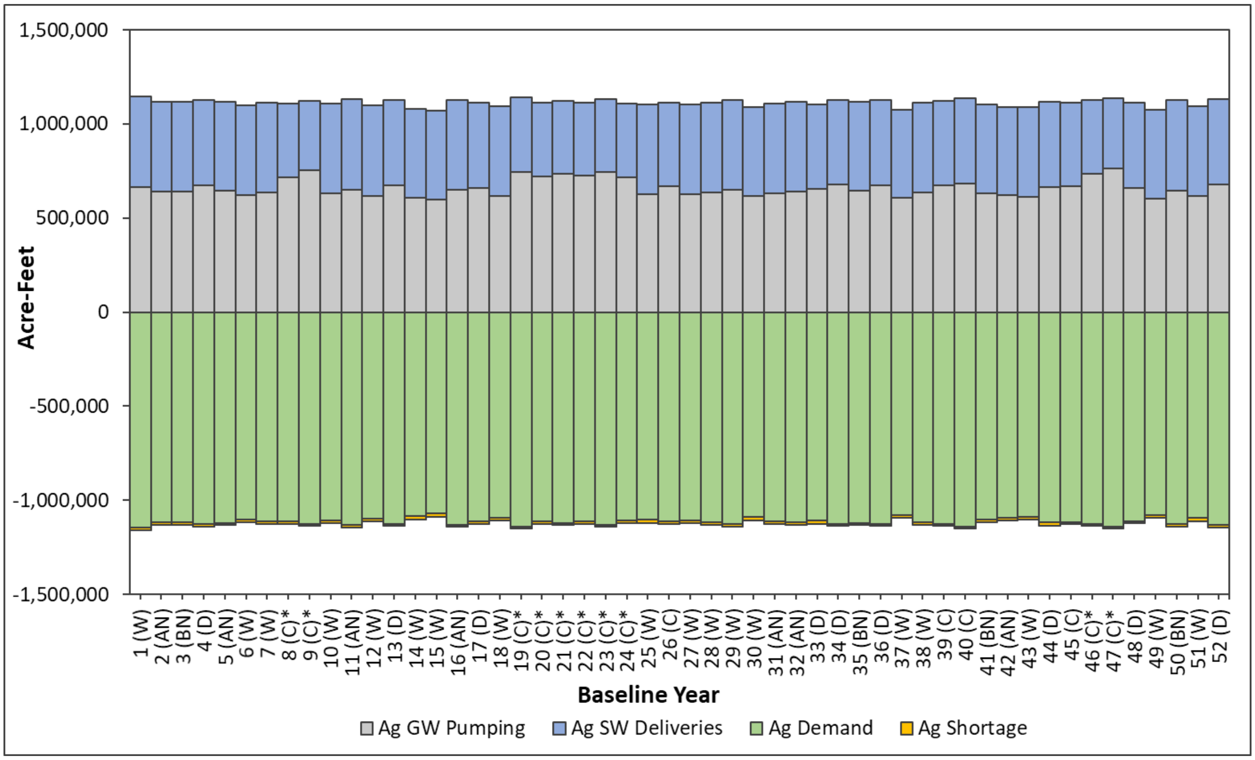
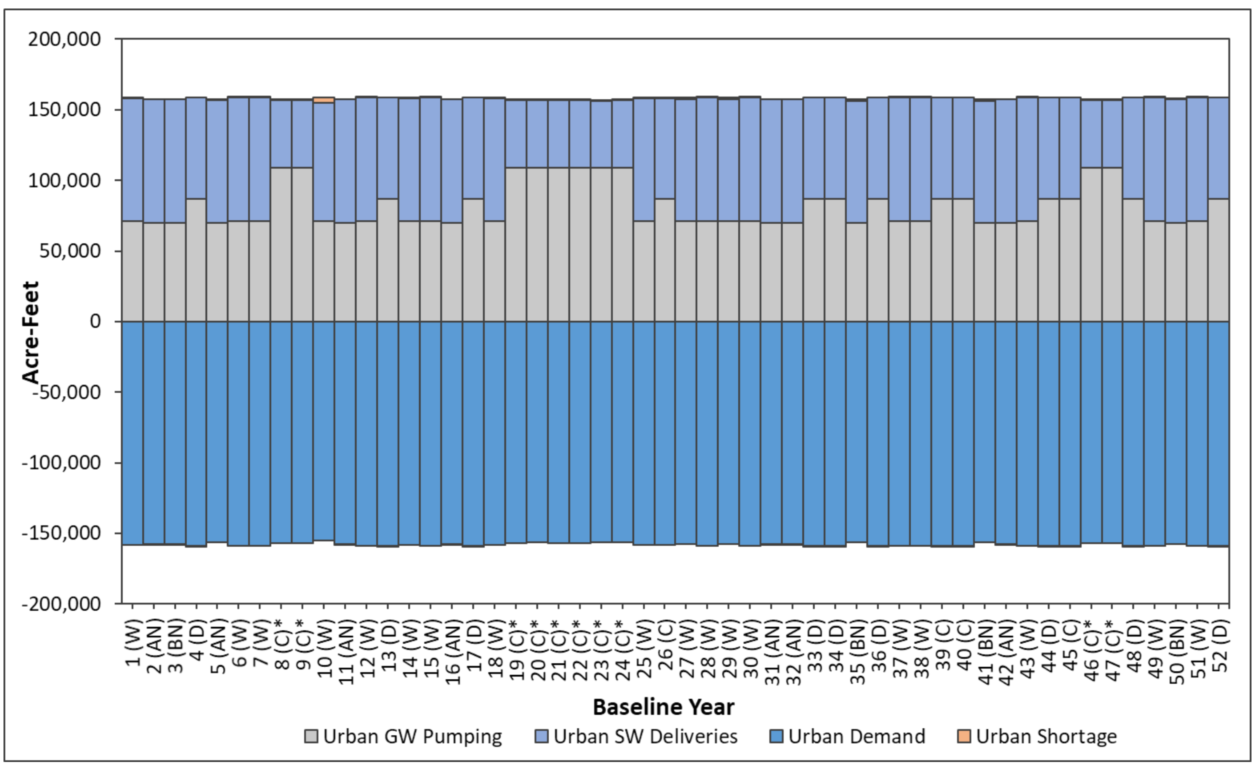


Figure 16: Eastern San Joaquin Subbasin Projected Urban Demand



2.2.2 Hydrologic Groundwater Budget

The primary components of the groundwater budget are the same as represented in the historical model. Corresponding to the major hydrologic processes affecting groundwater flow in the Subbasin, these are:

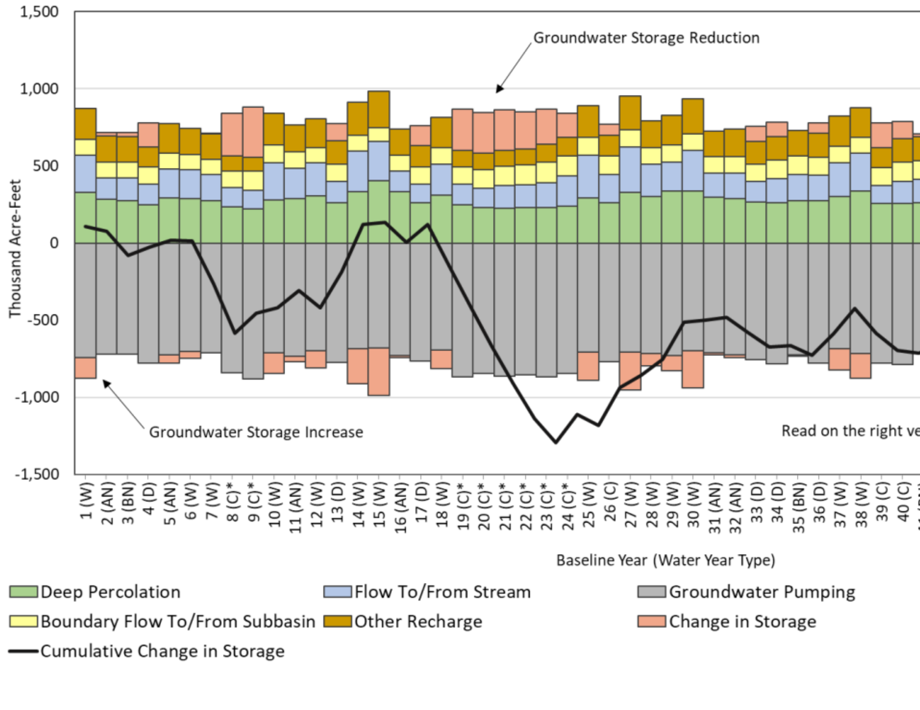
- Inflows:
    - Deep percolation (from rainfall and irrigation applied water)
    - Gain from stream (or recharge due to stream seepage)
    - Boundary inflow (from surrounding groundwater subbasins and the Sierra Nevada Mountains)
    - Other Recharge (from other sources such as irrigation canal seepage, managed aquifer recharge projects, and reservoir seepage)
- Outflows:
    - Groundwater pumping
    - Loss to stream (or outflow to streams and rivers)
    - Boundary outflow (to surrounding groundwater subbasins)
    - Change in groundwater storage (can be either an inflow or outflow)

Pumping in the PCBL Version 2.0 remains the largest component in the groundwater budget with an annual average 753 TAF. The PCBL offsets this pumping with 282 TAF of deep percolation, a net gain from stream of 181 TAF, 162 TAF of other recharge, and a total subsurface inflow of 112 TAF annually. The cumulative change in groundwater storage can be calculated from the annual change in groundwater storage. Due to inherent uncertainties in model input data, calculations, and calibration, all budget components have a degree of uncertainty. Given this uncertainty, the projected long-term average annual the groundwater storage deficit in ESJ Subbasin in the PCBL is 16 TAFY. These annual averages are shown in Table 9. The groundwater budgets, with average cumulative change in storage, are shown for the ESJ Subbasin in Figure 17.

Table 9: Eastern San Joaquin Subbasin Hydrologic Groundwater Budget Annual Average

Hydrologic Groundwater Budget Component	PCBL Version 2.0 Annual Average
Deep Percolation (TAF)	282
Other Recharge (TAF)	162
Net Stream Seepage (TAF)	181
Net Boundary Inflow (TAF)	112
Groundwater Pumping (TAF)	753
Change in Groundwater Storage (TAF)	16

Figure 17: Eastern San Joaquin Subbasin Projected Hydrologic Groundwater Budget



X-Axis Abbreviation	Description
W	Wet year type
AN	Above normal year type
BN	Below normal year type
D	Dry year type
C	Critical year type

3 Operational Water Budget

The groundwater budget produced by an integrated water resources model reflects a hydrologic groundwater budget, which includes results at various geographic scales (subregions, subbasins, GSAs, etc.). A hydrologic groundwater budget represents a balance of the groundwater system based on all components of the land and water supply system that affect the hydrology and physical conditions of the groundwater system. The groundwater budgets shown above in Section 1.3.2 and Section 2.2.2 are hydrologic groundwater budgets for the ESJ Subbasin for both the historical calibration and the projected conditions baseline. This section discusses the operational water budgets developed for the GSAs in ESJ Subbasin using PCBL Version 2.0. These operational water budgets were calculated using annual averages of GSA hydrologic groundwater budget results.

Operational water budgets can be developed to account for the impact on the groundwater subbasin due to area-specific operational activities. An operational water budget represents the balance of the groundwater system based on components that reflect water use by each entity. The hydrologic groundwater budget components such as deep percolation, groundwater pumping, conveyance and canal recharge, and managed recharge projects are considered operational since they depend on the actions taken by the entity, even if those actions occur outside of the footprint of the entity.

Operational water budget components include deep percolation from rainfall and applied water, recharge from conveyance and carriage losses, and any recharge as a result of managed aquifer recharge projects or storage reservoirs that are operated by an entity within the water budget region. Groundwater pumping within district boundaries is the outflow for the operational water budget. Table 10 summarizes the components of the hydrologic groundwater budget that are considered as part of the operational budget.

Components of the hydrologic groundwater budget that are not used in the operational budget are considered to be in a "Common Pool", whereby portions of the Common Pool account can be allocated to various entities within the basin based on a water accounting framework to be developed in a collaborative manner. The Common Pool account includes those resources that may be shared across the larger region such as stream/river seepage, boundary inflow and outflow (from the foothills, neighboring subbasins, and/or the Delta), and Camanche Reservoir seepage. The Common Pool account also includes a portion of the carriage recharge that cannot be entirely claimed by actions taken by a GSA. This recharge occurs during the conveyance of water from streams to riparian users located along streams but with water rights independent of GSAs. Table 10 includes the components of the hydrologic groundwater budget that are considered part of the Common Pool account.

Table 10: Water Budget Component Assignments

Hydrologic Groundwater Budget Component	Budget Assignment	Notes
Deep Percolation	Operational	From both rainfall and irrigation applied water
GW Pumping	Operational	Used for irrigation and municipal water supply
Other Recharge	Operational	Includes managed aquifer recharge and recharge from agency-operated unlined canals and/or local reservoirs
Net Stream Seepage	Common Pool	Due to stream-aquifer interaction
Boundary Flow	Common Pool	To/from neighboring GW Subbasins and the Sierra Nevada Mountains

Recharge from conveyance and carriage losses for each model diversion (see Section 1.1.9) was allocated to each GSA's operational water budget or the Common Pool as a percentage of the overall annual recharge calculated for that surface water diversion. Surface water diversions were largely allocated based on which entity maintains the water right or wheels the water to another entity. For diversions that are split across groundwater subbasins (i.e., riparian use along Dry Creek, Stanislaus River, and San Joaquin River), the fraction of the diversion within the ESJ Subbasin was calculated through analysis of the hydrologic groundwater budgets.

Since not all the detailed operational aspects of irrigation water supplies are accounted for in ESJWRM, special treatments are required for certain cases. One such case is the assumption that 5% of the total Camanche Reservoir releases for NSJWCD diversions are included as part of the overall Mokelumne River seepage and should be part of NSJCWD's operational water budget. This was added to the operational water budget by calculating 5% of the overall amount of East Bay Municipal Utility District (EBMUD) releases from Camanche Reservoir for NSJWCD and subtracting that amount from the total stream seepage in the Common Pool for NSJWCD.

Table 11 (split between two pages) shows the Operational Water Budget for each ESJ Subbasin GSA and the entire Subbasin, also summarized in Figure 18 and Figure 19. The total Common Pool account for the Subbasin is 347,000 acre-feet, consisting of stream seepage, boundary flows, Camanche Reservoir seepage, and Common Pool recharge. The Common Pool account will need to be allocated to each entity based on a yet to be developed and agreed upon accounting framework.

Table 11: Operational Water Budget by GSA and for ESJ Subbasin

Component	SJC #1	CDWA	WID	Lodi	NSJWCD	LCSD	Stockton	SJC #2
Deep Percolation[1]	37,000	17,600	10,100	600	35,100	50	300	60
Precipitation	6,000	4,100	2,500	200	13,500	40	100	20
Applied Water	31,000	13,500	7,600	400	21,600	10	200	40
Other Recharge[2]	0	3,700	13,000	0	2,000	0	0	0
Carriage/Canal Recharge and Managed Aquifer Recharge[3]	0	3,700	13,000	0	2,000	0	0	0
Local Reservoir Seepage	0	0	0	0	0	0	0	0
Total Contribution	**37,000**	**21,300**	**23,100**	**600**	**37,100**	**50**	**300**	**60**
Groundwater Pumping	60,100	9,200	26,700	14,100	165,300	400	11,100	4,500
Total Extraction	**60,100**	**9,200**	**26,700**	**14,100**	**165,300**	**400**	**11,100**	**4,500**
Net Effect on Groundwater System	**(23,100)**	**12,100**	**(3,600)**	**(13,500)**	**(128,200)**	**(350)**	**(10,800)**	**(4,440)**

Notes:

[1] Deep Percolation- Includes percolation due to both precipitation and applied water (both surface water and groundwater)

[2] Other Recharge- Includes canal seepage, reservoir seepage, aquifer recharge projects, and drainage from ungauged watersheds

[3] Carriage/Canal Recharge and Managed Aquifer Recharge- Includes canal seepage and MAR projects attributed to each GSA. Also includes calculated 5% of total Camanche Reservoir releases for NSJWCD assumed to be Mokelumne River stream seepage

Table 11 Continued. Operational Water Budget by GSA and for ESJ Subbasin

Component	SEWD	LCWD	CSJWCD	SDWA	Manteca	SSJID	OID North	Eastside GSA	ESJ Subbasin
Deep Percolation[1]	44,300	20	37,600	3,100	290	51,300	14,600	30,000	282,020
Precipitation	8,400	10	5,200	700	90	8,500	1,900	18,800	70,060
Applied Water	35,900	10	32,400	2,400	200	42,800	12,700	11,200	211,960
Other Recharge[2]	24,600	0	2,600	800	0	41,400	17,500	100	105,700
Carriage/Canal Recharge and Managed Aquifer Recharge[3]	24,600	0	2,600	800	0	25,400	17,500	100	89,700
Local Reservoir Seepage	0	0	0	0	0	16,000	0	0	16,000
Total Contribution	**68,900**	**20**	**40,200**	**3,900**	**290**	**92,700**	**32,100**	**30,100**	**387,720**
Groundwater Pumping	160,400	400	139,300	3,700	20,600	34,900	31,100	69,400	751,200
Total Extraction	**160,400**	**400**	**139,300**	**3,700**	**20,600**	**34,900**	**31,100**	**69,400**	**751,200**
Net Effect on Groundwater System	**(91,500)**	**(380)**	**(99,100)**	**200**	**(20,310)**	**57,800**	**1,000**	**(39,300)**	**(363,480)**

Notes:

[1] Deep Percolation- Includes percolation due to both precipitation and applied water (both surface water and groundwater)

[2] Other Recharge- Includes canal seepage, reservoir seepage, aquifer recharge projects, and drainage from ungauged watersheds

[3] Carriage/Canal Recharge and Managed Aquifer Recharge- Includes canal seepage and MAR projects attributed to each GSA. Also includes calculated 5% of total Camanche Reservoir releases for NSJWCD assumed to be Mokelumne River stream seepage

Figure 18: Operational Water Budget Total Contribution and Extraction by GSA

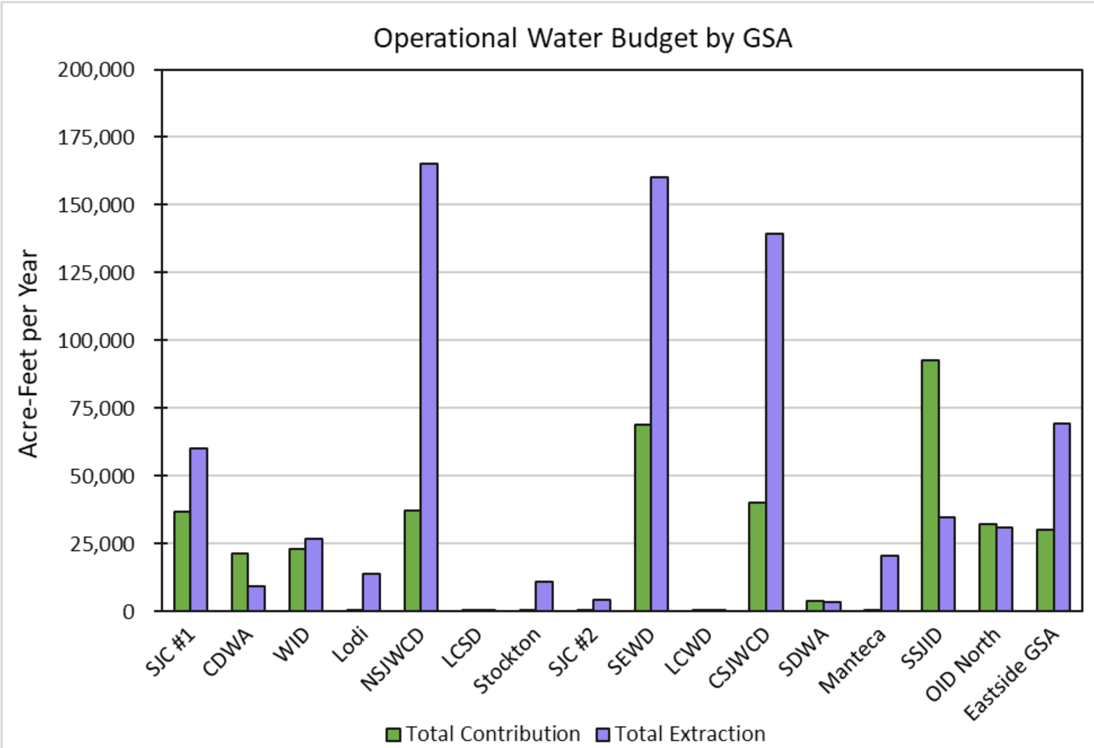
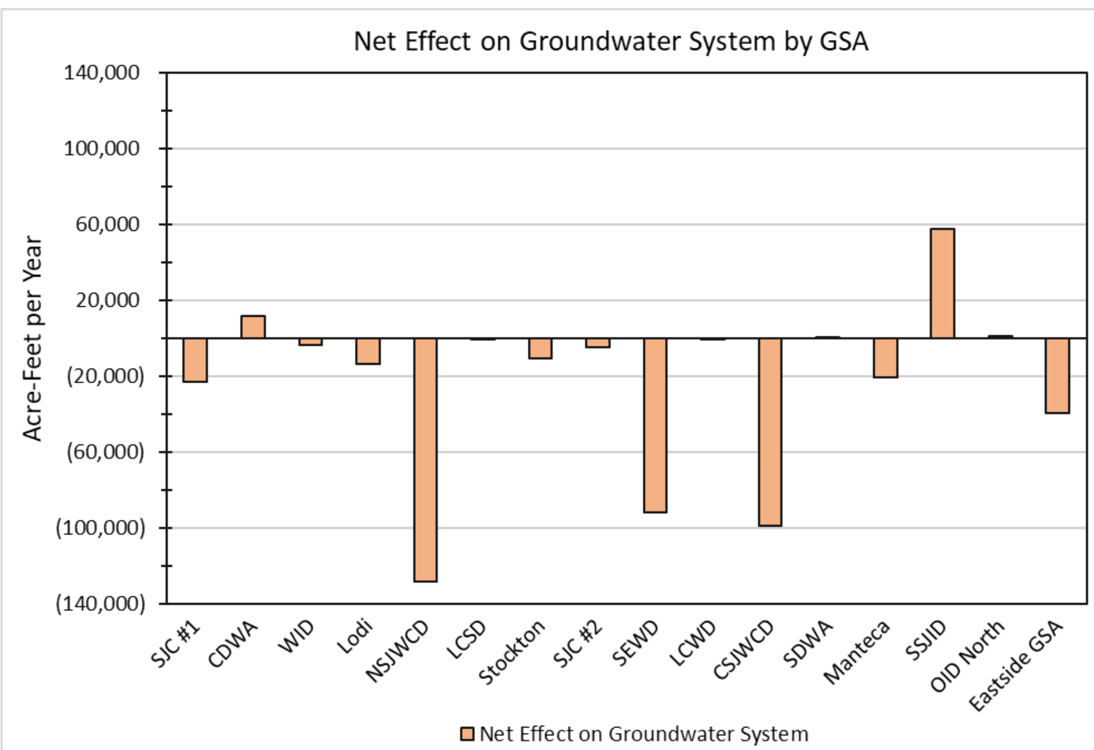


Figure 19: Operational Water Budget Net Effect on Groundwater System by GSA



4 Conclusions and Recommendations

The updated ESJWRM Version 2.0 is a robust, comprehensive, defensible, and well-established model for assessing the water resources in the ESJ Subbasin under historical and projected conditions using PCBL Version 2.0. The following recommendations are to be considered for further refinements and enhancements of the model:

- **Continue engagement with local groundwater users and managers**. Continue working with local agencies and groundwater users in ESJ Subbasin to further understand the local operations of the groundwater system and improve representation of groundwater users in the ESJWRM.
- **Enhance variability of potential evapotranspiration**. The current version of the IDC used for estimation of the consumptive use of crops in the ESJWRM uses monthly potential ET values that are the same for all years during the model period. Given that there may be annual variability in the potential ET data with possible effects on the annual estimation of crop water demand, it is recommended to use more detailed data with temporal variability to develop a full time series of ET values for use in the model.
- **Refine infiltration of precipitation**. The current version of the IDC is based on parameters from the DWR C2VSim model. Further refinements can be made to reflect the local soil conditions and rainfall runoff patterns.
- **Refine surface water deliveries in Cosumnes Subbasin.** The surface water deliveries in the Cosumnes Subbasin are currently at the subregion level and do not have the detailed spatial resolution of other areas within the ESJ Subbasin. This data may be verified and updated with modeling in that subbasin completed to meet the requirements of SGMA.
- **Update land use as needed.** As part of the statewide SGMA support, the DWR prepares statewide land use surveys every other year. It is recommended that the appropriate land use surveys be incorporated in the historical model, as well as the projected baseline as necessary and needed.
- **Integration with GRAT.** ESJGWA is in the process of developing a Groundwater Recharge Assessment Tool (GRAT). It is recommended to integrate the ESJWRM with the GRAT to better assess the implications of any water recharge on the state of the basin and distribution of benefits.

5 References

California Department of Finance (DOF). Downloaded March 2021. E-4 Population Estimates for Cities, Counties, and the State, 2011-2020 with 2010 Census Benchmark. https://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-4/2010-21/.

Department of Water Resources (DWR). Statewide Crop Mapping 2016. Downloaded for groundwater subbasins in model area. https://gis.water.ca.gov/app/CADWRLandUseViewer/.

Department of Water Resources (DWR). Statewide Crop Mapping 2018. Downloaded for groundwater subbasins in model area. https://gis.water.ca.gov/app/CADWRLandUseViewer/.

Dogrul, Emin C. and Tariq N. Kadir. 2021a. Integrated Water Flow Model Theoretical Documentation (IWFM-2015), Revision 1273. Bay-Delta Office, California Department of Water Resources. September 2021. https://data.cnra.ca.gov/dataset/iwfm-integrated-water-flow-model/resource/64b1047a-39ff-46db-8b93-1e6f95e50865.

Dogrul, Emin C. and Tariq N. Kadir. 2021b. DWR Technical Memorandum: Theoretical Documentation and User's Manual for IWFM Demand Calculator (IDC-2015), Revision 1273. Bay-Delta Office, California Department of Water Resources. September 2021. https://data.cnra.ca.gov/dataset/iwfm-integrated-water-flow-model/resource/64b1047a-39ff-46db-8b93-1e6f95e50865.

Doherty, J., 2015. Calibration and Uncertainty Analysis for Complex Environmental Models. Watermark Numerical Computing, Brisbane, Australia. ISBN: 978-0-9943786-0-6.

Eastern San Joaquin Groundwater Authority (ESJGWA). 2019. Eastern San Joaquin Groundwater Subbasin Groundwater Sustainability Plan. November 2019.

Lockeford Community Services District (LCWD). 2016. Final Lockeford Community Services District Municipal Services Review. Prepared for San Joaquin County Local Agency Formation Commission. September 2016.

Oakdale Irrigation District (OID). 2021. 2020 Agricultural Water Management Plan. Prepared by Davids Engineering. March 2021.

Oregon State University (OSU). Downloaded March 2021. PRISM Climate Group. http://prism.oregonstate.edu.

South San Joaquin Irrigation District (SSJID). 2021. 2020 Agricultural Water Management Plan. Prepared by Davids Engineering. Adopted March 23, 2021.

Woodard & Curran. 2018a. Eastern San Joaquin Water Resources Model (ESJWRM) Final Report. August 2018.

Woodard & Curran. 2018b. Eastern San Joaquin Water Resources Model Agricultural and Urban Demand Estimates Technical Memorandum. February 2018.

APPENDIX A: LAND AND WATER USE BUDGETS BY GSA FOR HISTORICAL MODEL (ESJWRM 2.0)

FIGURES

Figure 1: San Joaquin County #1 GSA Agricultural Demand

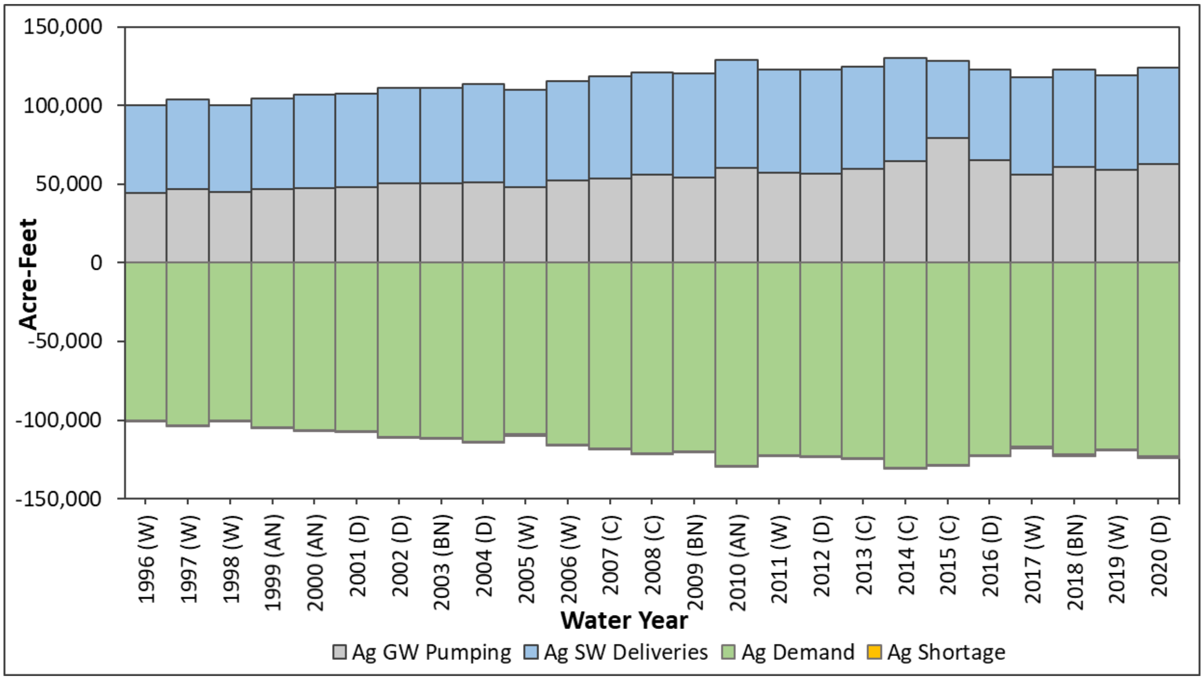


Figure 2: San Joaquin County #1 GSA Urban Demand

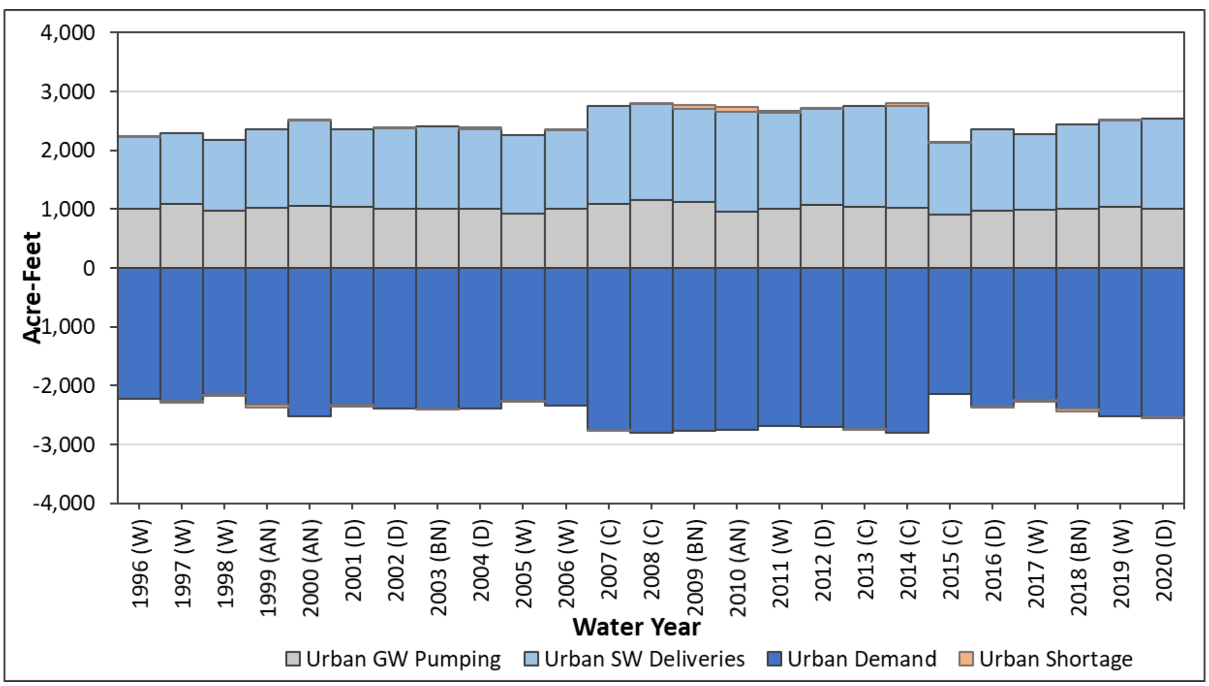


Figure 3: Central Delta Water Agency GSA Agricultural Demand

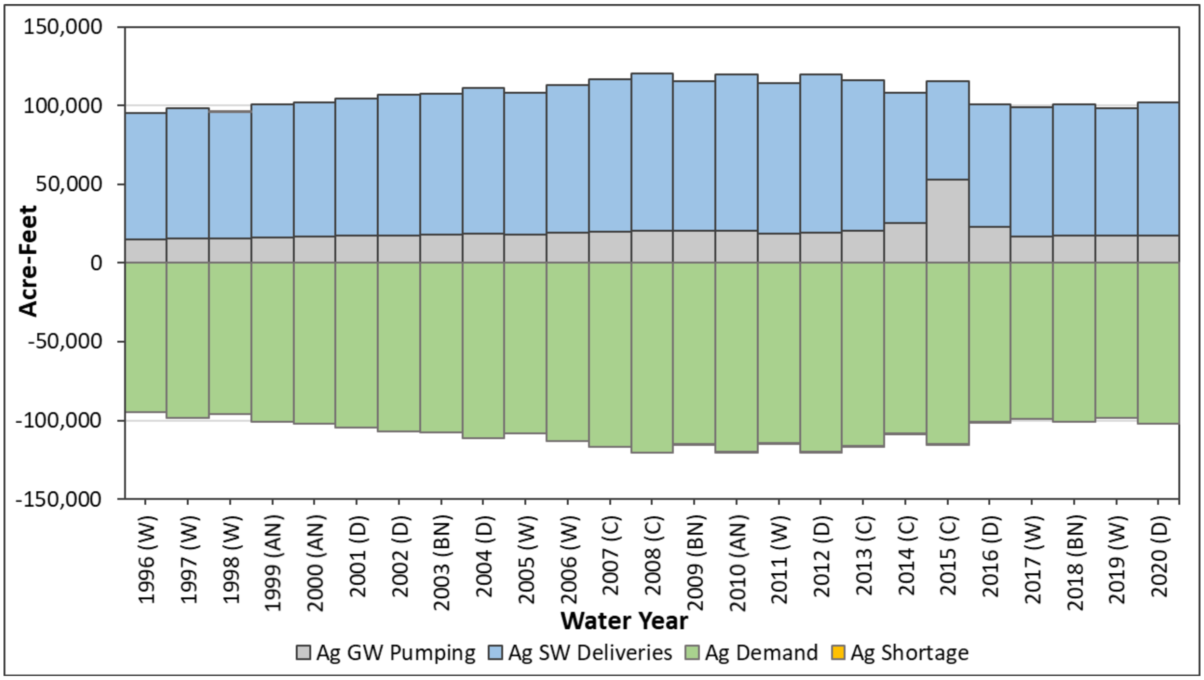


Figure 4: Central Delta Water Agency GSA Urban Demand

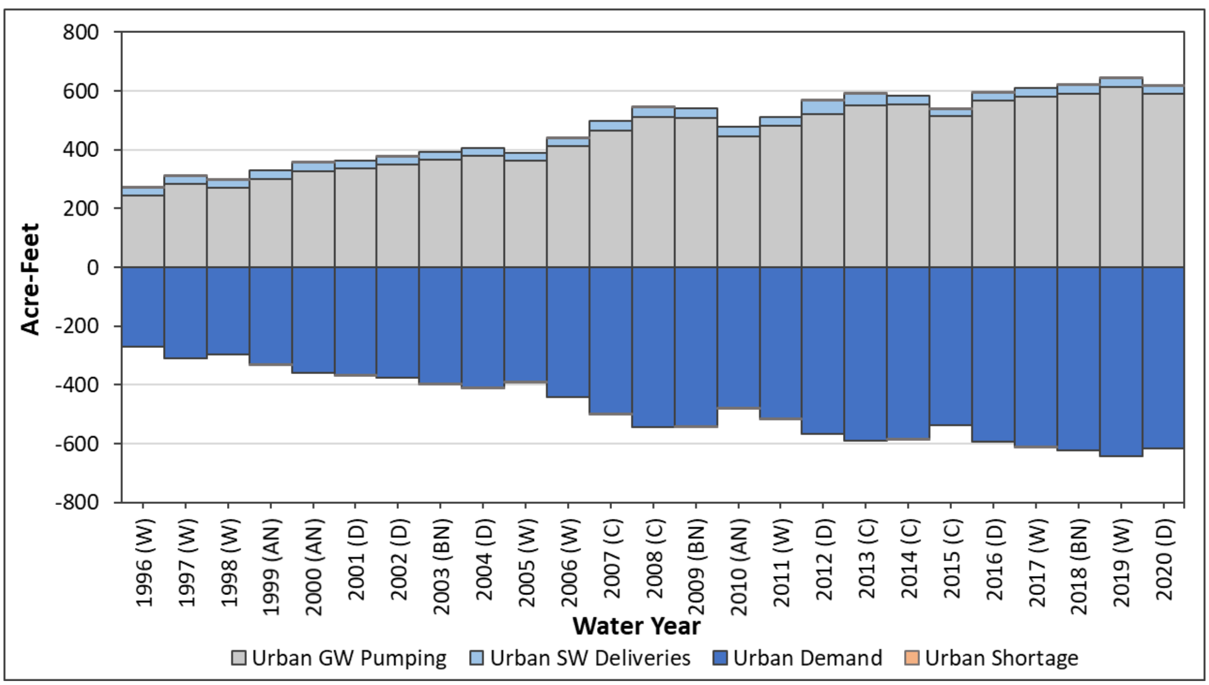


Figure 5: Woodbridge Irrigation District GSA Agricultural Demand

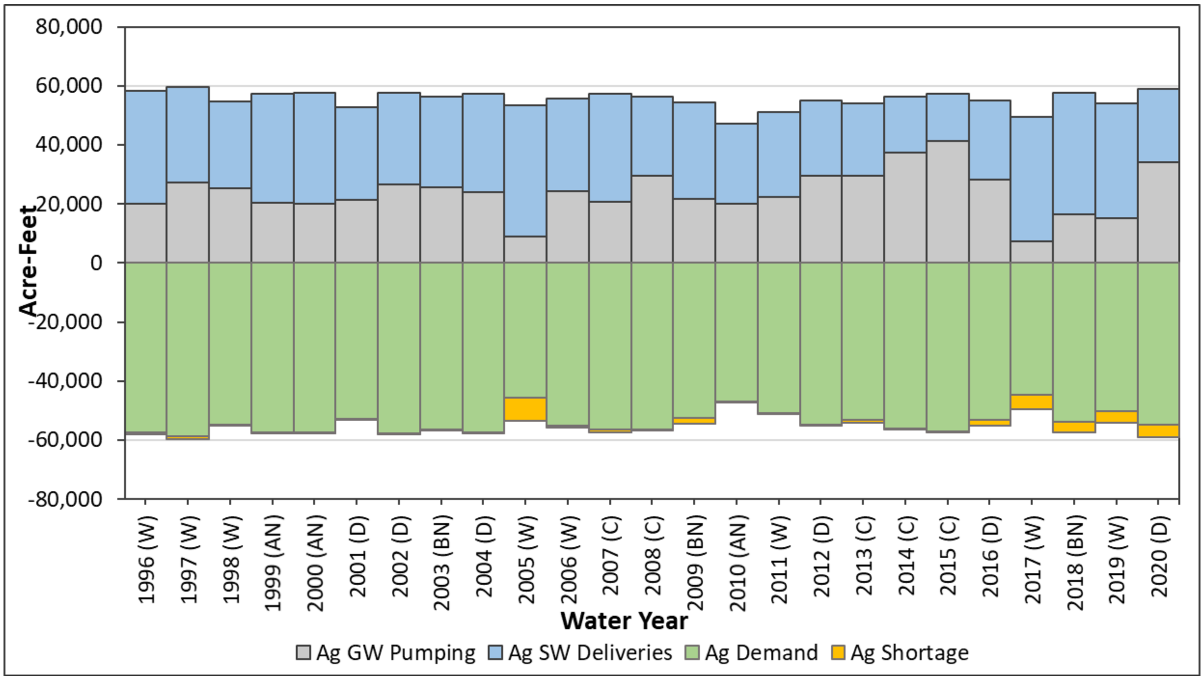


Figure 6: Woodbridge Irrigation District GSA Urban Demand

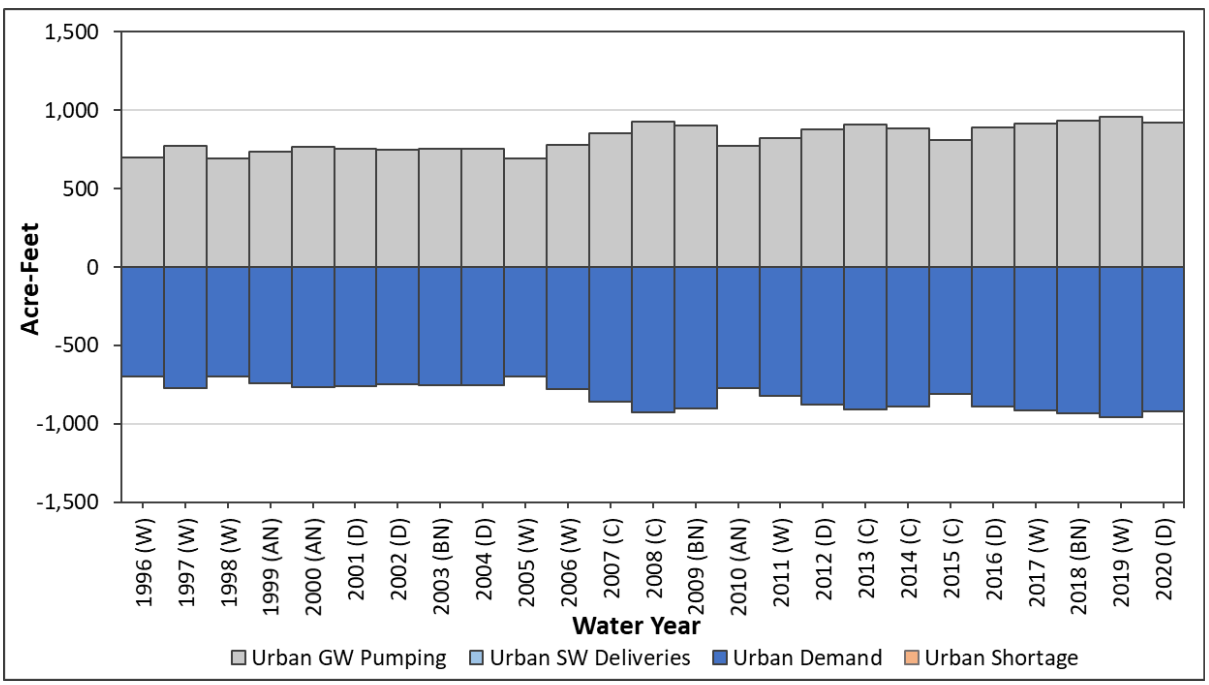


Figure 7: City of Lodi GSA Agricultural Demand

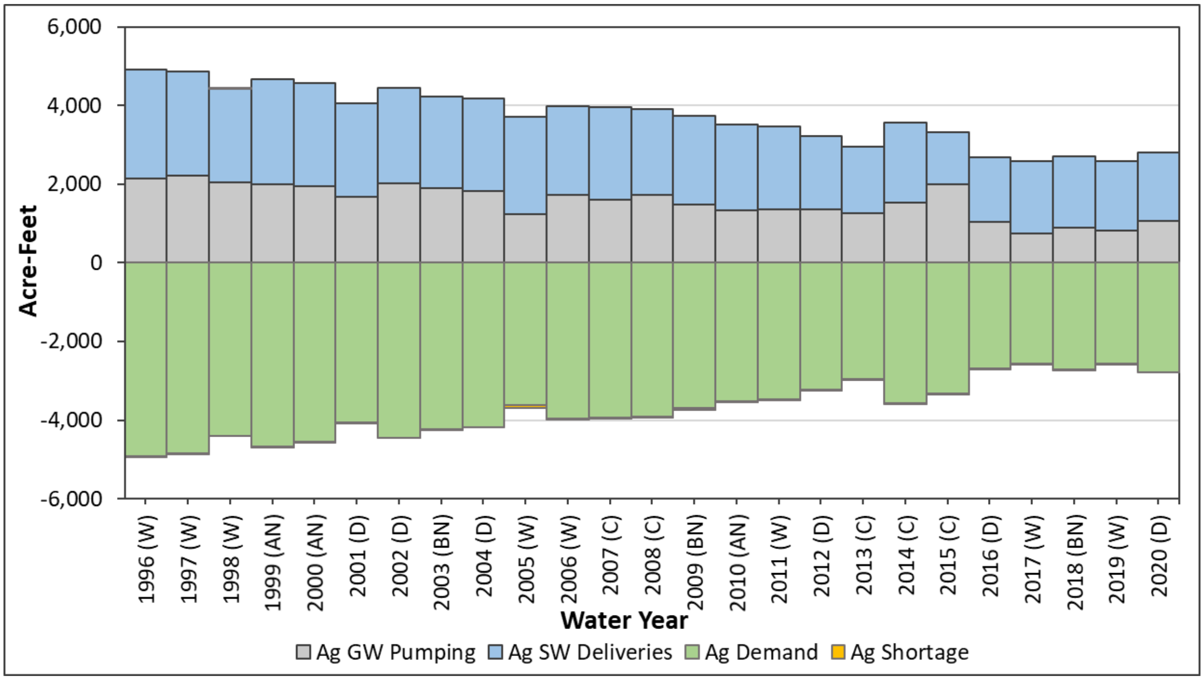


Figure 8: Cit of Lodi GSA Urban Demand

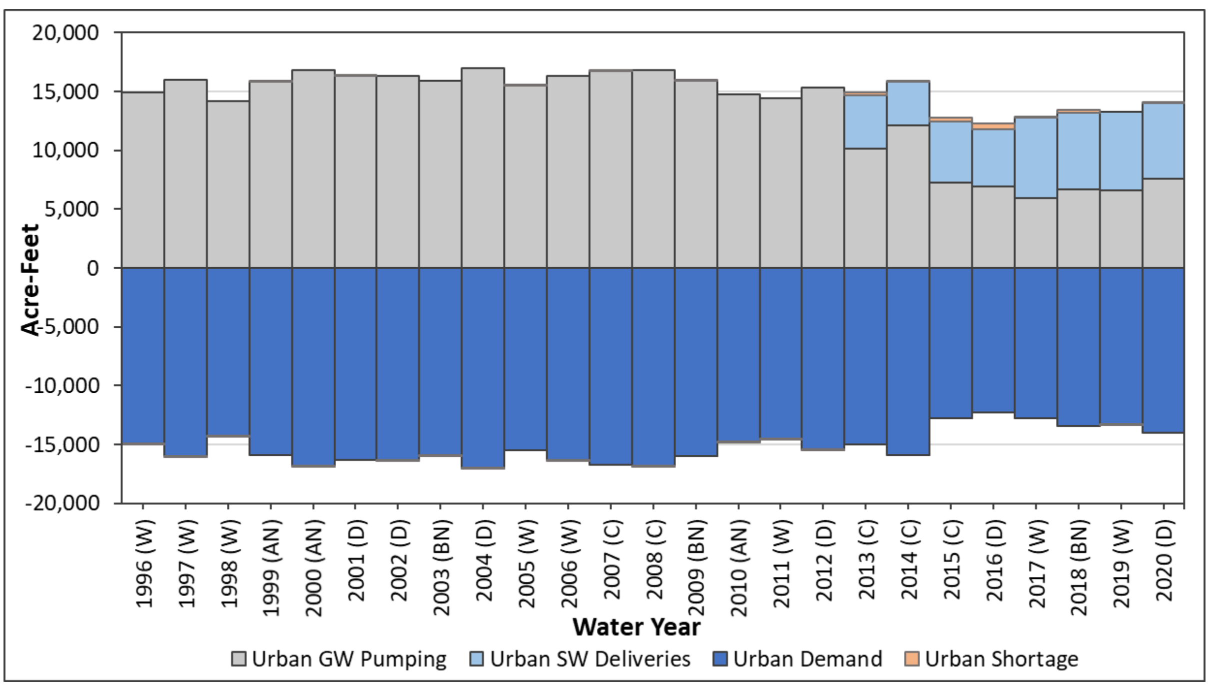


Figure 9: North San Joaquin Water Conservation District GSA Agricultural Demand

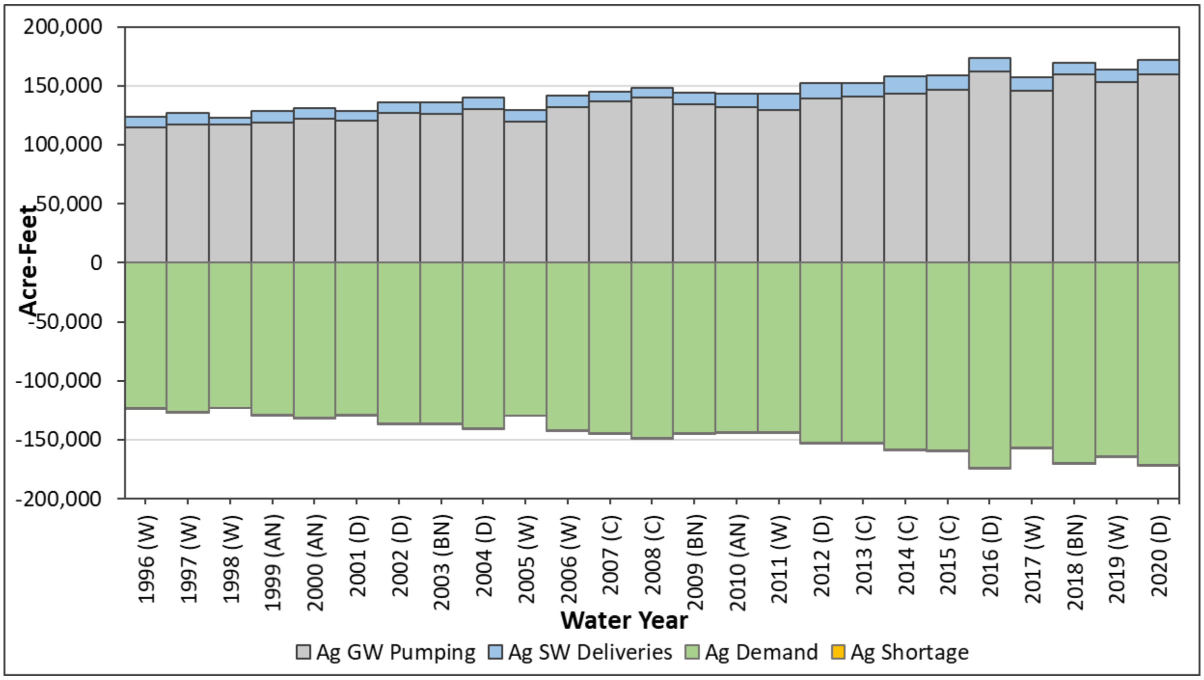


Figure 10: North San Joaquin Water Conservation District GSA Urban Demand

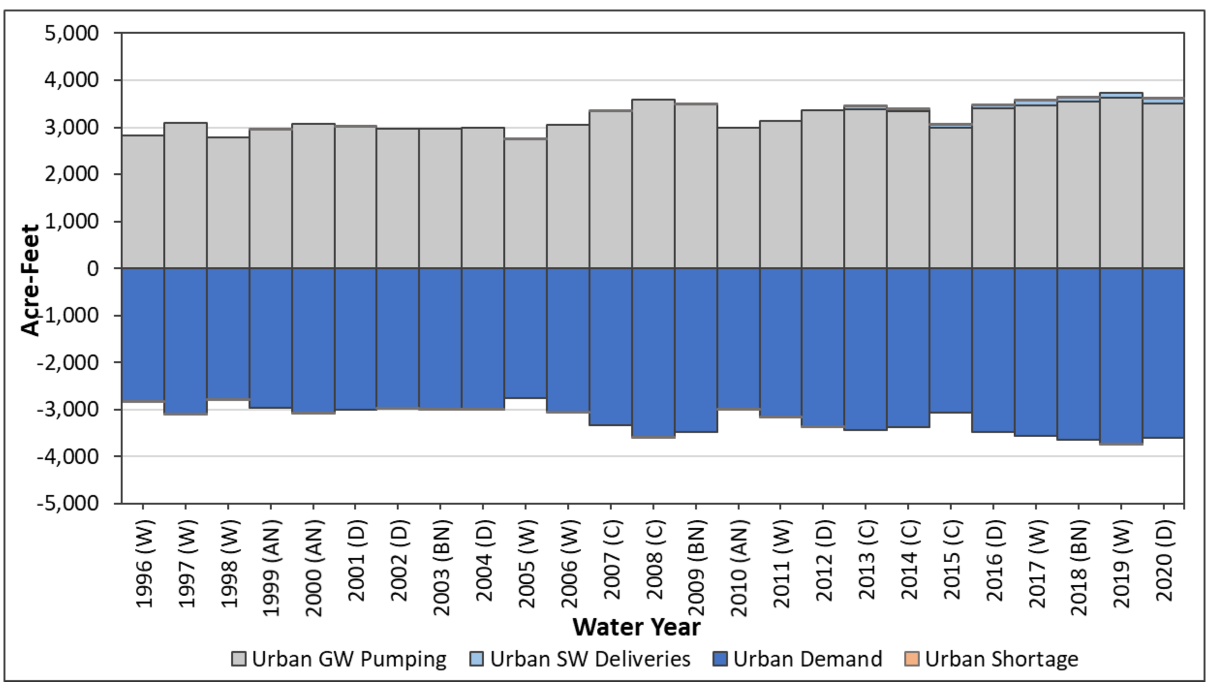


Figure 11: Lockeford Community Services District GSA Urban Demand

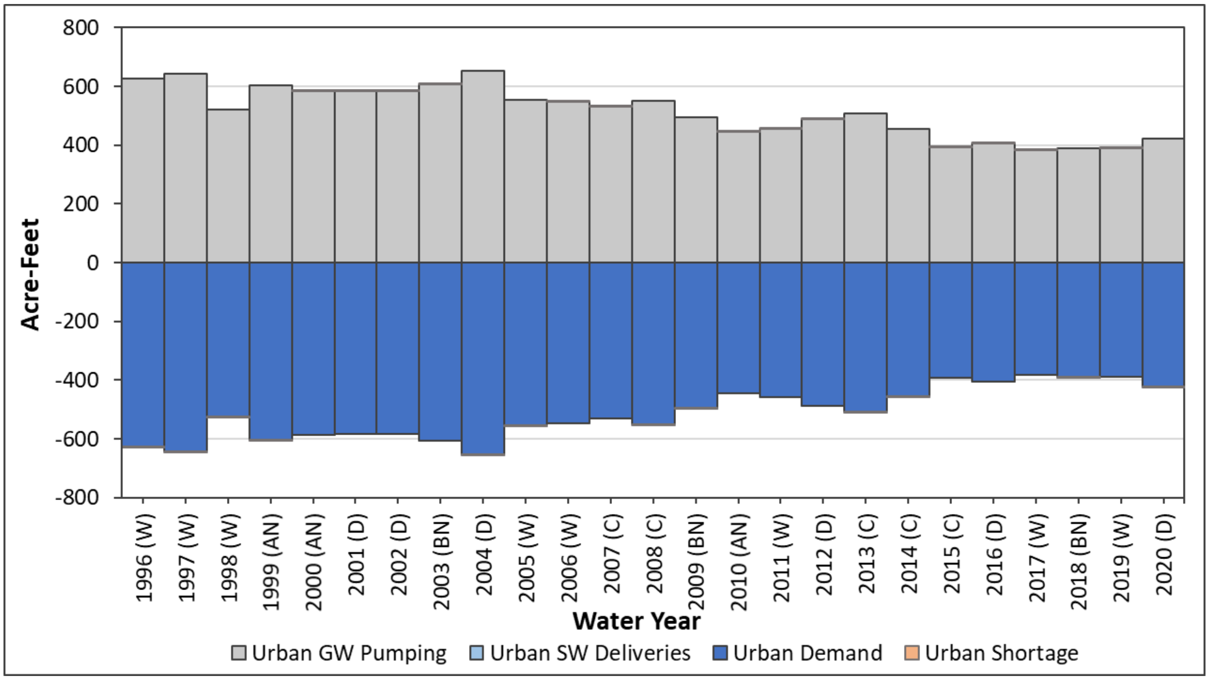


Figure 12: City of Stockton GSA Agricultural Demand

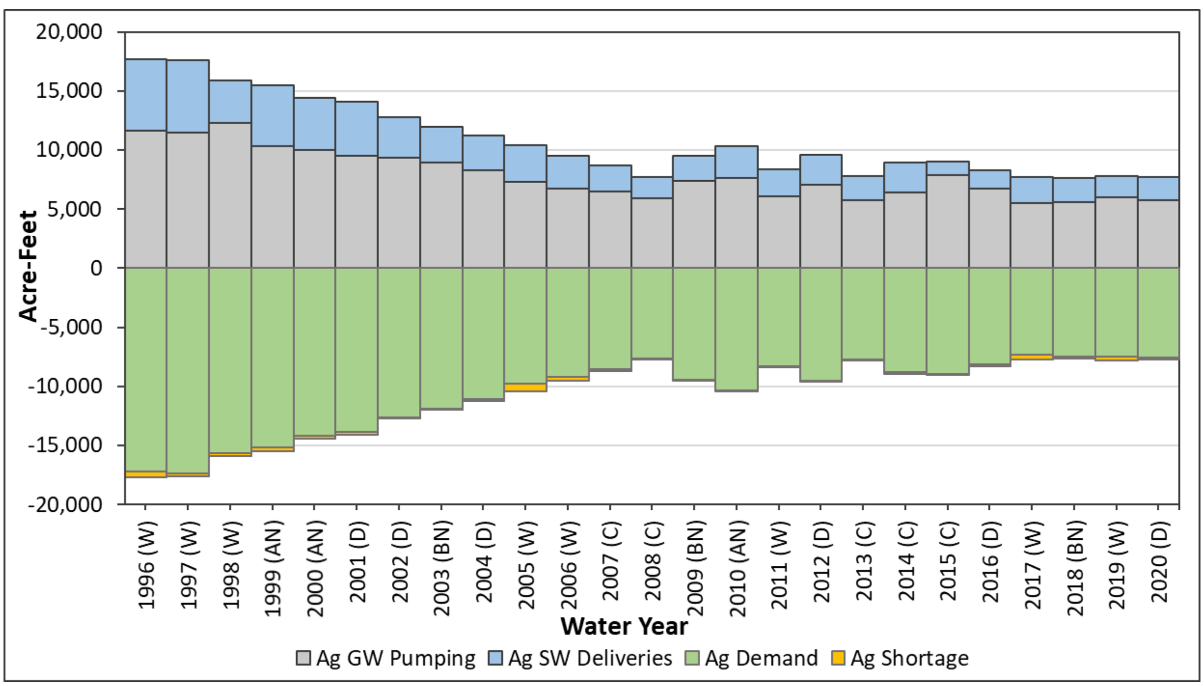


Figure 13: City of Stockton GSA Urban Demand

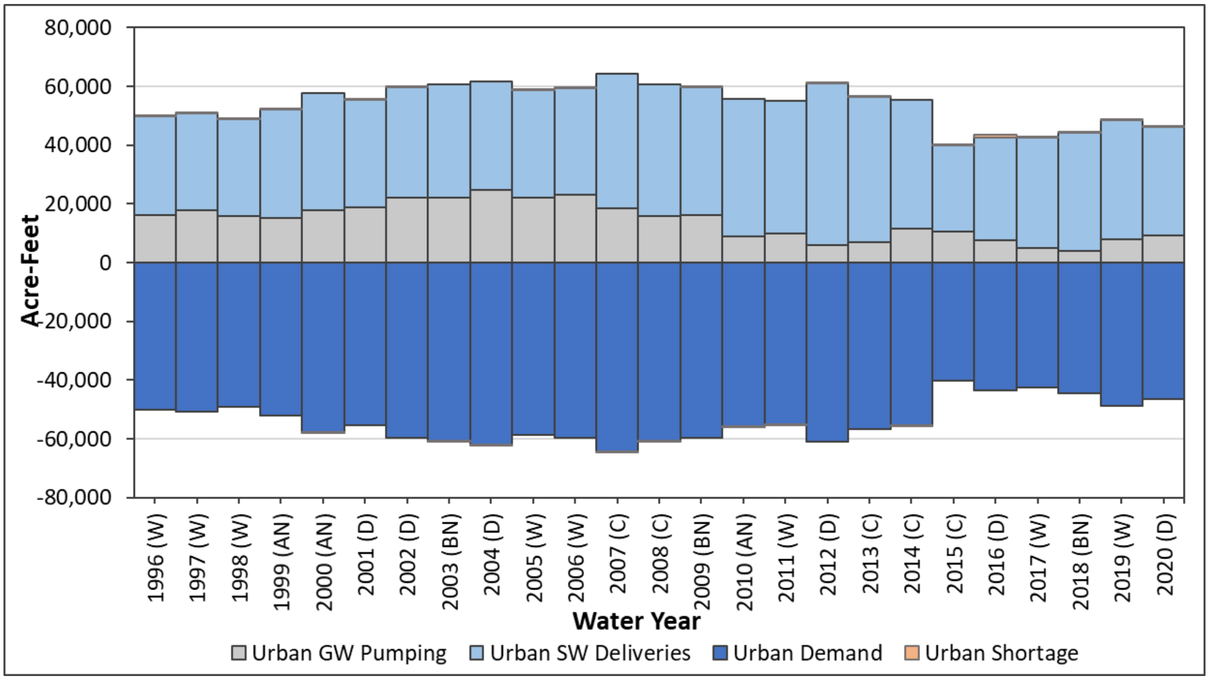


Figure 14: San Joaquin County #2 GSA Agricultural Demand

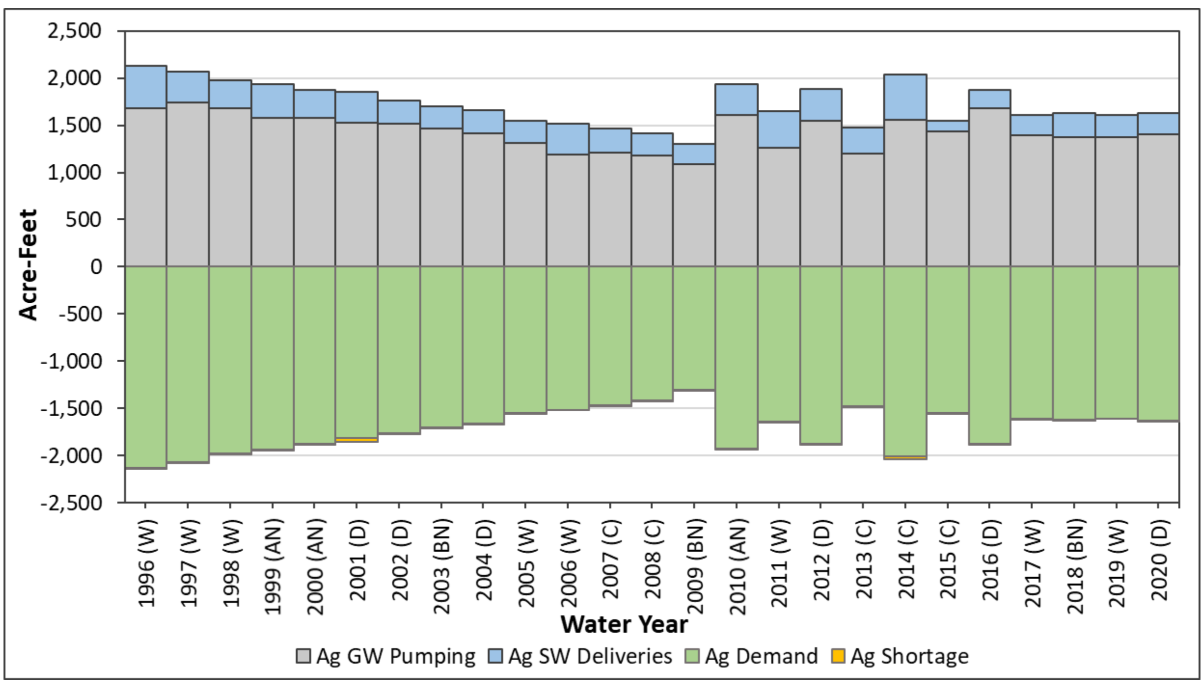


Figure 15: San Joaquin County #2 GSA Urban Demand

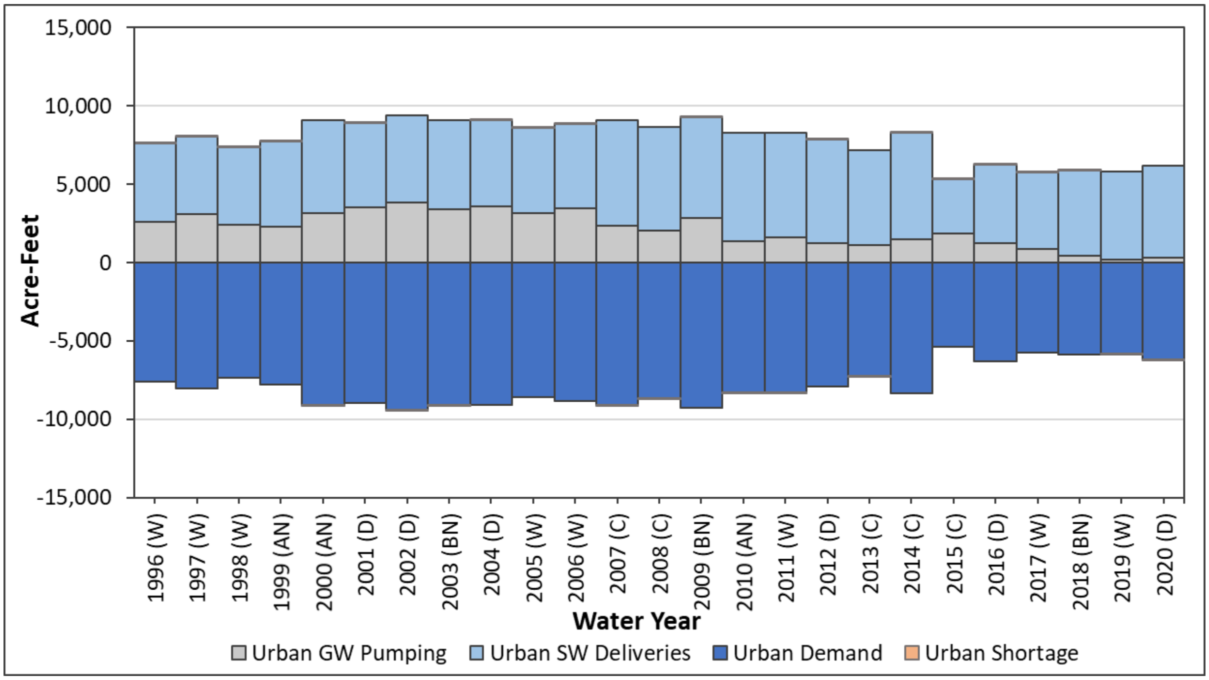


Figure 16: Stockton East Water District GSA Agricultural Demand

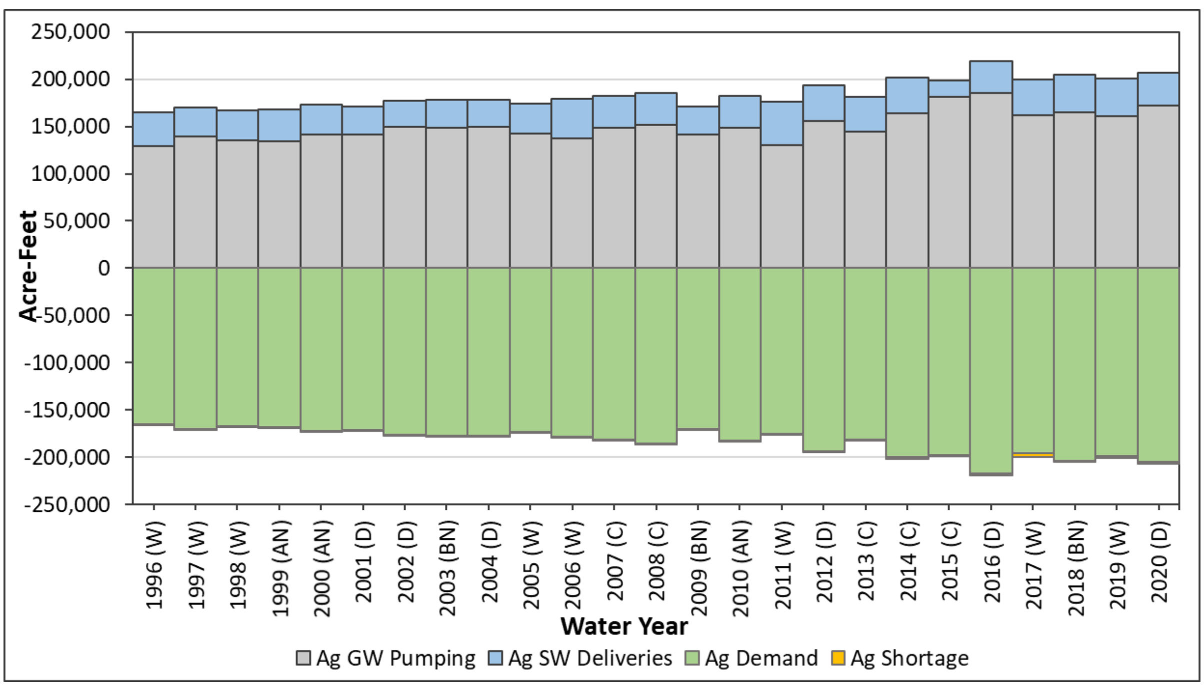


Figure 17: Stockton East Water District GSA Urban Demand

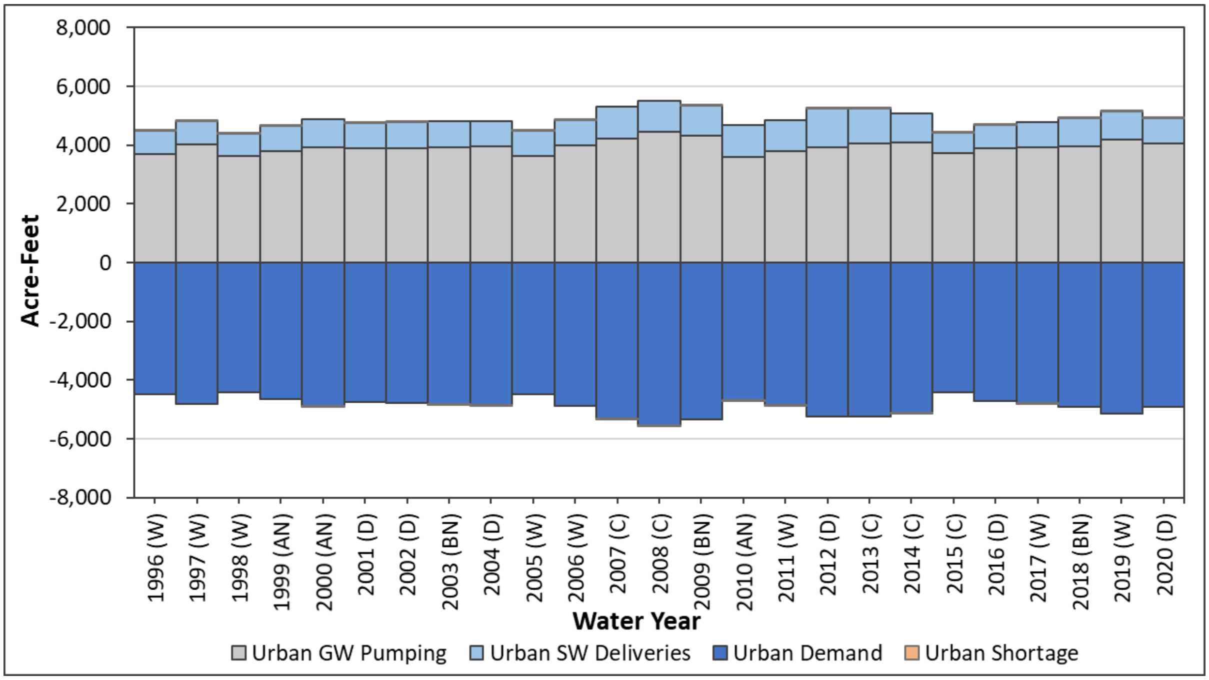


Figure 18: Linden County Water District GSA Urban Demand

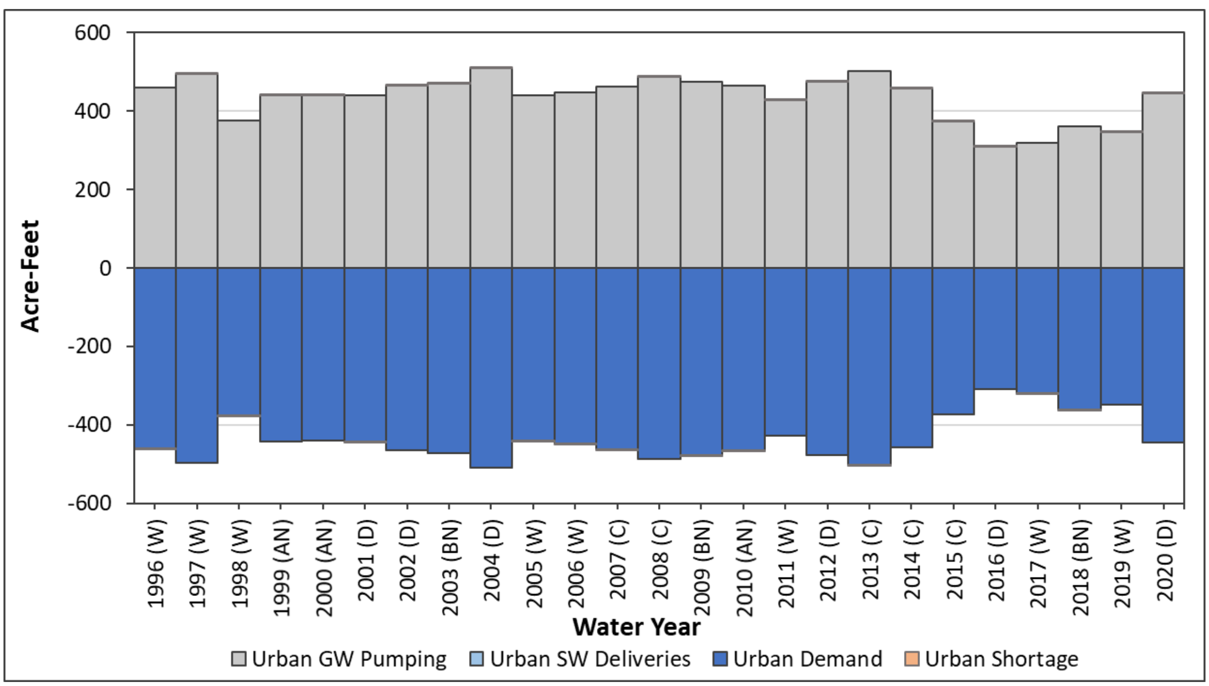


Figure 19: Central San Joaquin Water Conservation District GSA Agricultural Demand

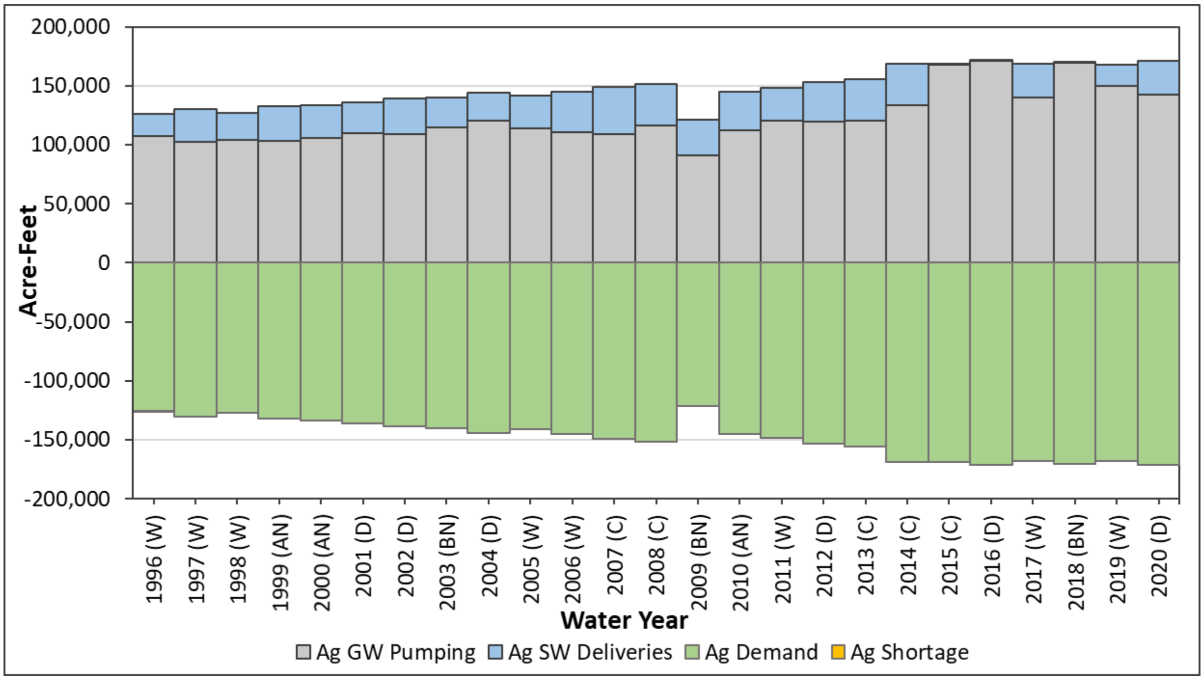


Figure 20: Central San Joaquin Water Conservation District GSA Urban Demand

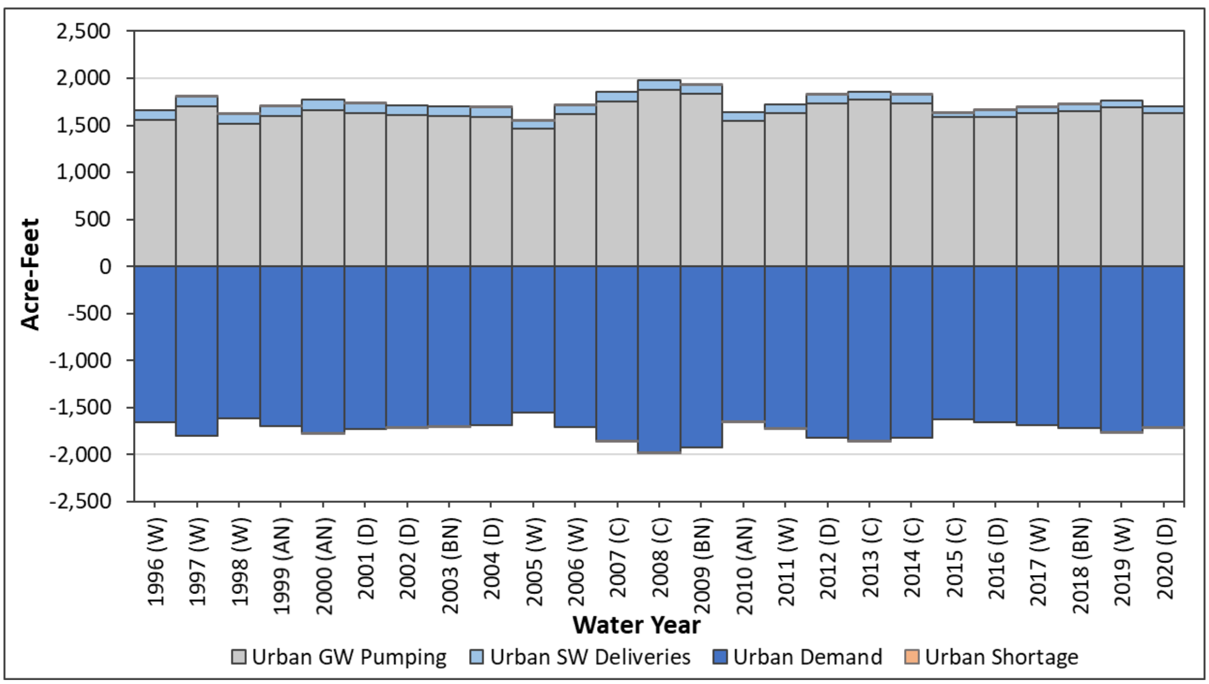


Figure 21: South Delta Water Agency GSA Agricultural Demand

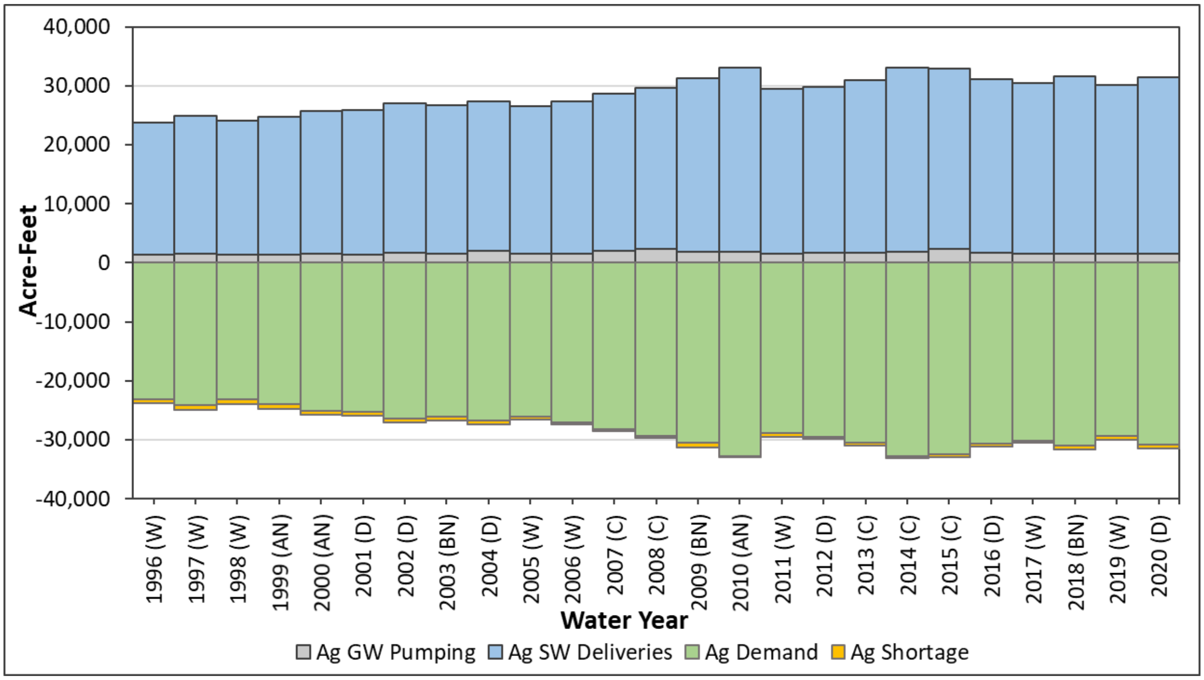


Figure 22: South Delta Water Agency GSA Urban Demand

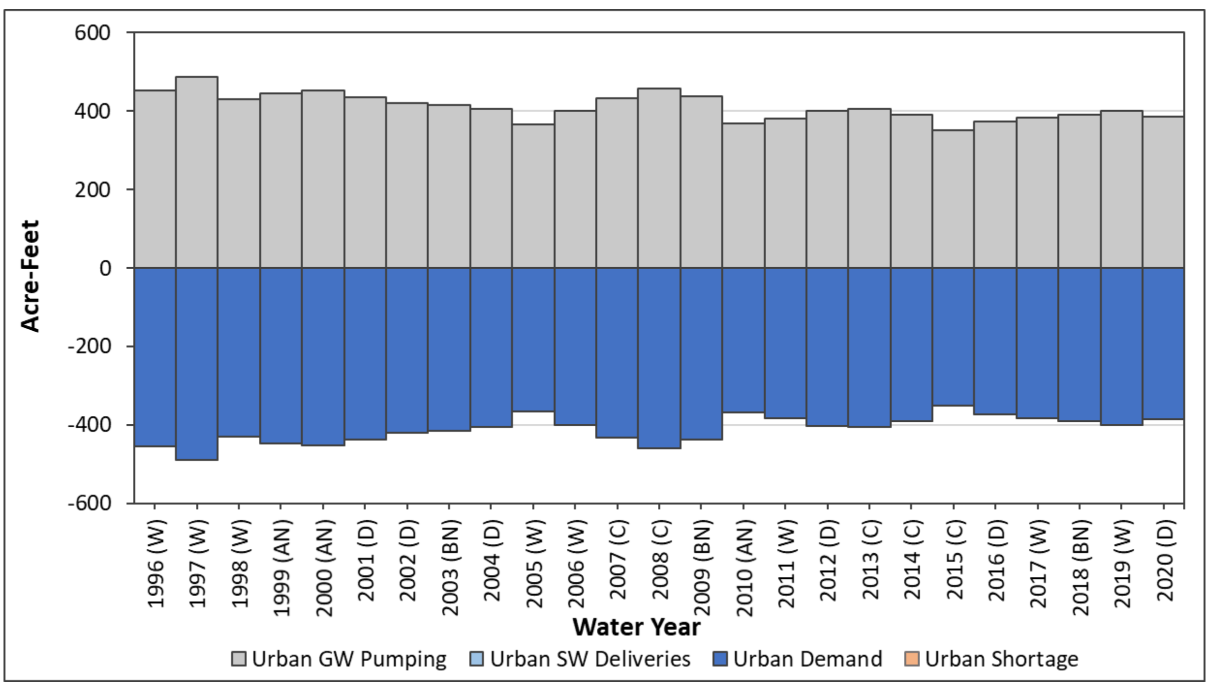


Figure 23: City of Manteca GSA Agricultural Demand

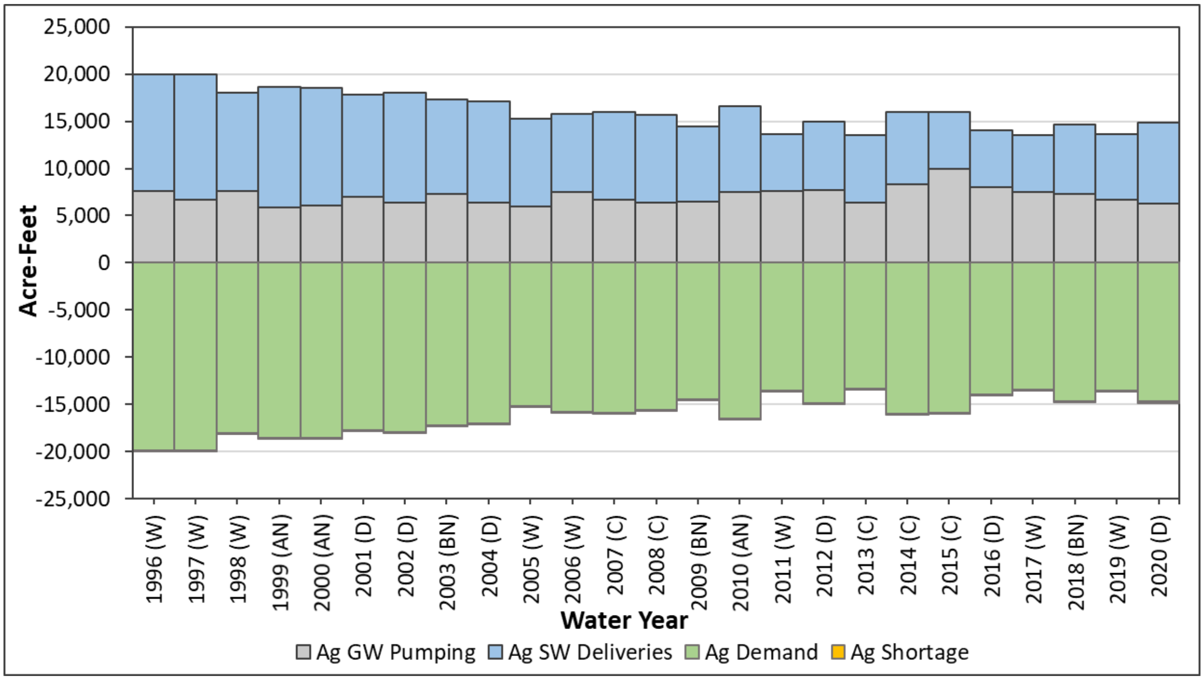


Figure 24: City of Manteca GSA Urban Demand

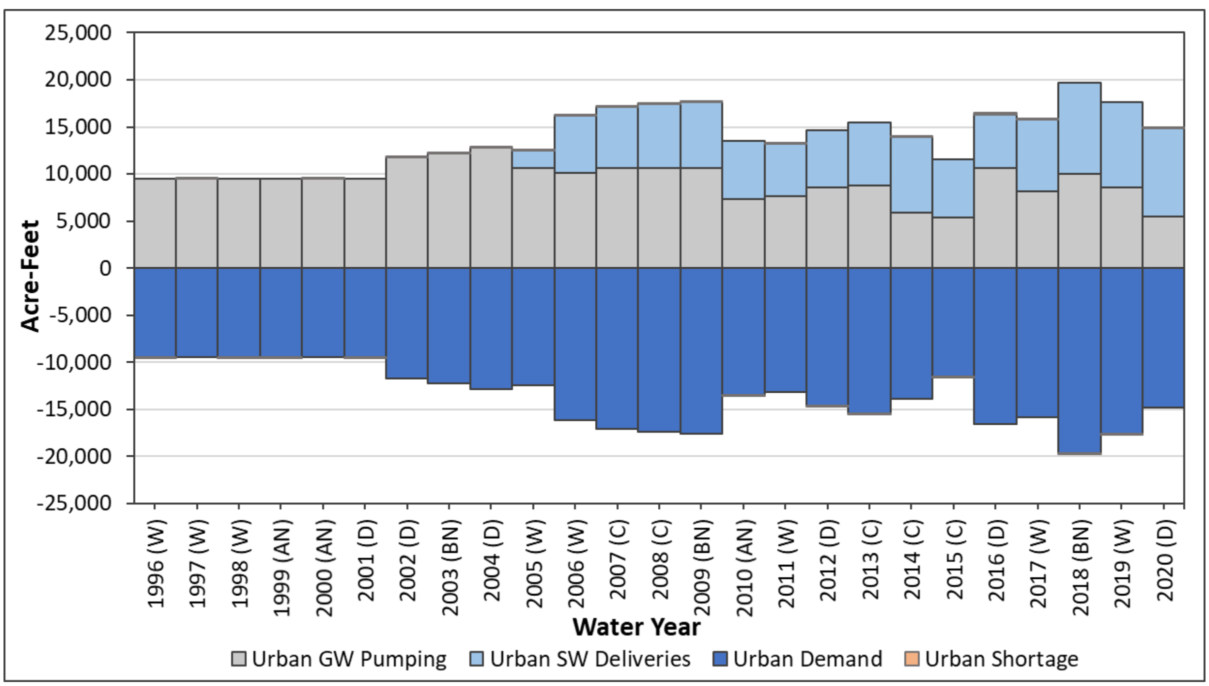


Figure 25: South San Joaquin Irrigation District GSA Agricultural Demand

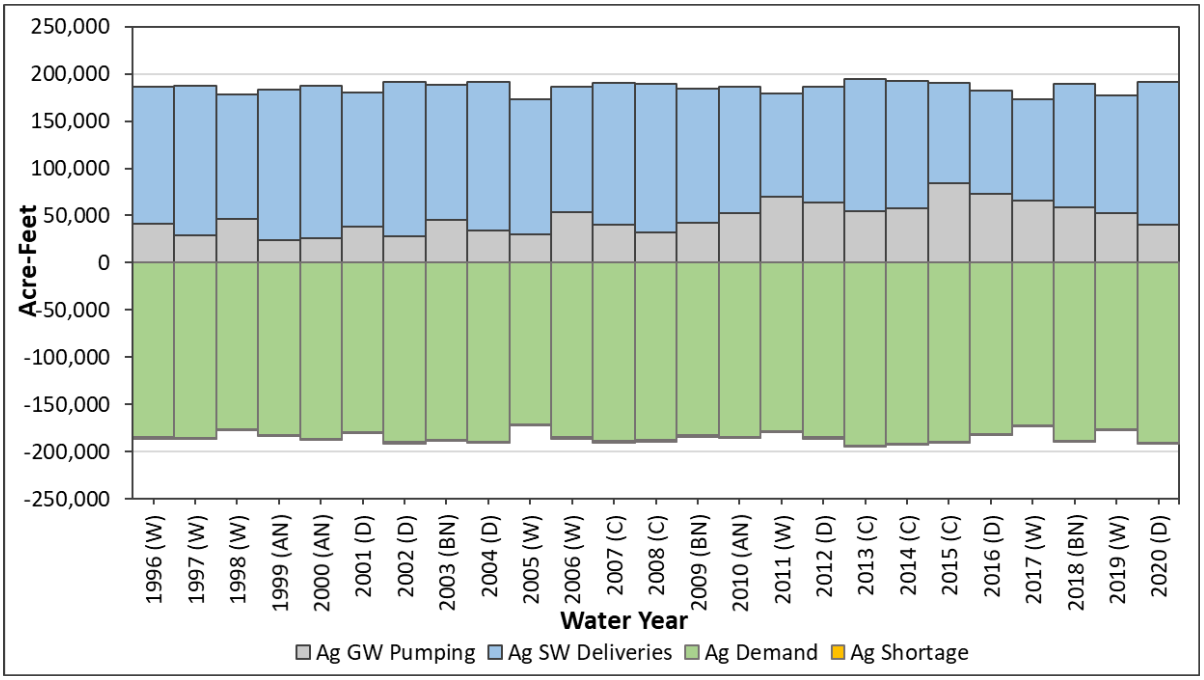


Figure 26: South San Joaquin Irrigation District GSA Urban Demand

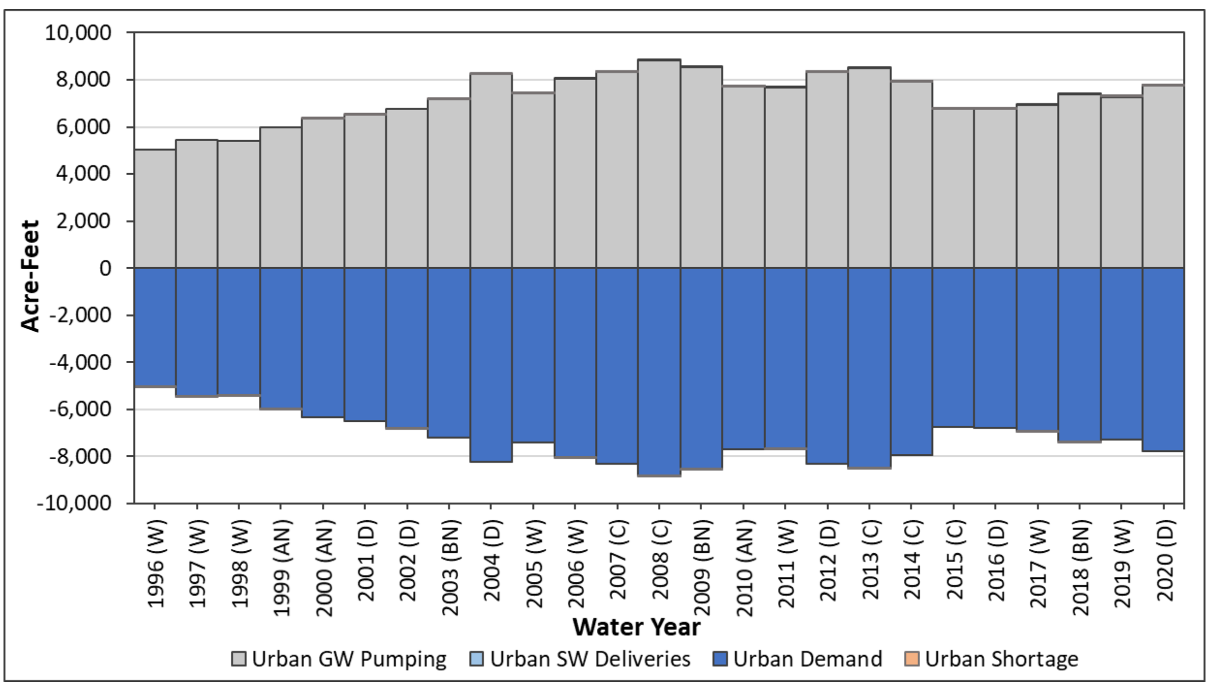


Figure 27: Oakdale Irrigation District GSA (North) Agricultural Demand

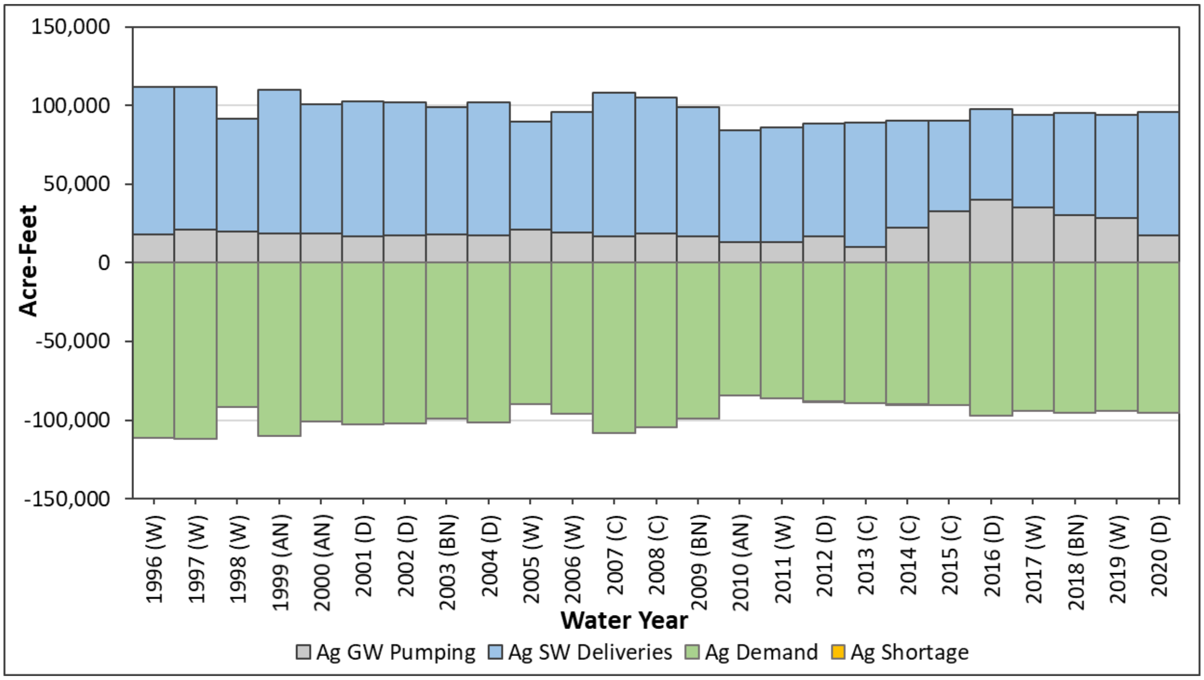


Figure 28: Oakdale Irrigation District GSA (North)Urban Demand

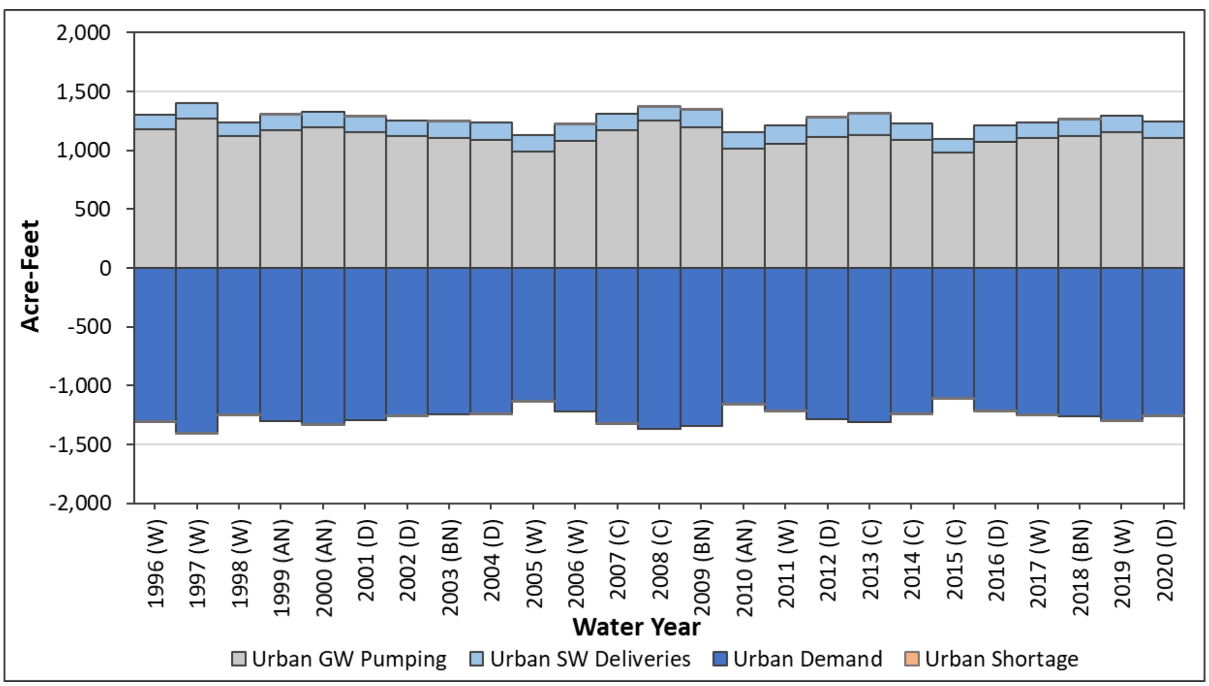


Figure 29: Oakdale Irrigation District GSA (South) Agricultural Demand

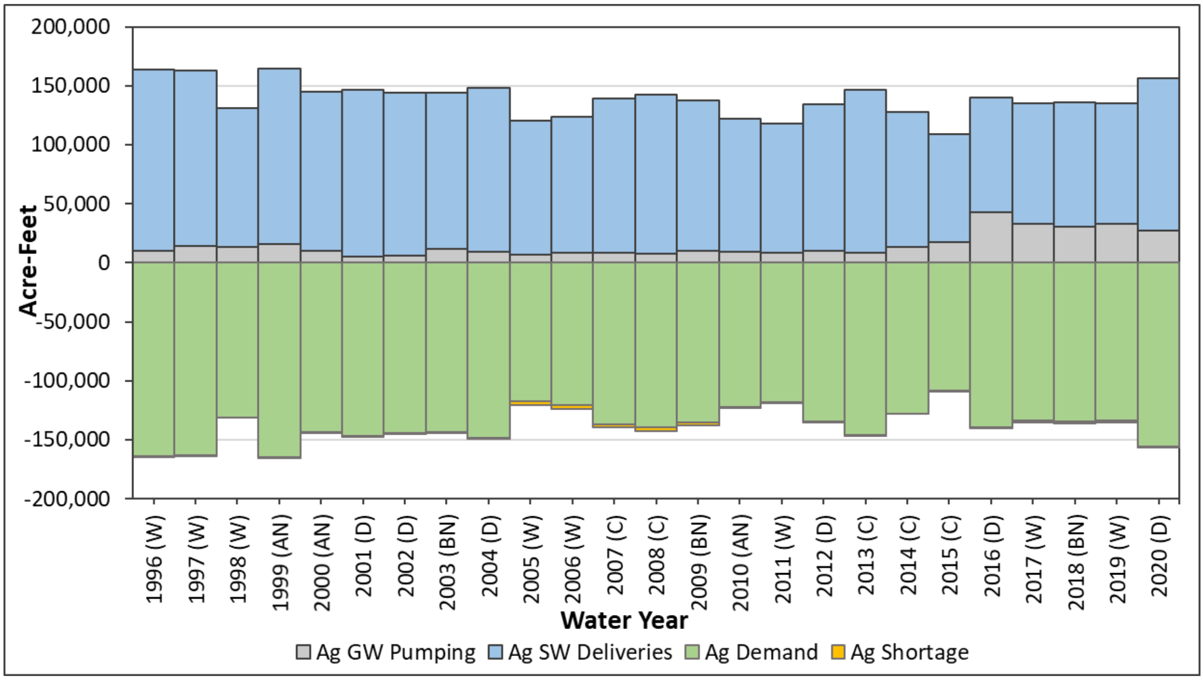


Figure 30: Oakdale Irrigation District GSA (South) Urban Demand

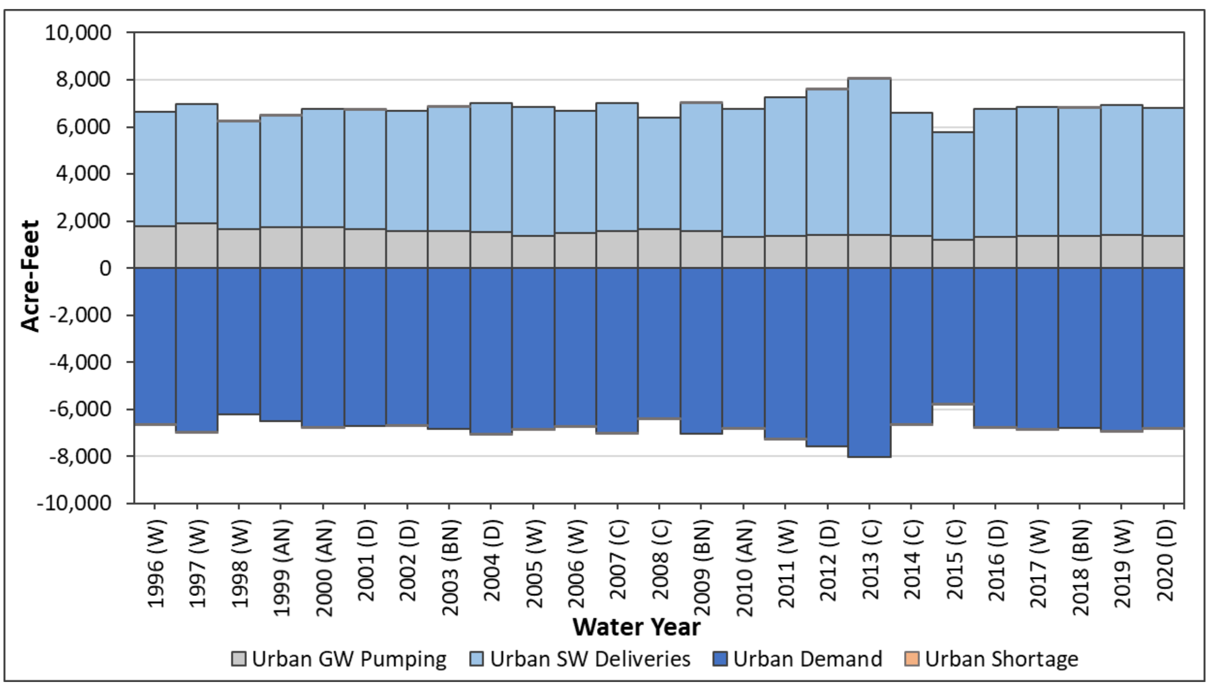


Figure 31: Eastside San Joaquin GSA Agricultural Demand

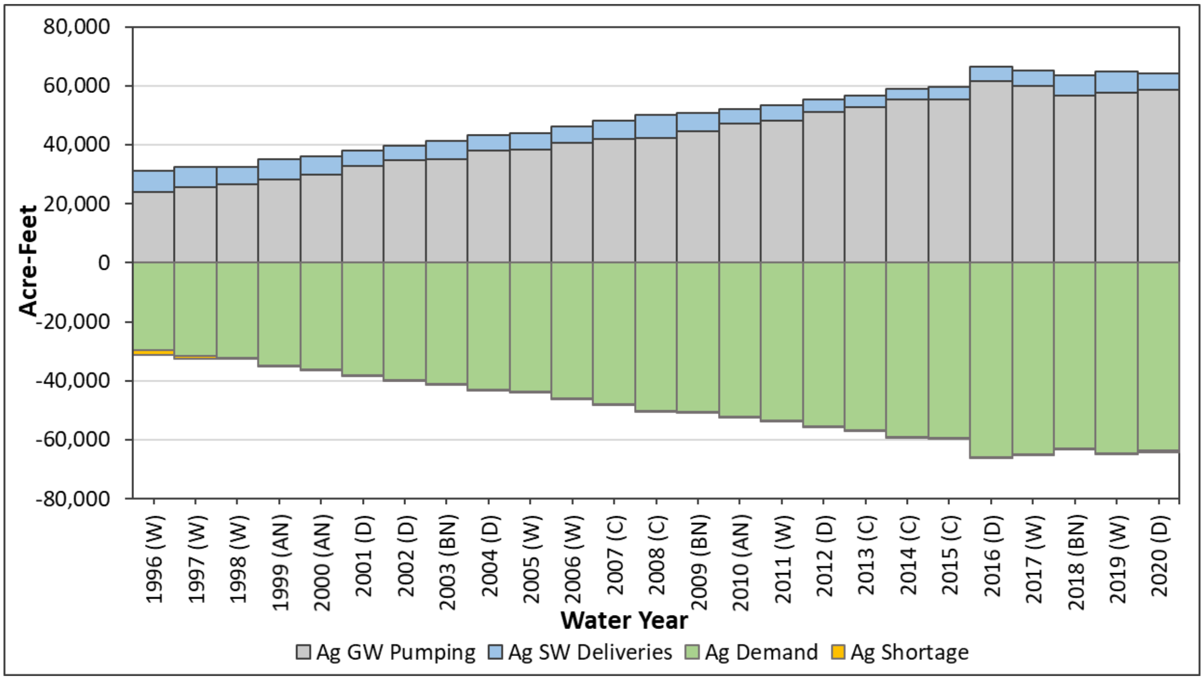
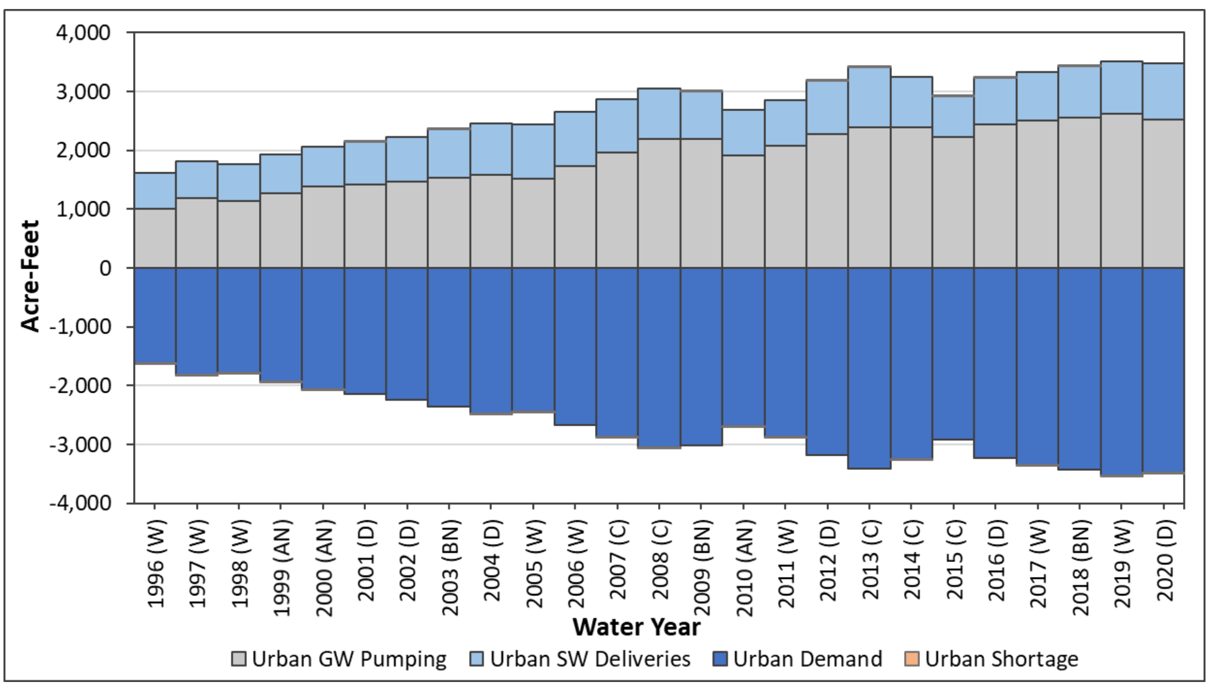


Figure 32: Eastside San Joaquin GSA Urban Demand



APPENDIX B: LAND AND WATER USE BUDGETS BY GSA FOR PROJECTED CONDITIONS BASELINE MODEL (PCBL VERSION 2.0)

FIGURES

Figure 1: San Joaquin County #1 GSA Projected Agricultural Demand

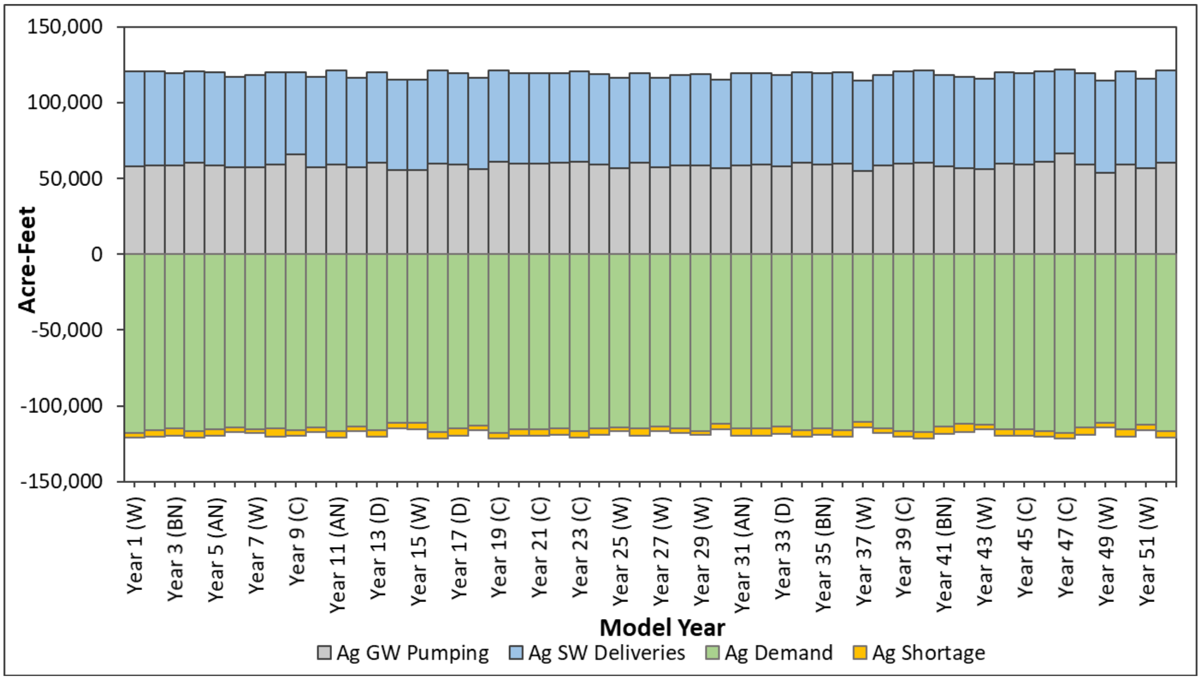


Figure 2: San Joaquin County #1 GSA Projected Urban Demand

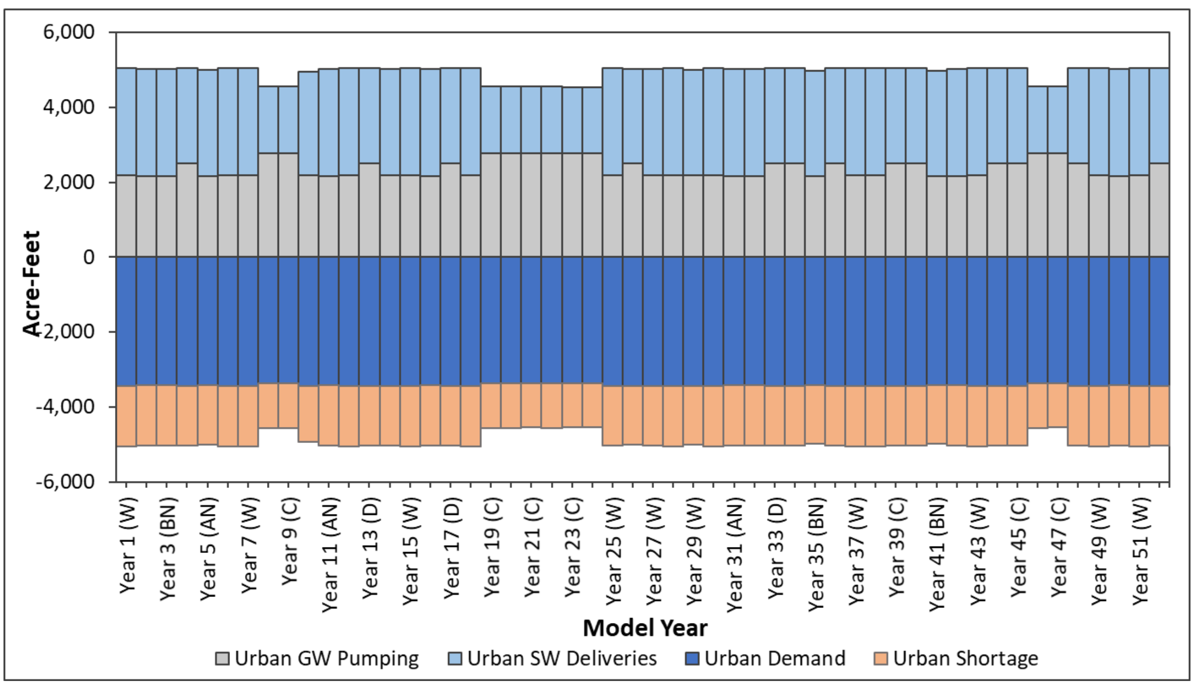


Figure 3: Central Delta Water Agency GSA Projected Agricultural Demand

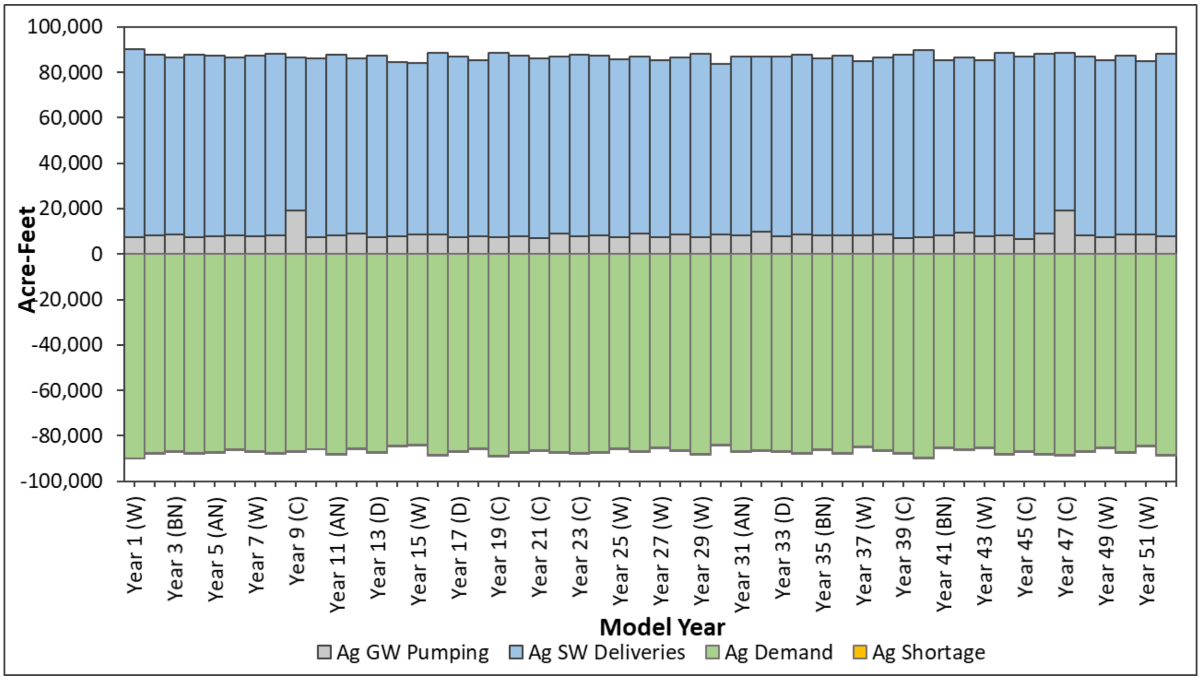


Figure 4: Central Delta Water Agency GSA Projected Urban Demand

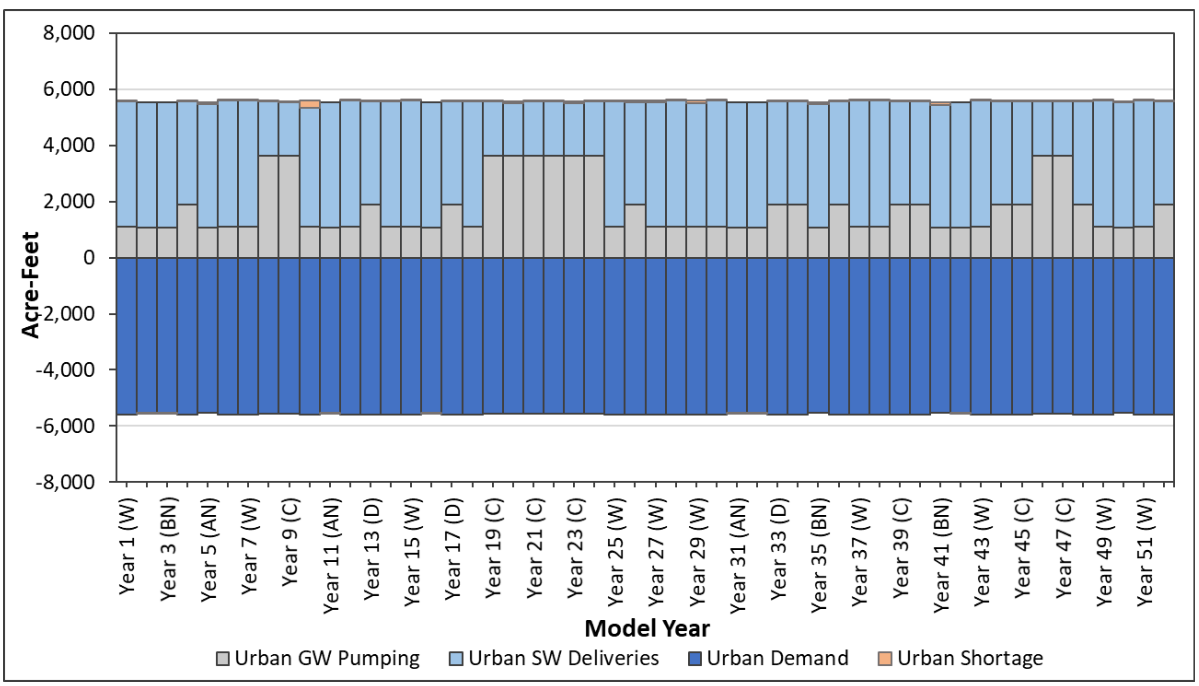


Figure 5: Woodbridge Irrigation District GSA Projected Agricultural Demand

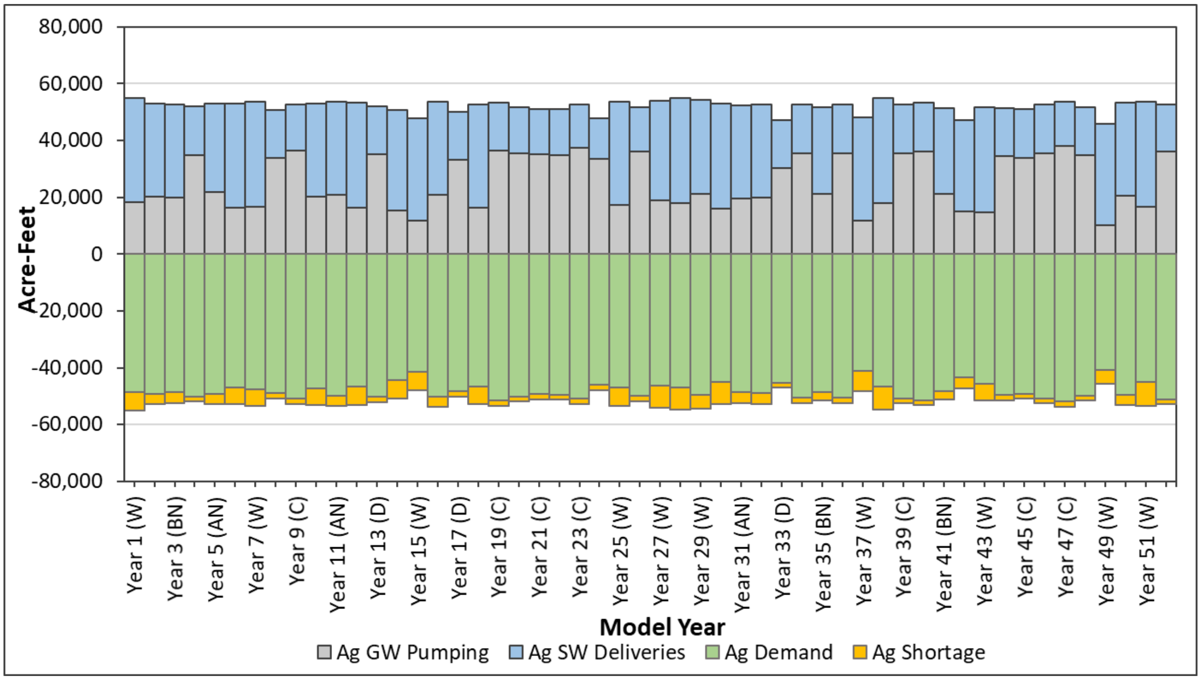


Figure 6: Woodbridge Irrigation District GSA Projected Urban Demand

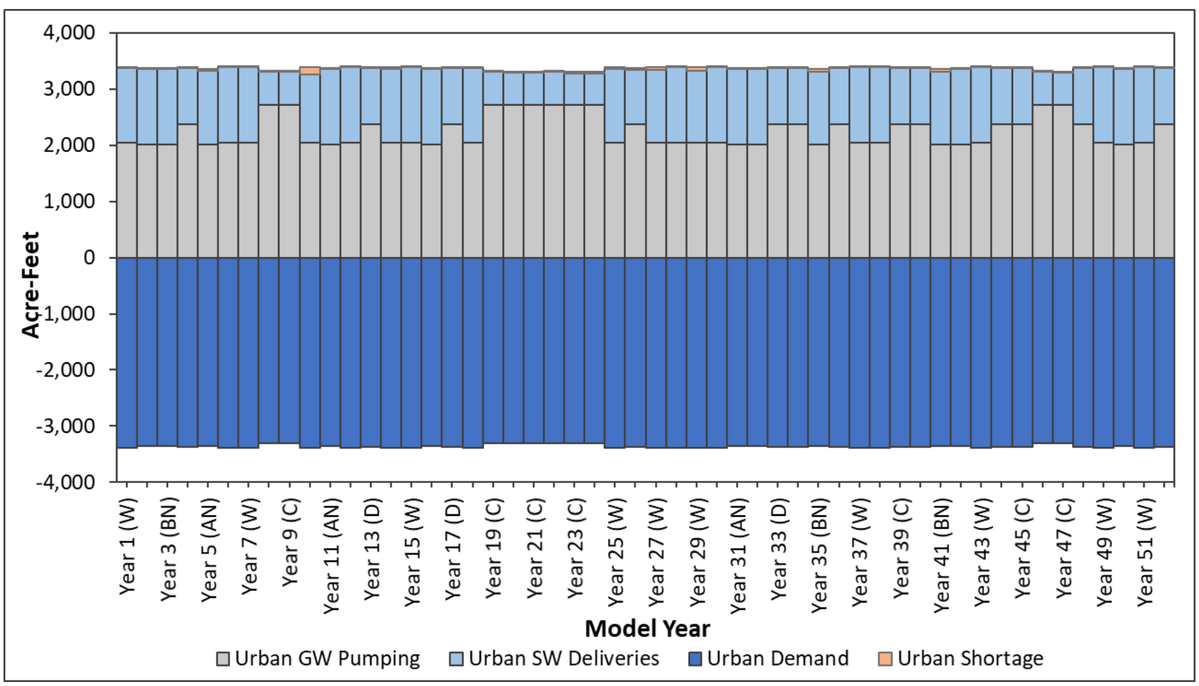


Figure 7: City of Lodi GSA Projected Agricultural Demand

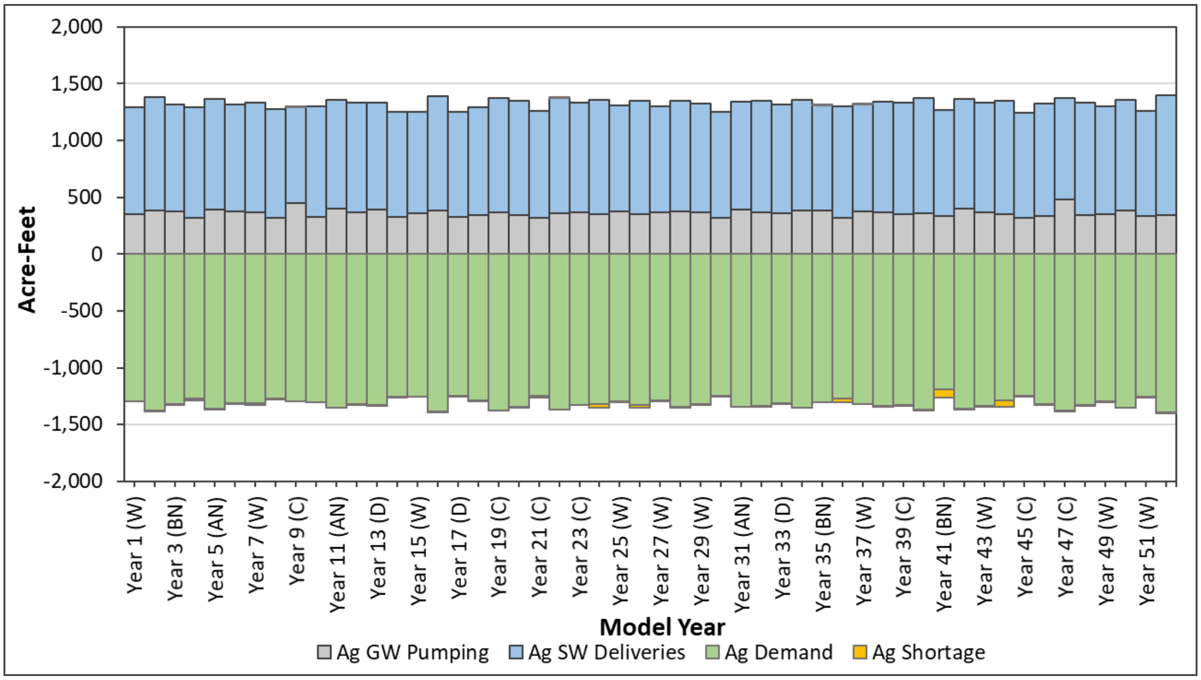


Figure 8: City of Lodi GSA Projected Urban Demand

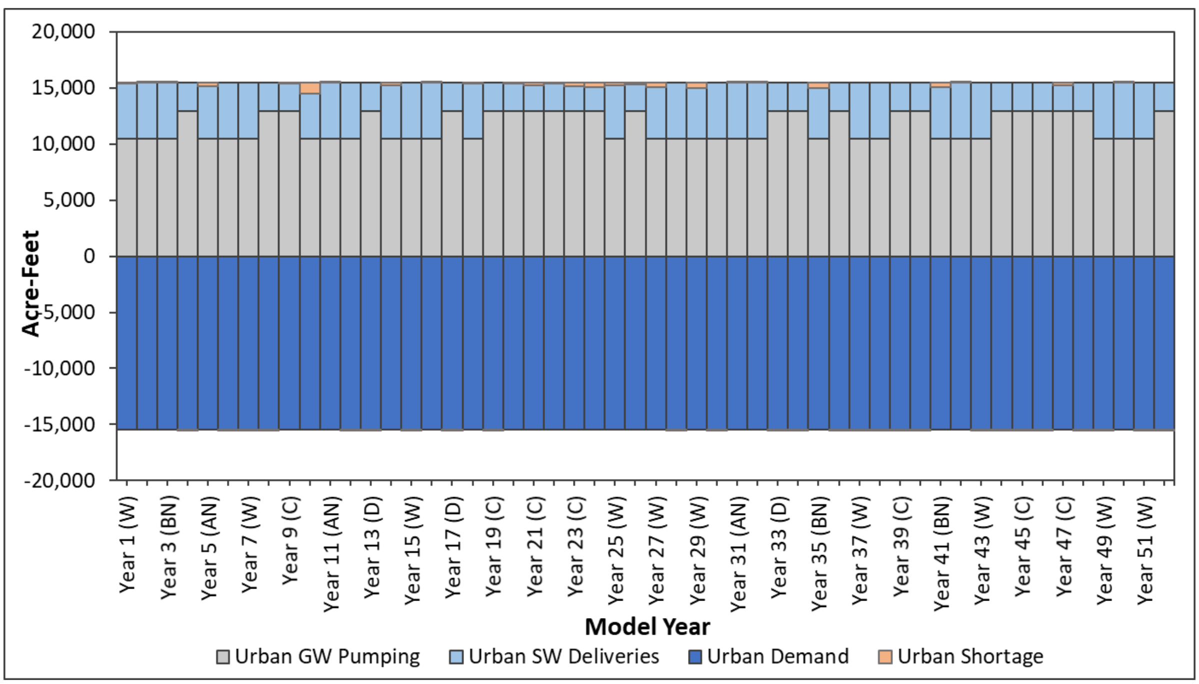


Figure 9: North San Joaquin Water Conservation District GSA Projected Agricultural Demand

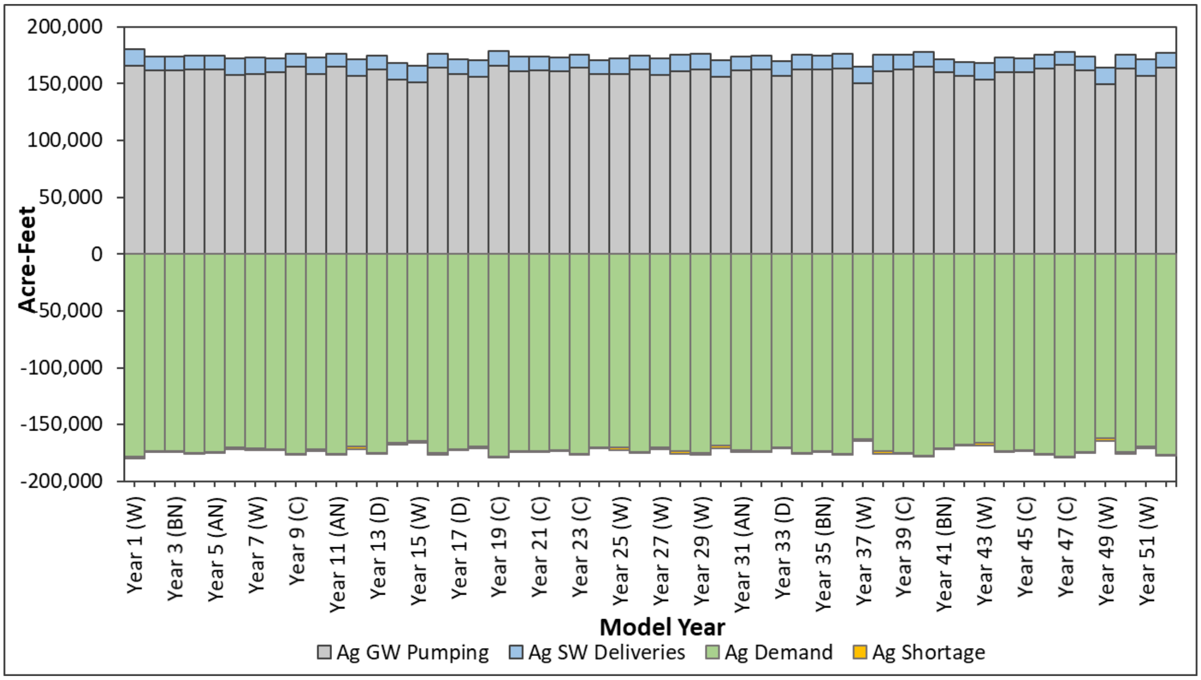


Figure 10: North San Joaquin Water Conservation District GSA Projected Urban Demand

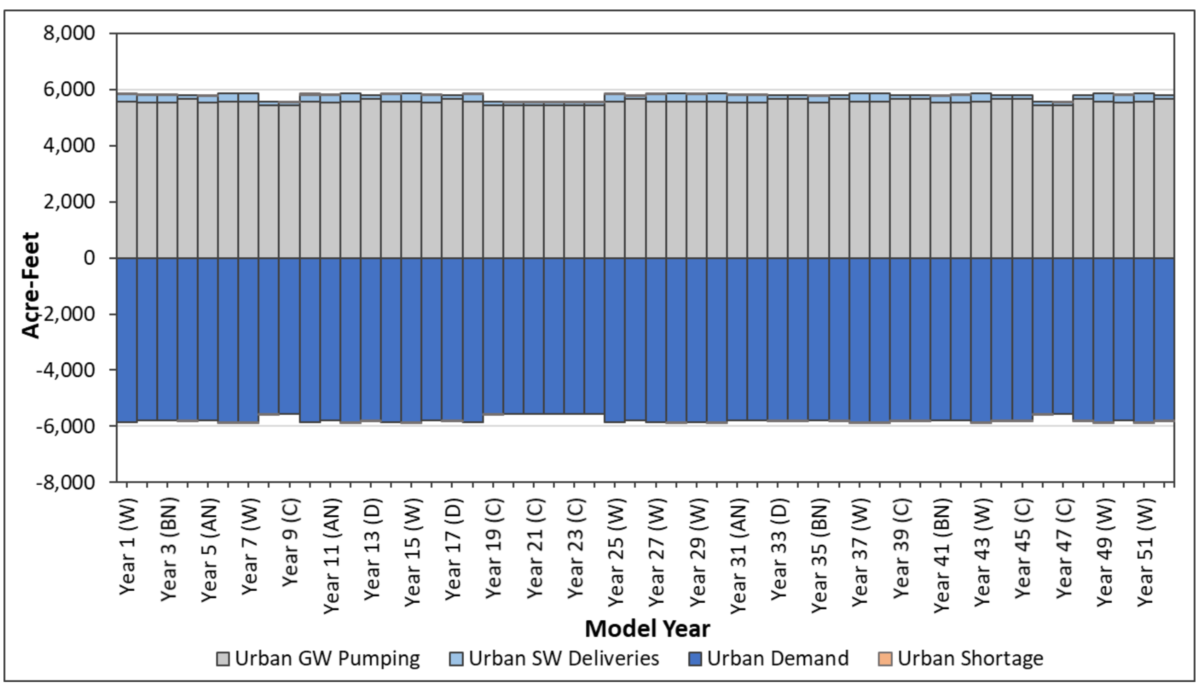


Figure 11: Lockeford Community Services District GSA Projected Urban Demand

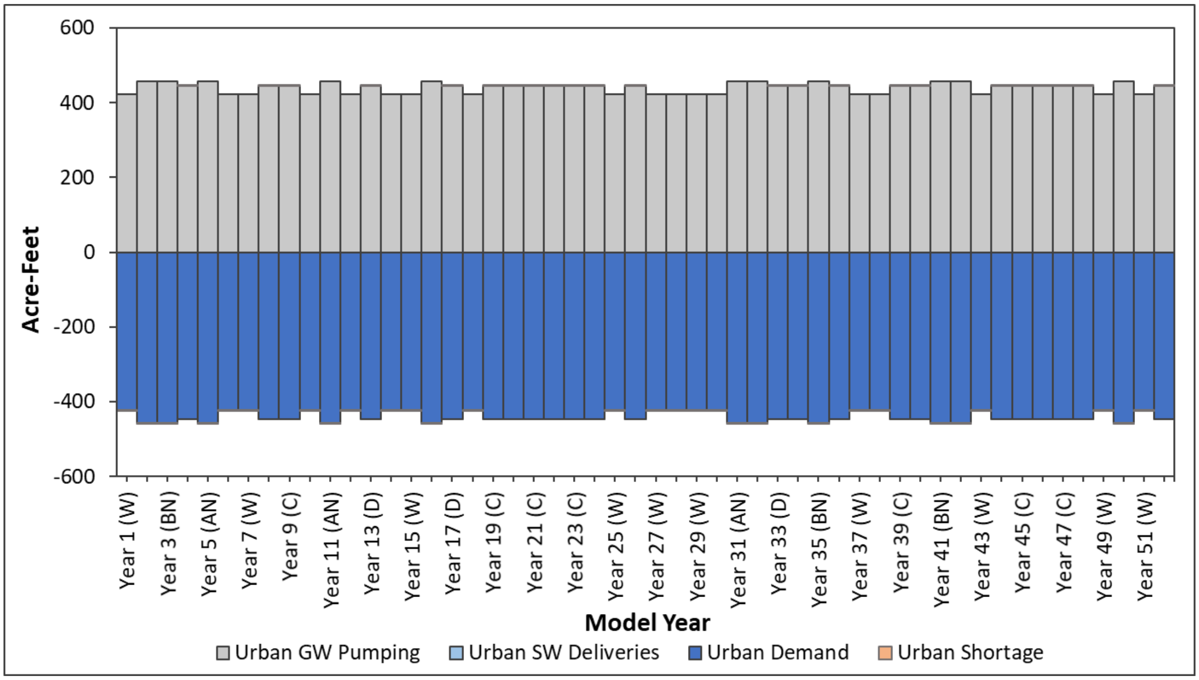


Figure 12: City of Stockton GSA Projected Urban Demand

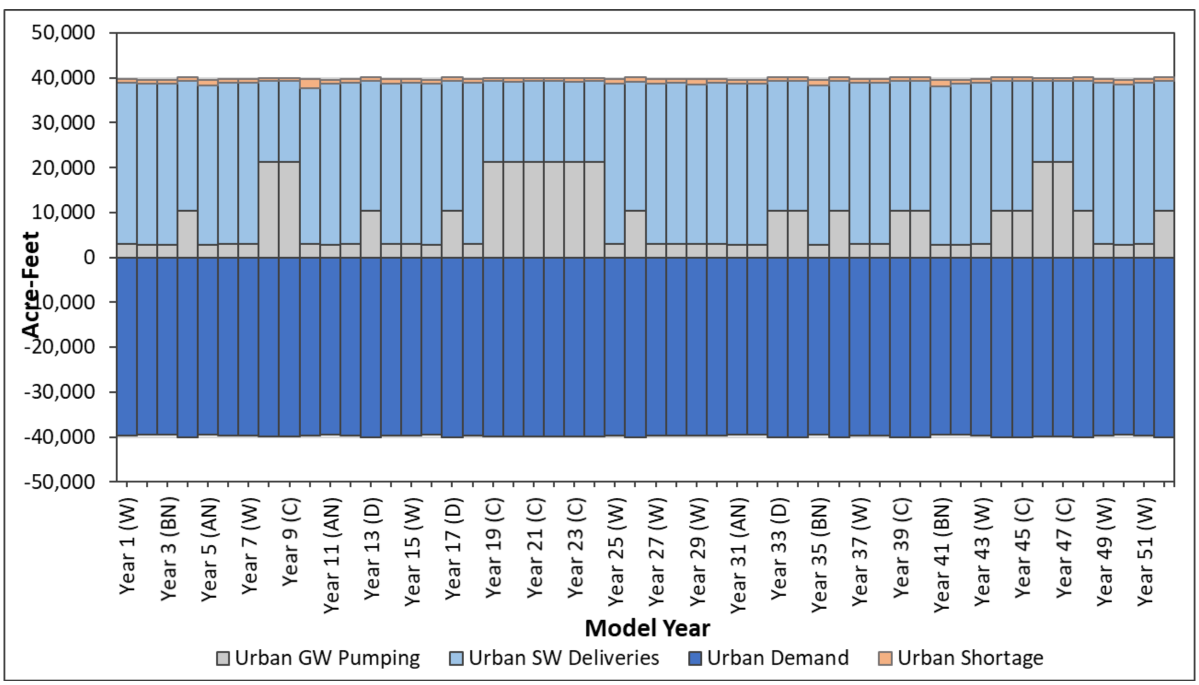


Figure 13: San Joaquin County #2 GSA Projected Urban Demand

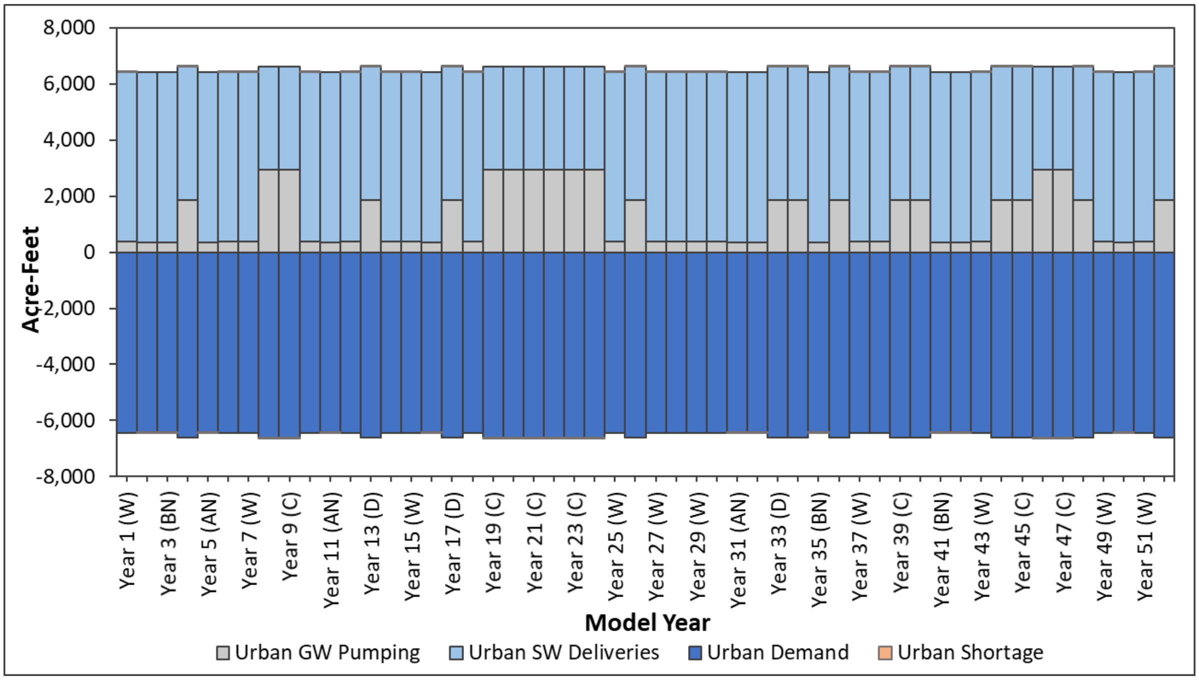


Figure 14: Stockton East Water District GSA Projected Agricultural Demand

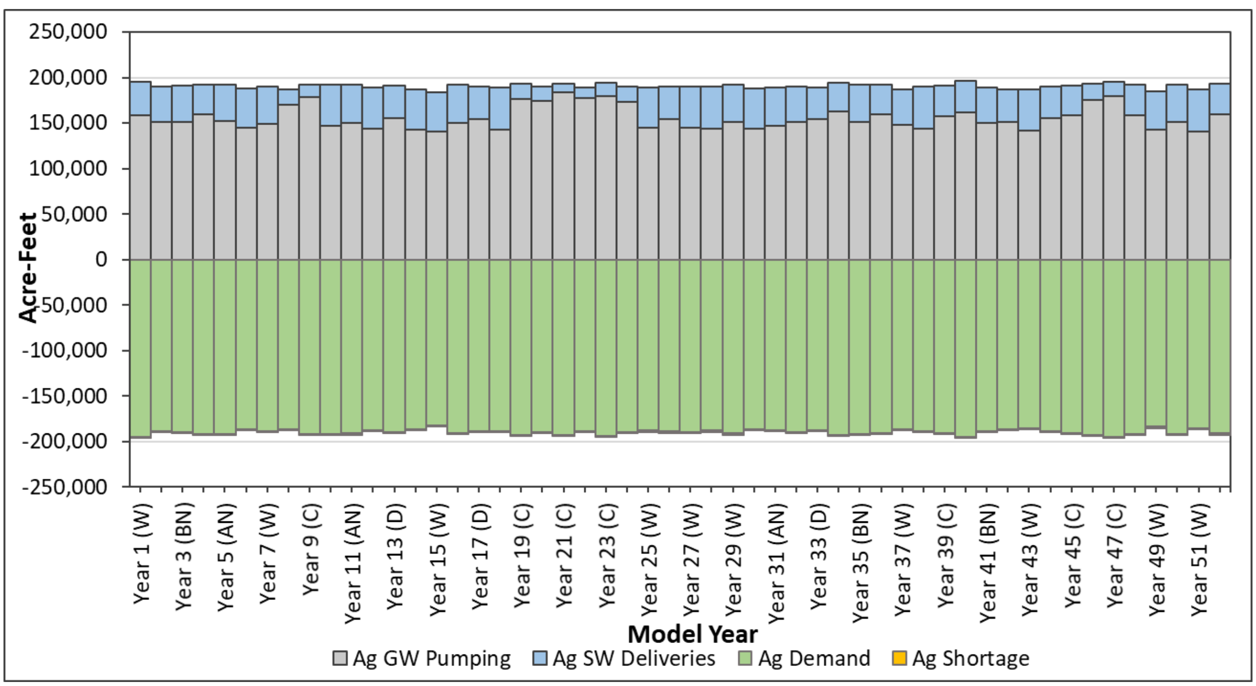


Figure 15: Stockton East Water District GSA Projected Urban Demand

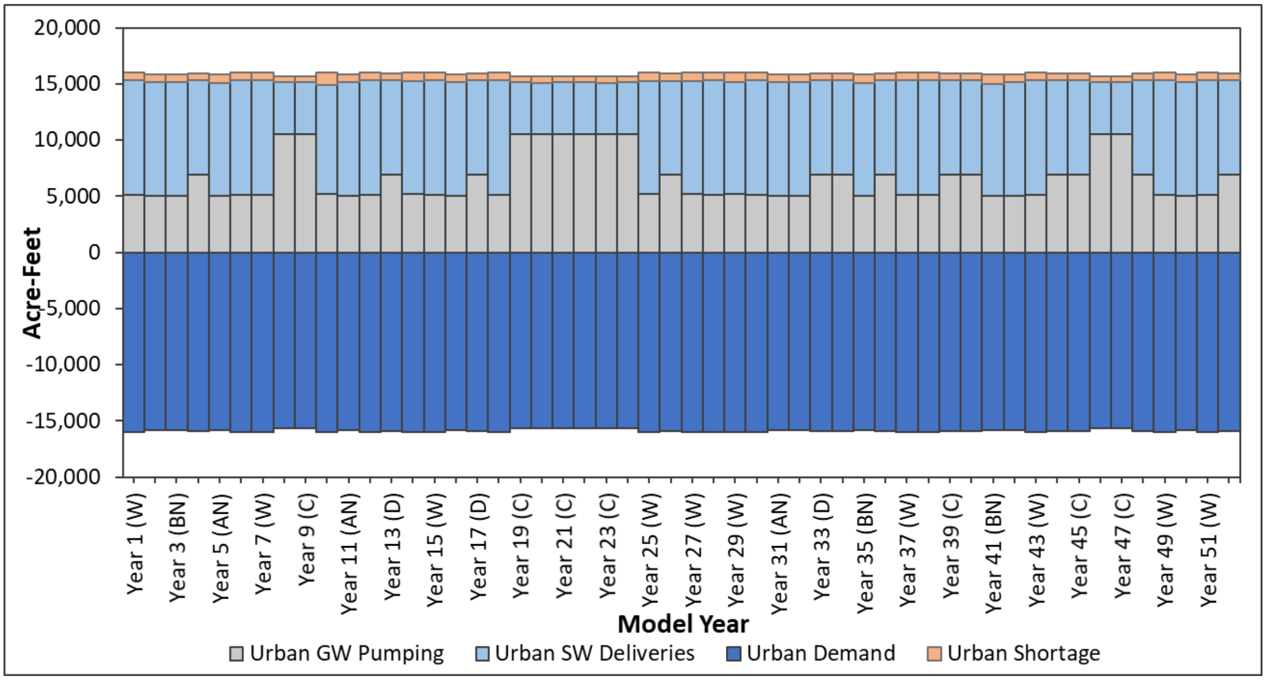


Figure 16: Linden County Water District GSA Projected Urban Demand

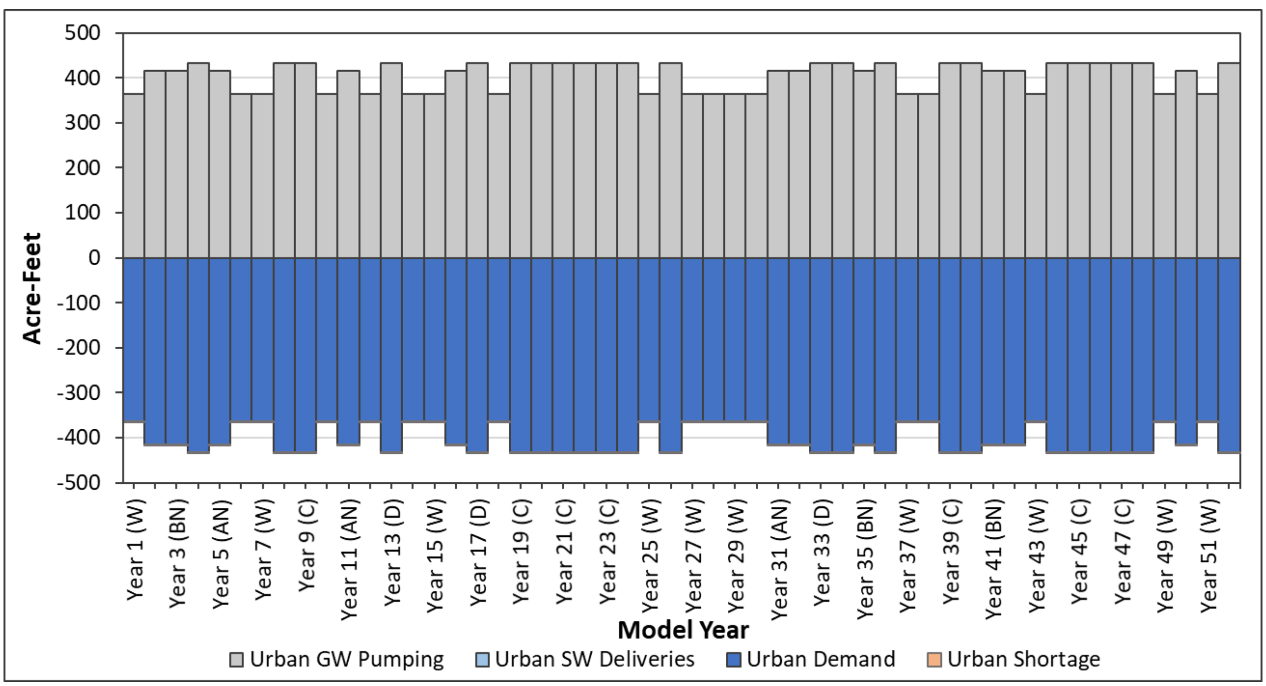


Figure 17: Central San Joaquin Water Conservation District GSA Projected Agricultural Demand

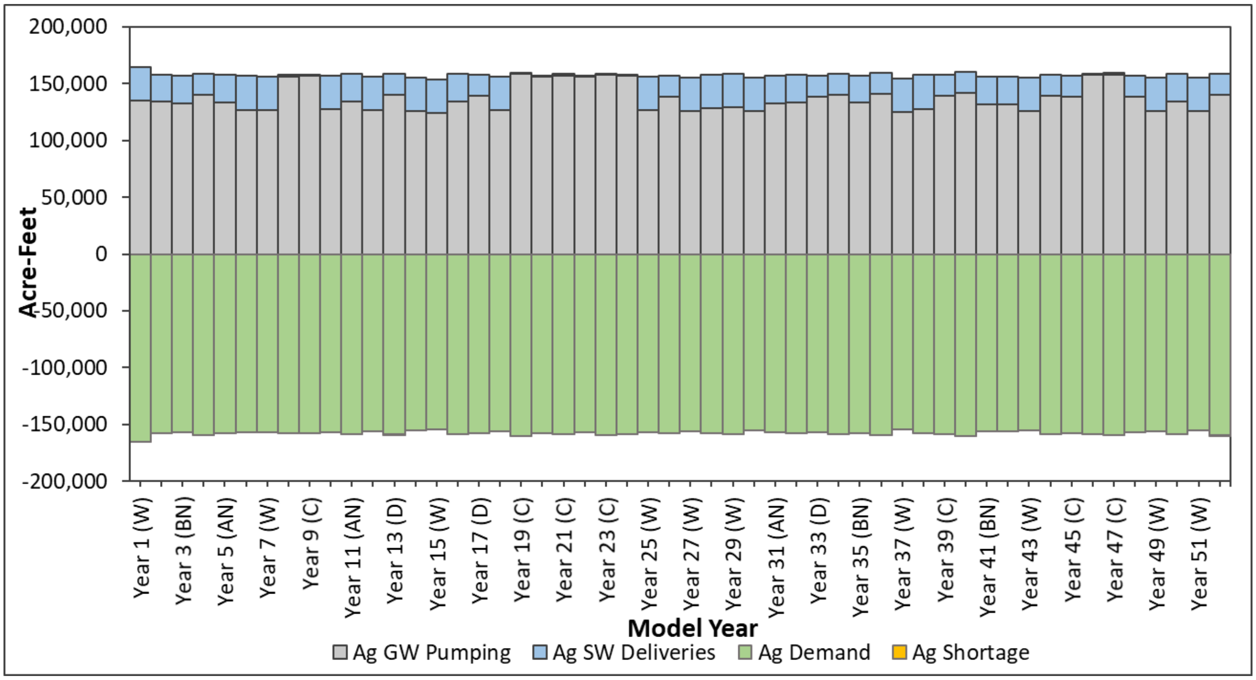


Figure 18: Central San Joaquin Water Conservation District GSA Projected Urban Demand

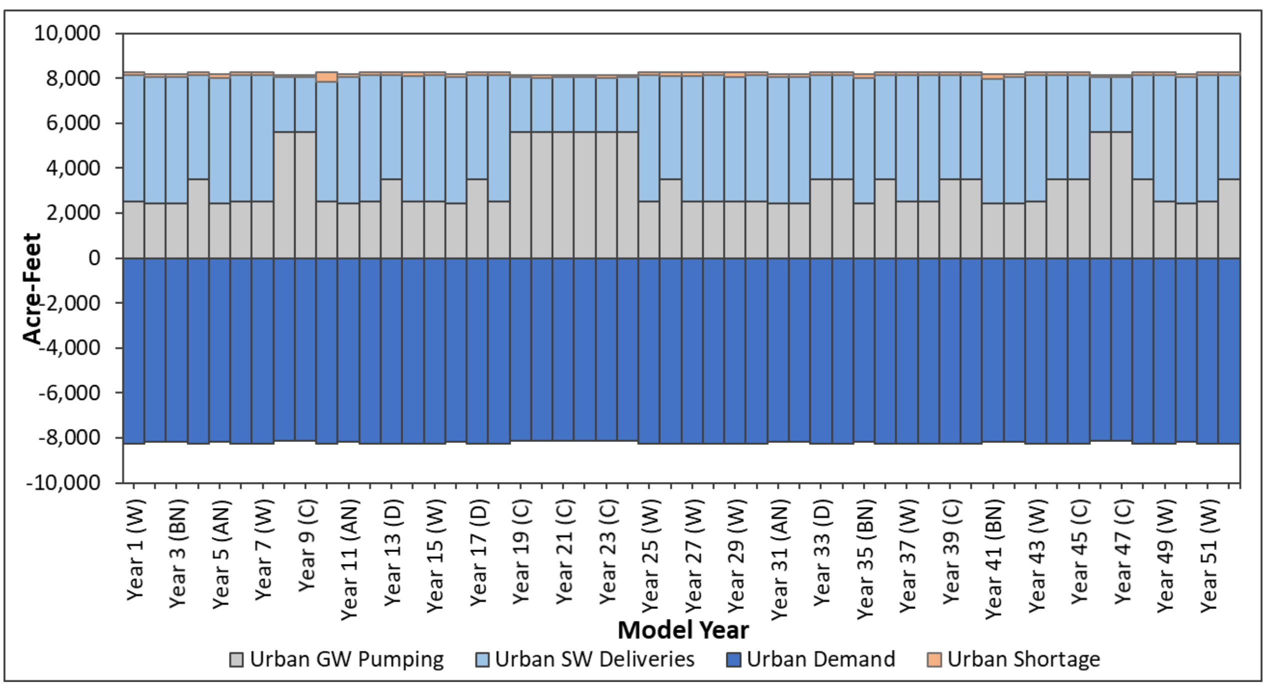


Figure 19: South Delta Water Agency GSA Projected Agricultural Demand

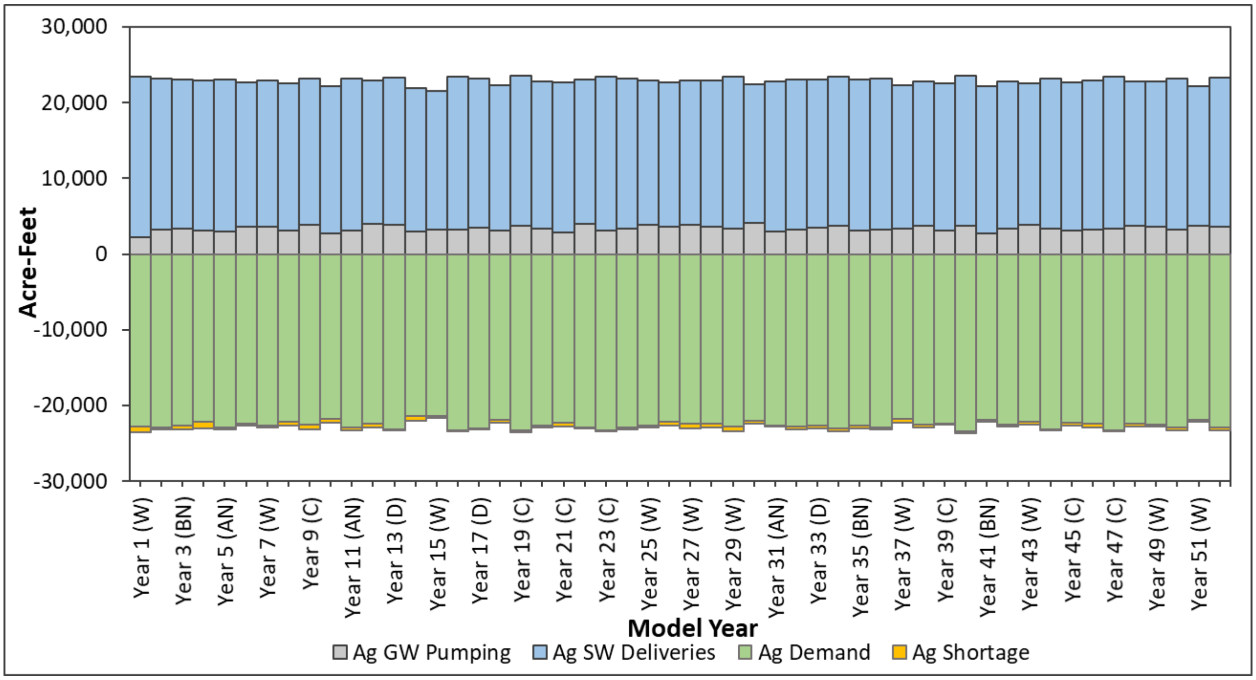


Figure 20: South Delta Water Agency GSA Projected Urban Demand

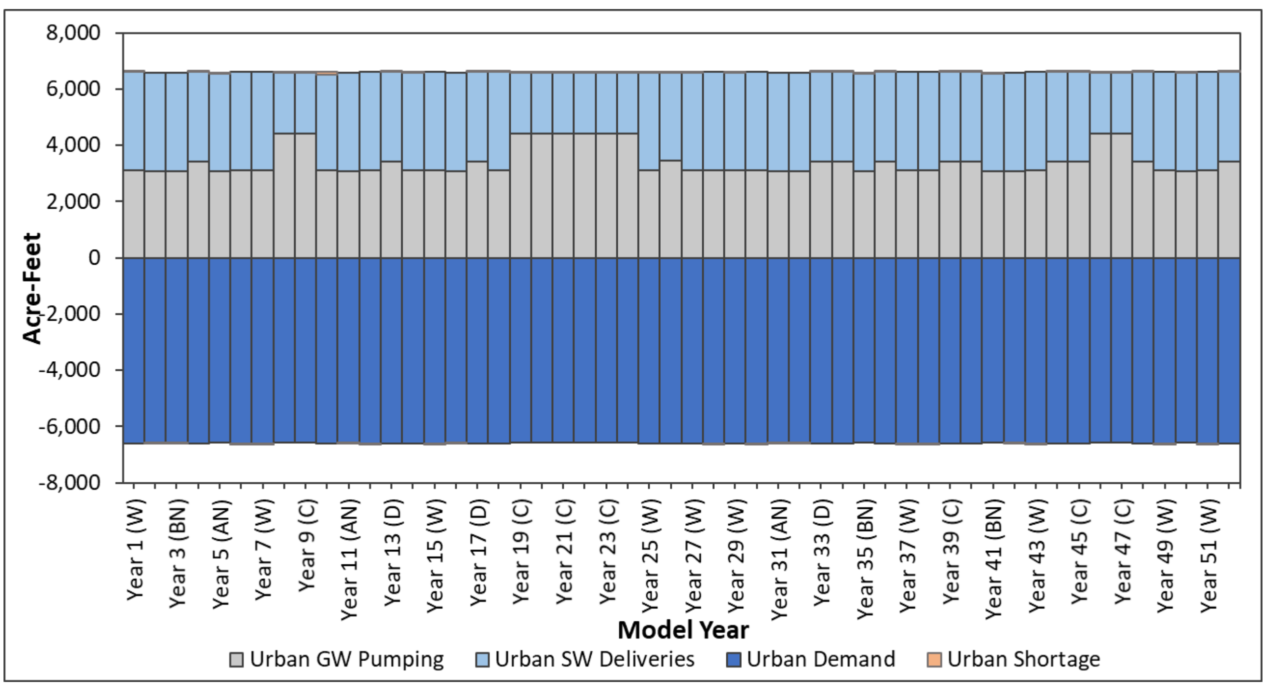


Figure 21: City of Manteca GSA Projected Urban Demand

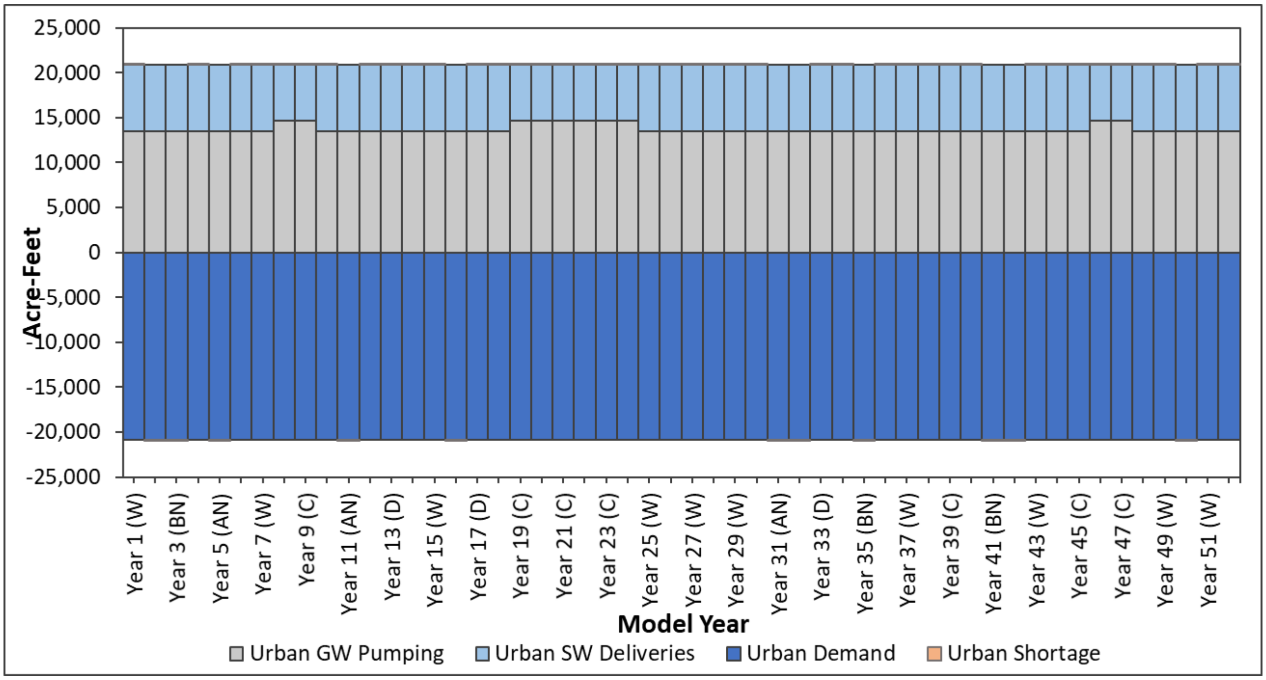


Figure 22: South San Joaquin Irrigation District GSA Projected Agricultural Demand

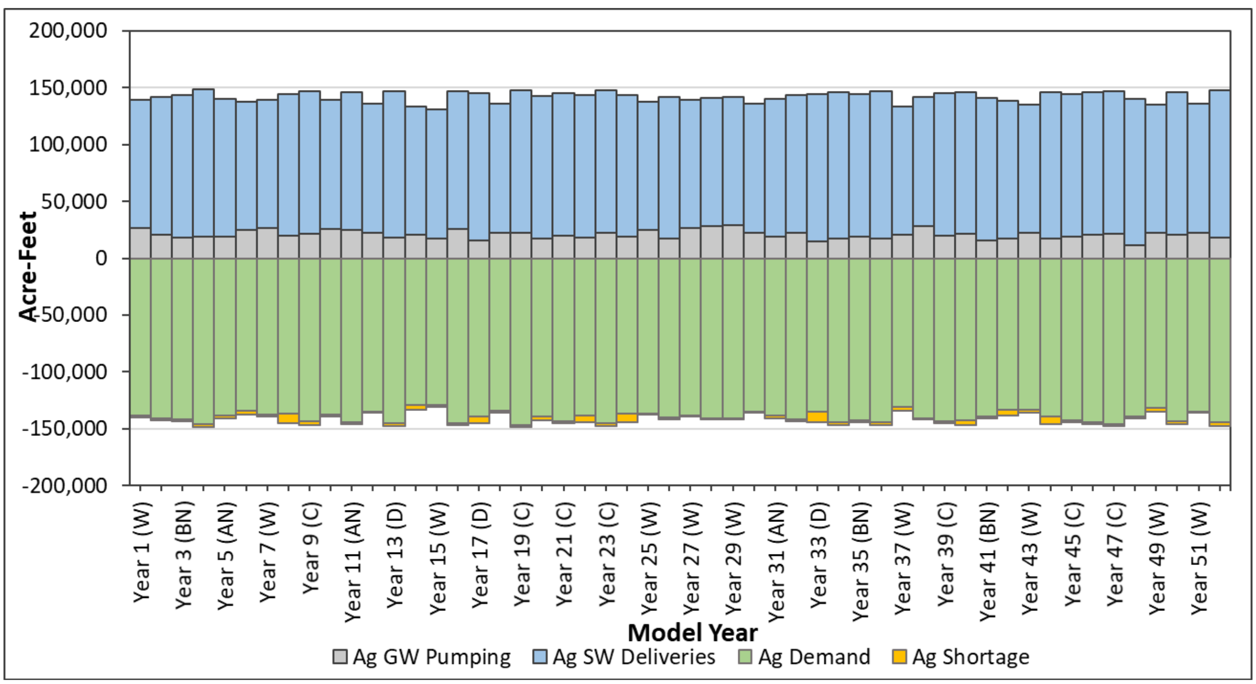


Figure 23: South San Joaquin Irrigation District GSA Projected Urban Demand

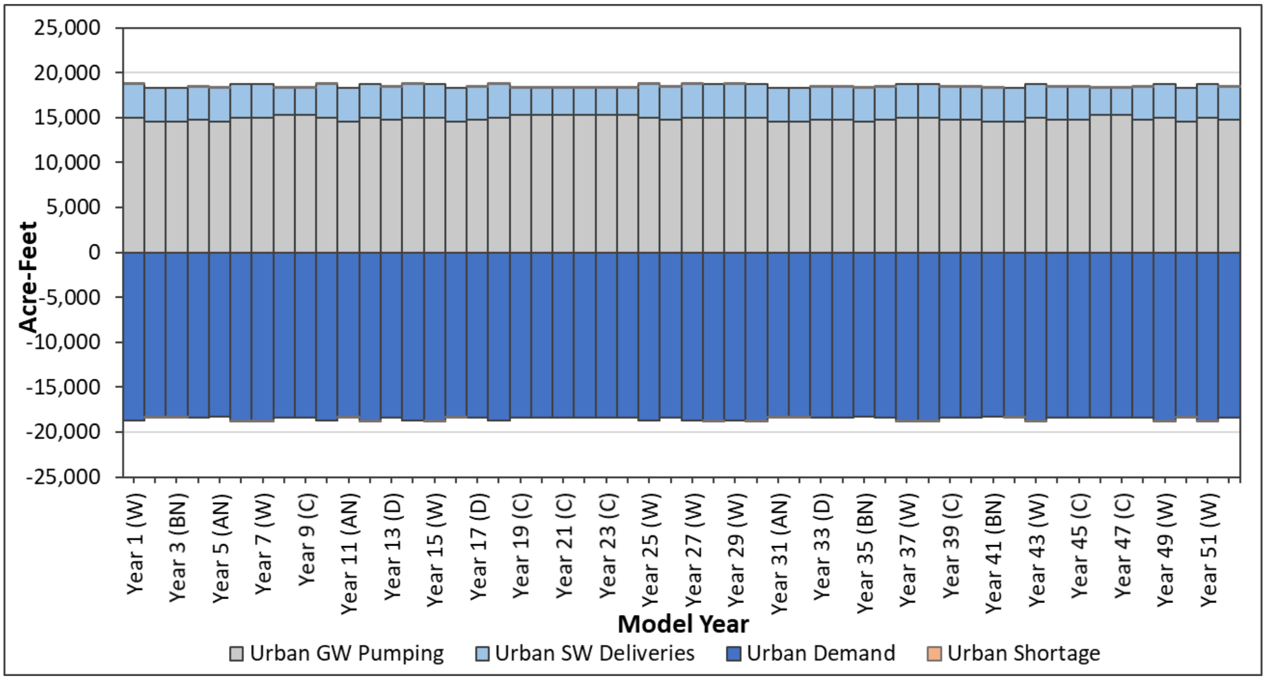


Figure 24: Oakdale Irrigation District GSA (North) Projected Agricultural Demand

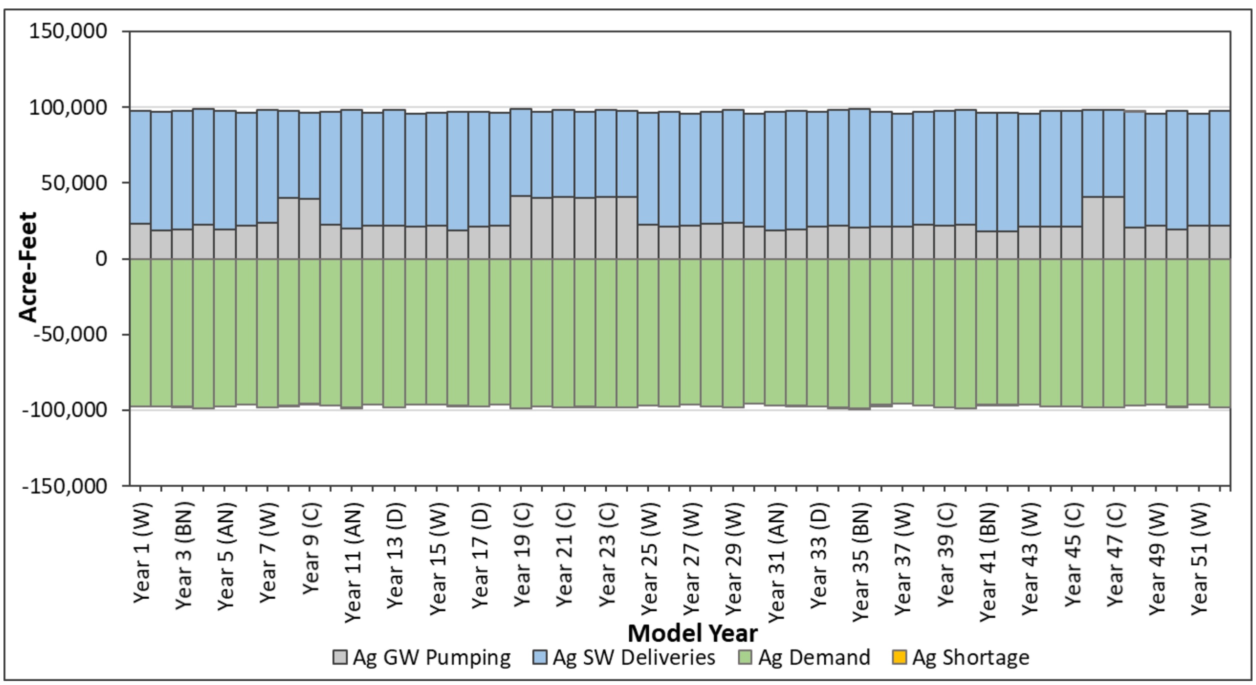


Figure 25: Oakdale Irrigation District GSA (North) Projected Urban Demand

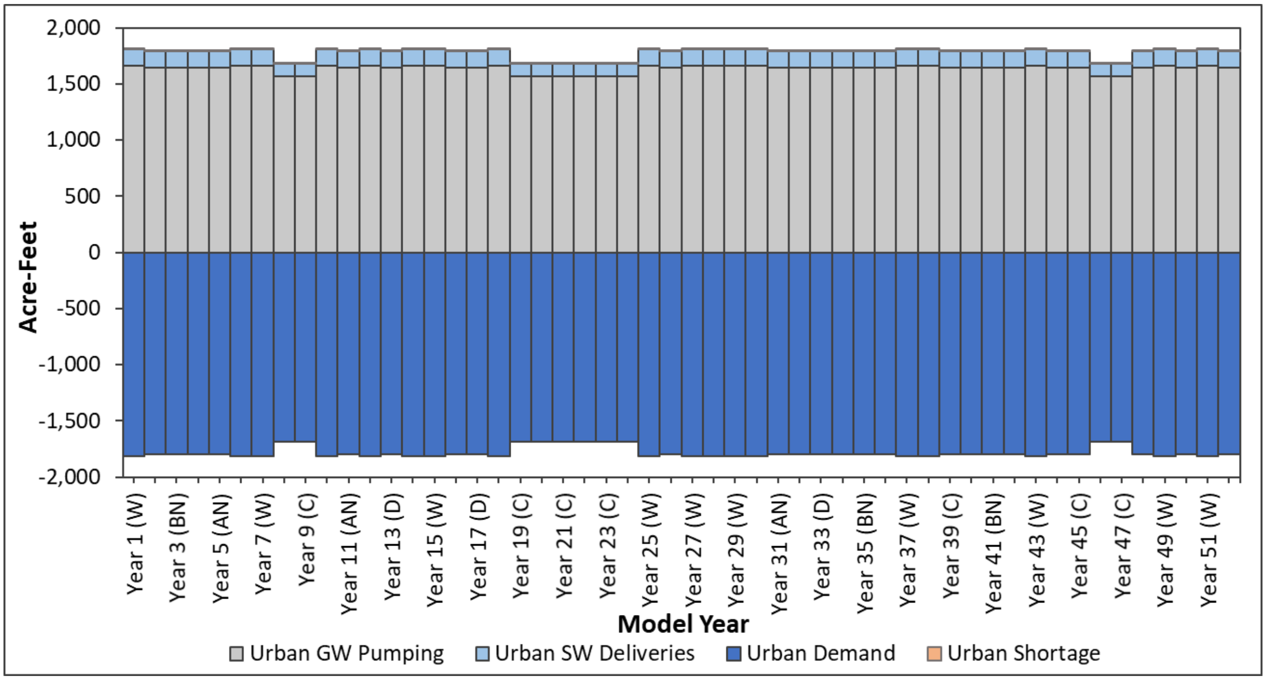


Figure 26: Oakdale Irrigation District GSA (South) Projected Agricultural Demand

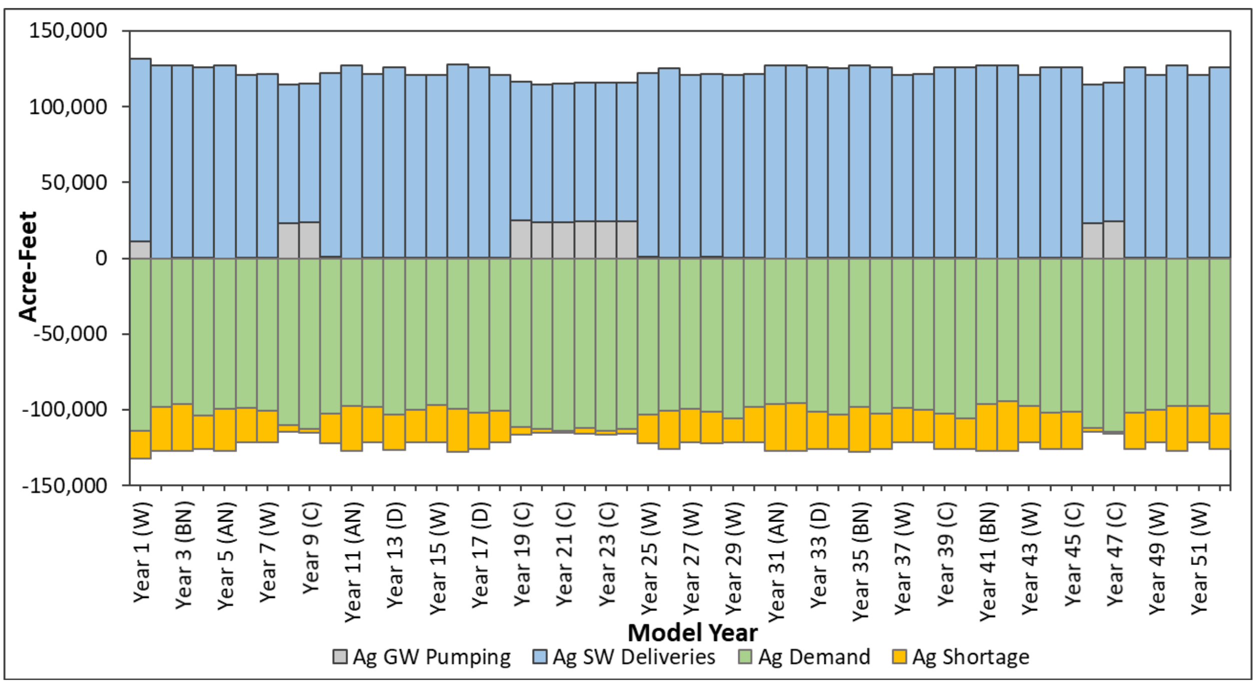


Figure 27: Oakdale Irrigation District GSA (South) Projected Urban Demand

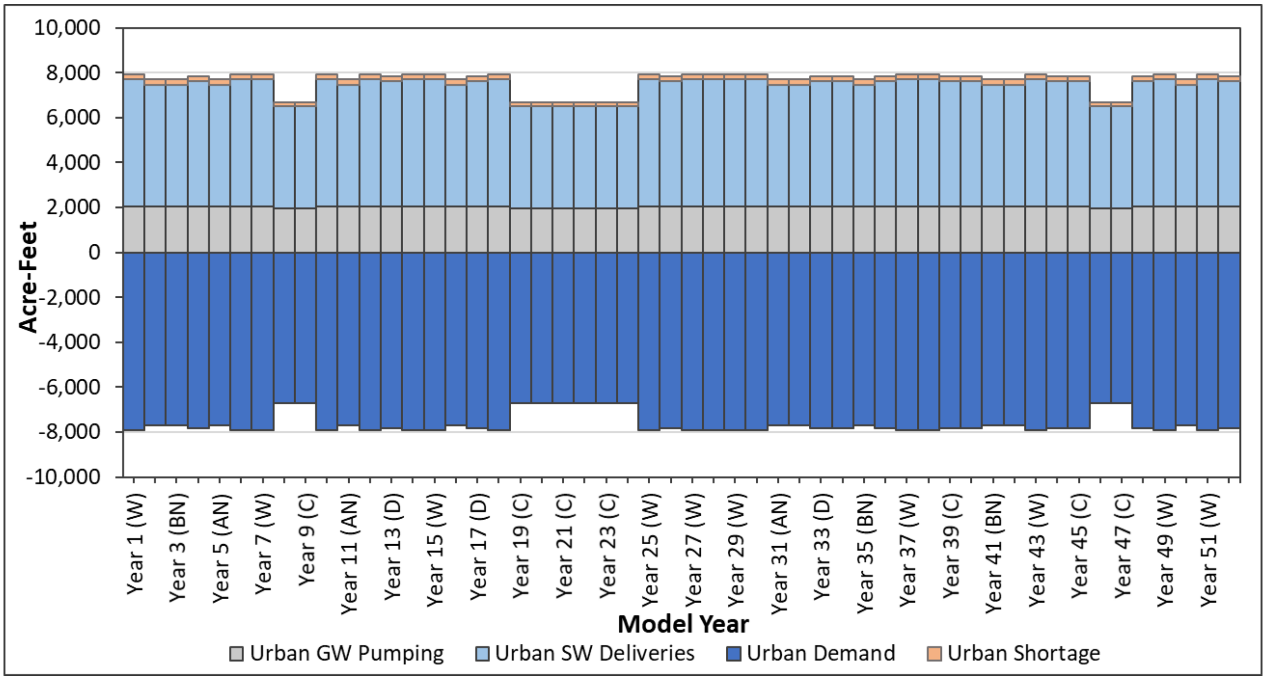


Figure 28: Eastside GSA Projected Agricultural Demand

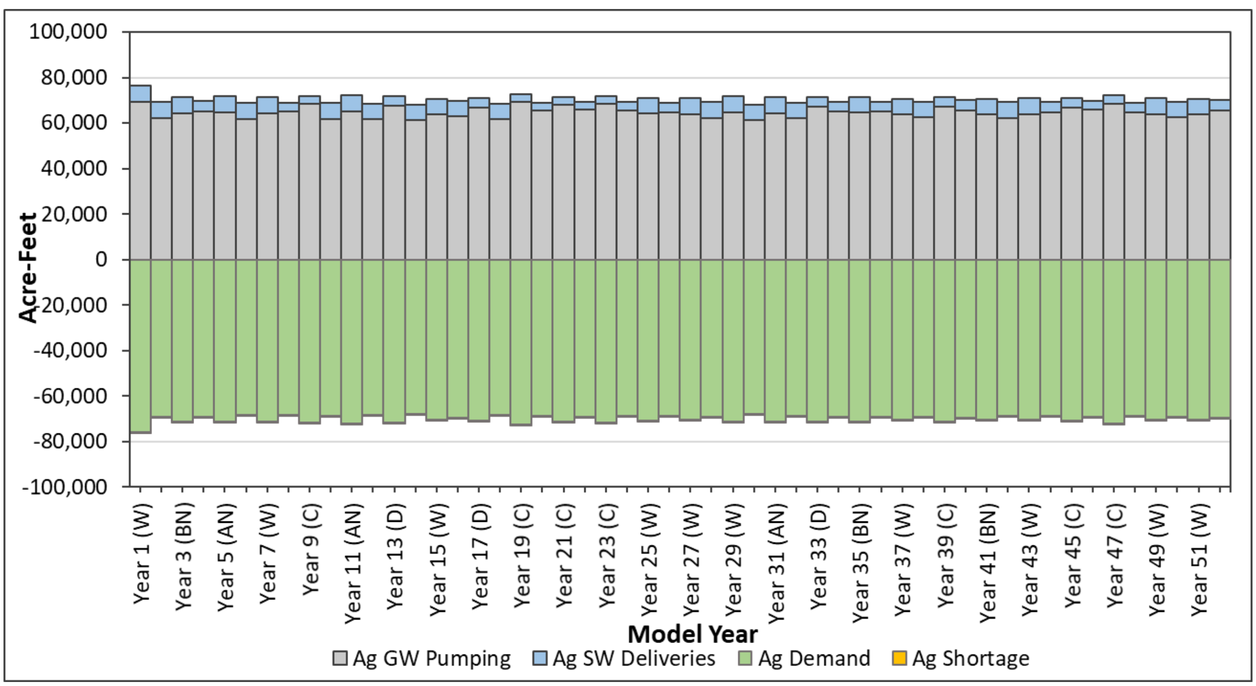
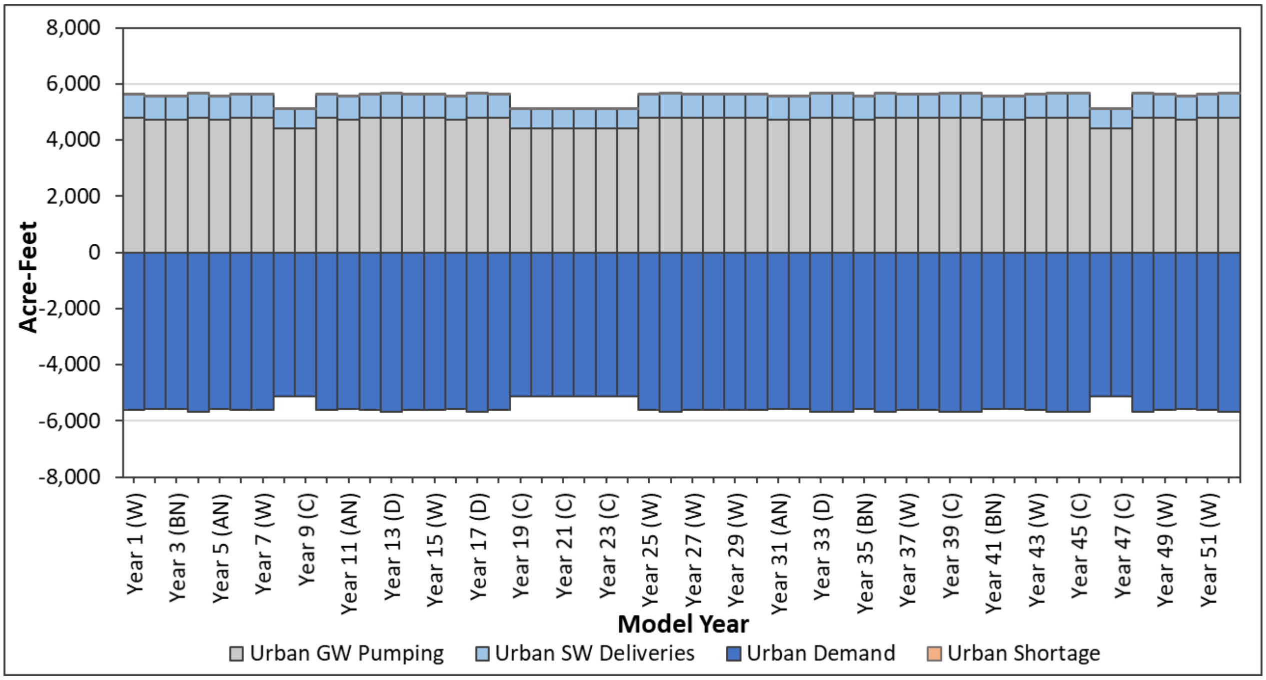


Figure 29: Eastside GSA Projected Urban Demand



EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY
Board Meeting Minutes
December 8, 2021

I. Call to Order/Pledge of Allegiance & Safety Announcement/Roll Call

The Eastern San Joaquin Groundwater Authority (GWA) Board Teleconference meeting convened, and Chairman Chuck Winn called the meeting to order, via the online Microsoft Teams Meeting platform, at 10:31 a.m. on December 8, 2021. The meeting was Teleconference only.

Chairman Winn led the agenda.

Mrs. Kristy Smith with San Joaquin County conducted the roll call.
In attendance were Chairman Chuck Winn; Vice Chairman Mel Panizza; Secretary Kris Balaji; Directors Jeremiah Mecham, Dan Wright, Myron Blanton, Robert Holmes; Alternate Directors Walt Ward, Joe Valente.

Also in attendance were Directors David Breitenbucher, Mike Henry, Eric Thorburn who arrived after roll call was completed.

II. SCHEDULED ITEMS

A. Discussion/Action Items:

1. Approval of the September 8, 2021 Meeting Minutes

Chairman Winn called for the approval of minutes of the meeting on September 8, 2021. There were no comments by the GWA Board members and no comments by the public.

Motion:
Director Dan Wright moved, and Director Jeremiah Mecham second, approval of the September 8, 2021 minutes.
With no members opposed, the motion passed unanimously.

2. Approval of the September 30, 2021 Special Meeting Minutes

Chairman Winn called for the approval of minutes of the special meeting on September 30, 2021. There were no comments by the GWA Board members and no comments by the public.

Motion:
Director Dan Wright moved, and Director Jeremiah Mecham second, approval of the September 30, 2021 minutes.
With no members opposed, the motion passed unanimously.

3. Discussion and Possible Action to Adopt Resolution R-21-XX Determining to Conduct Meetings Using Teleconferencing Pursuant to Government Code 54953 as Amended by AB 361

Mr. Rod Attebery with Neumiller and Beardslee (GWA Counsel) provided an overview of AB 361 guidelines, noting that the Resolution needs to be a standing item every 30 days, allowing for continued virtual meetings during state of emergency. Chairman Winn noted the glitch within the policy is the 30-day window, when not all meetings occur every 30 days. Chairman Winn questioned how we meet the requirements if we don't meet monthly, perhaps via email. Mr. Attebery agreed that the language would be better written another way and that the same issue has been brought up with other agencies, but the only way to guarantee certainty is to approve a resolution every 30 days. Mr. Matt Zidar with San Joaquin County questioned if bylaws could be added allowing the Chairman to renew. Mr. Attebery noted that bylaws were an interesting thought, and he would look into it further.

Chairman Winn asked for a motion to approve the Resolution Determining to Conduct Meetings Using Teleconferencing Pursuant to Government Code 54953 as Amended by AB 361.

Motion:
Alternate Director Joe Valente moved, and Director Robert Holmes second.
With no members opposed, the motion passed unanimously.

4. **State of California Department of Water Resources (DWR) Comments on the Eastern San Joaquin Groundwater Sustainability Plan (GSP)**

Mr. Zidar reviewed the un-official DWR comments on the GSP received so far, noting that the official comments would be coming in January and would require response within 180 days from receipt and that no GSP approval would be provided until comments are addressed. Mr. Zidar explained the DWR Consultation Process and noted that an initial informal meeting had occurred to discuss the process requirements. Mr. Zidar added that legal review of the comments is requested, and that County Counsel Kirin Virk would be coordinating with other counsel within the Basin to discuss and start a work group. Mr. Zidar added that Groundwater Sustainability Agency (GSA) coordination is needed to form work groups and to finalize the response to DWR.

Chairman Winn noted that the group needs good coordination and to get on task with discussions as quickly as possible, working together to resolve any discrepancies or issues that arise.

5. **Steering Committee Recommendations**
   a. **Approval of Woodard & Curran Task Order No. 5 to Master Services Agreement A-20-1**
   b. **Approval of David's Engineering Contract and Draft Work Plan**
   c. **Approval of Budget Amendment Resolution**

Mr. Zidar provided details on the Steering Committee recommendation to the Board, to approve the Woodard & Curran Task Order No. 5, the David's Engineering Contract and Draft Work Plan, and the Budget Amendment Resolution.

Mr. John Davids with David's Engineering provided a brief background of himself, his past engineering experience, and his firm. Mr. Zidar provided a review of the adopted budget and the allocation movements required to accomplish the work currently needed. Mr. Zidar noted that the Steering Committee recommendation is to reduce the reserves and allocate the funds to the David's Engineering contract. Additionally, it is recommended to amend the budget as noted by staff and the Steering Committee.

Chairman Winn asked for a motion to approve the three Steering Committee recommended items, Woodard & Curran Task Order No. 5, David's Engineering Contract and Work Plan, and Budget Amendment Resolution.

Motion:
Director Dan Wright moved, and Director Robert Holmes second.

With no members opposed, the motion passed unanimously.

d. Board Meeting Frequency and Schedule

Mr. Zidar advised the Board of the Steering Committee recommendation to go back to monthly meetings, through June 2022 to accommodate additional items of discussion to occur. No comments or discussion from the Board.

Chairman Winn asked for a motion to approve the Board Meeting frequency be moved to monthly through June 2022.

Motion:

Director Robert Holmes moved, and Alternate Director Joe Valente second.
With no members opposed, the motion passed unanimously.

6. Approach to GSA Outreach

Mr. Zidar requested the Board and Members initiate a conversation regarding what is needed by GSAs to assist them in their outreach efforts. Mr. Zidar added that ideally, would be great if there were more opportunities and materials to share the items discussed at the Technical Advisory Committee and Steering Committee, with the GSA Boards and Stakeholders. Mr. Fritz Buchman of san Joaquin County clarified that Mr. Zidar is requesting input on what can staff do to help GSA representatives provide outreach to their constituents.

Chairman Winn noted that while the Committees have done well, always appreciate the materials for meetings in advance. Chairman Winn added that would like to get information out to members ahead of time, to allow for review prior to meetings. Chairman Winn additionally suggested that a summary of DWR Comment Meetings, be provided to members for review. Mr. Zidar noted that staff is in the process of working out procedures to get all meeting materials out a week in advance of scheduled meetings.

Chairman Winn commented on the communication with residents, customers, etc. noting that often there is confusion and pushback on the issues from the public. Chairman Winn added that GSAs need to identify the issues or concerns their rate payers have and address them earlier rather than later, provide all the information possible.

Mr. Zidar noted there was previous discussion of a Water Summit or some sort of a broader outreach workshop, to be held by GSAs. Chairman Winn suggested that we explore bringing together all water agencies and work with GSAs on a way to gather and disseminate information.

7. DWR P68 PSP for SGMA Implementation

Mr. Zidar provided details on Technical Advisory Committee (TAC) level discussions pertaining to the DWR SGMA Implementation Grant Proposal Solicitation Package and GWA Strategy. Mr. Zidar provided an overview noting that the comments to the PSP were released in draft form in October and that solicitation is open from December to January or possibly February. Mr. Zidar explained that in the first round, $7.6 million would be awarded to each Critically Over Drafted (COD) Basin, but $3.7 million of that is directed action or conditional. Mr. Zidar noted that we must be sure our application proposal includes this type of conditional project or the funds may be lost. Mr. Zidar further explained that the conditional projects could include geophysical investigations of groundwater basins to identify recharge potential, early implementation of existing flood management plans that incorporate groundwater recharge, or projects that would complement efforts of a GSP providing for floodplain expansion to benefit groundwater recharge or habitat.

Mr. Zidar noted that while we can have one proposal from the basin, there could be multiple projects included. Additionally, he noted that spending plans are requested to be included in proposal. Mr. Zidar advised that a call for projects was released and that two were received, from NSJWCD and the County. Mr. Zidar noted that the Steering Committee had previously authorized the TAC to evaluate and select the projects to be recommended to the Steering Committee and ultimately the Board for approval in January for grant application submittal in February.

8. Accounting Framework and Funding/Financing Strategy

Mr. Zidar provided an overview and status update of the Accounting Framework and Funding/Financing project. Mr. Zidar made note that the Water Budgets results are behind with Woodard & Curran but should see more information coming soon.

Ms. Emily Finnegan with Stantec provided a status report on their portion of the Accounting Framework and Funding/Financing workplan laid out. Ms. Finnegan advised that Stakeholder Assessments have been completed with 17 responses received and noted that individual interviews, to dig into the surveys and understand concerns, would occur with each GSA next. Ms. Finnegan added that the interviews could not be done until the Water Budgets are completed and accepted. Ms. Finnegan advised the Board that the case studies are wrapping up now and that the results will be provided to share with GSA Boards and to help facilitate 2022 workshops. Mr. Zidar added that these Stakeholder Assessments provide some details on additional outreach needed to reach desired consensus.

Ms. Finnegan noted that while the intent is for most of these conversations to occur at the Steering Committee level, we may want to present at the Board level to ensure all information is being provided.

9. DWR Updates

Chairman Winn added the item to the agenda, as it was deferred from the Steering Committee Meeting earlier that morning.

Ms. Chelsea Spier with DWR provided additional updates to her informational sheet included in the agenda package. Ms. Spier noted that the DWR AEM Flyover Studies have our basin planned for an April 2022 fly and DWR will be reaching out to obtain data to assist in their calibrations. Ms. Spier advised that the California Groundwater Update 2020 has been released and that information can be found on the calgroundwaterlive.org website. Ms. Spier additionally noted that since subsidence was mentioned in GSP comments, DWR will continue to collect subsidence data and post the results quarterly.

III. <u>Director Comments</u>

Chairman Winn noted that during a recent State Supervisor's Meeting, there was discussion on the issue of Drought Relief and the suggested mitigation by looking at projects that would occur during the wet years. Chairman Winn added that Supervisors need to be more aggressive in getting legislature to be more proactive.

IV. <u>Public Comment:</u>

None.

V. <u>Future Agenda Items and Meeting Dates:</u>

Mr. Buchman provided clarification that the Steering Committee recommendation of monthly Board Meetings included that they would be held on the second Wednesday of each month.

VI. Adjournment:
Chairman Winn adjourned the December 8, 2021 meeting at 11:38 a.m.

Next Regular Meeting:
Wednesday, January 12, 2022
10:30 am – 12:00 pm
Location TBD

Eastern San Joaquin Groundwater Authority Board of Directors
December 8, 2021

Roll Call

Agency Name	Director First	Director Last		Alternate First	Alternate Last	
Cal Water	Jeremiah	**Mecham** •				
Central Delta Water Agency	George	**Biagi, Jr.**		Dante	**Nomellini**	
Central San Joaquin Water Conservation District	Grant	**Thompson**		Reid	**Roberts**	
City of Lodi	Alan	**Nakanishi**		Charlie	**Swimley**	
City of Manteca	David	**Breitenbucher** • Late				
City of Stockton	Dan	**Wright** •		Mel Paul	**Lytle Canepa**	
Eastside San Joaquin GSA	Russ	**Thomas**		Walter	**Ward** •	
Linden County Water District	Myron	**Blanton** •		Steven	**Lagorio**	
Lockeford Community Services District	Mike	**Henry** • Late		Joseph Eric	**Salzman** **Schmid**	
North San Joaquin Water Conservation District	Tom	**Flinn**		Joe	**Valente** •	
Oakdale Irrigation District	Eric	**Thorburn, P.E.** • Late				
South Delta Water Agency	John	**Herrick, Esq.**		Jerry	**Robinson**	
South San Joaquin Groundwater Sustainability Agency	Robert	**Holmes** •		Brandon	**Nakagawa**	
Woodbridge Irrigation District	Andy	**Christensen**				
San Joaquin County Public Works **Secretary (1)**	Kris	**Balaji** •				
Stockton East Water District **Vice Chair (2)**	Melvin	**Panizza** •		Andrew	**Watkins**	
San Joaquin County **Chairman (3)**	Chuck	**Winn** •		Kathy	**Miller**	

Quorum

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Joint Exercise of Powers Board of Directors Meeting

MEMBER SIGN-IN SHEET

Location: Teleconference Call Only Date: 12/08/2021 Time: 10:30 AM

INITIAL	Member's Name	GSA	Phone	Email
Present	Jeremiah Mecham	Cal Water Member		jmecham@calwater.com
	George Biagi, Jr.	Central Delta Water Agency Member	209-481-5201	gbiagi@deltabluegrass.com
	Dante Nomellini	Central Delta Water Agency Alternate	209-465-5883	ngmplcs@pacbell.net
	Grant Thompson	Central San Joaquin Water Conservation District Member	209-639-1580	gtom@velociter.net
	Reid Roberts	Central San Joaquin Water Conservation District Alternate	209-941-8714	reidwroberts@gmail.com
	Alan Nakanishi	City of Lodi Member	209-333-6702	anakanishi@lodi.gov
	Charlie Swimley	City of Lodi Alternate	209-333-6706	cswimley@lodi.gov
Present	David Breitenbucher	City of Manteca Member	209-456-8017	dbreitenbucher@ci.manteca.ca.us
		City of Manteca Alternate		
Present	Dan Wright	City of Stockton Member	209-937-5614	Dan.Wright@stocktonca.gov
	Paul Canepa	City of Stockton Alternate	209-603-7091	Paul.Canepa@stocktonca.gov
	Mel Lytle	City of Stockton Alternate	209-	Mel.Lytle@stocktonca.gov
	Russ Thomas	Eastside San Joaquin GSA Member	209-480-8968	rthomasccwd@hotmail.com
Present	Walter Ward	Eastside San Joaquin GSA Alternate	209-525-6710	wward@envres.org

INITIAL	Member's Name	GSA	Phone	Email
Present	Myron Blanton	Linden County Water District Member	209-351-0242	myronapp@gmail.com
	Steven M Lagorio	Linden County Water District Alternate	209-471-7516	smlagorio57@gmail.com
Present	Mike Henry	Lockeford Community Services District Member	209-712-4014	midot@att.net
	Joseph Salzman	Lockeford Community Services District Alternate	209-727-5035	lcsd@softcom.net
	Eric Schmid	Lockeford Community Services District Alternate	209-727-5035	lcsd@softcom.net
	Tom Flinn	North San Joaquin Water Conservation District Member	209-663-8760	tomflinn2@me.com
Present	Joe Valente	North San Joaquin Water Conservation District Alternate	209-334-4786	jcvalente@softcom.net
Present	Eric Thorburn, P.E.	Oakdale Irrigation District Member	209-840-5525	ethorburn@oakdaleirrigation.com
		Oakdale Irrigation District Alternate		
Present	Chuck Winn	San Joaquin County Member	209-953-1160	cwinn@sjgov.org
	Kathy Miller	San Joaquin County Alternate	209-953-1161	kmiller@sjgov.org
	John Herrick, Esq.	South Delta Water Agency Member	209-224-5854	jherrlaw@aol.com
	Jerry Robinson	South Delta Water Agency Alternate	209-471-4025	N/A
Present	Robert Holmes	South San Joaquin GSA Member	209-484-7678	rholmes@ssjid.com
Present	Brandon Nakagawa	South San Joaquin GSA Alternate	209-249-4613	bnakagawa@ssjid.com
Present	Melvin Panizza	Stockton East Water District Member	209-948-0333	melpanizza@aol.com
Present	Andrew Watkins	Stockton East Water District Alternate	209-484-8591	watkins.andrew@verizon.net
	Anders Christensen	Woodbridge Irrigation District Member	209-625-8438	widirrigation@gmail.com
		Woodbridge Irrigation District Alternate		

Eastern San Joaquin Groundwater Authority Staff & Support

INITIAL	Member's Name	Organization	Phone	Email
Present	Kris Balaji	San Joaquin County	468-3100	kbalaji@sjgov.org
Present	Fritz Buchman	San Joaquin County	468-3034	fbuchman@sjgov.org
Present	Matt Zidar	San Joaquin County	953-7460	mzidar@sjgov.org
Present	Glenn Prasad	San Joaquin County	468-3089	grasad@sjgov.org
	Alicia Connelly	San Joaquin County	468-3531	aconnelly@sjgov.org
Present	Kristy Smith	San Joaquin County	468-0219	kmsmith@sjgov.org
present	Rod Attebery	Neumiller & Beardslee / Legal Counsel	948-8200	rattebery@neumiller.com
Present	Sally Perez	San Joaquin County	953-7948	sperez@sjgov.org

EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

Joint Exercise of Powers Board of Directors Meeting

OTHER INTERSTED PARTIES - SIGN-IN SHEET

Location: Teleconference Call Only Date: 12/08/2021 Time: 10:30 AM

INITIAL	Member's Name	Organization	Phone	Email
P	Douglas Smith	—		
P	Fay Tamez	Stanislaus County		
P	Emily Finnegan	Stantec		
P	John Davids	Davids Engineering		
P	Brenda Kiely	SJC CAO		
P	Mikayla Tran	—		
P	Hope Paulin	SJC		
P	Scot Moody	SEWD		
P	Chelsea Spier	DWR		
P	Kirin Virk	SJC CC		
P	Emily Sheldon	OID		
P	Jennifer Spaletta	Atty.		

Eastern San Joaquin Groundwater Authority Board of Directors
December 8, 2021

Roll Call

Agency Name	Director First	Director Last			Alternate First	Alternate Last	
Cal Water	Jeremiah	Mecham •					
Central Delta Water Agency	George	Biagi, Jr.			Dante	Nomellini	
Central San Joaquin Water Conservation District	Grant	Thompson			Reid	Roberts	
City of Lodi	Alan	Nakanishi			Charlie	Swimley	
City of Manteca	David	Breitenbucher • Late					
City of Stockton	Dan	Wright •			Mel Paul	Lytle Canepa	
Eastside San Joaquin GSA	Russ	Thomas			Walter	Ward •	
Linden County Water District	Myron	Blanton •			Steven	Lagorio	
Lockeford Community Services District	Mike	Henry • Late			Joseph Eric	Salzman Schmid	
North San Joaquin Water Conservation District	Tom	Flinn			Joe	Valente •	
Oakdale Irrigation District	Eric	Thorburn, P.E. • Late					
South Delta Water Agency	John	Herrick, Esq.			Jerry	Robinson	
South San Joaquin Groundwater Sustainability Agency	Robert	Holmes •			Brandon	Nakagawa	
Woodbridge Irrigation District	Andy	Christensen					
San Joaquin County Public Works **Secretary (1)**	Kris	Balaji •					
Stockton East Water District **Vice Chair (2)**	Melvin	Panizza •			Andrew	Watkins	
San Joaquin County **Chairman (3)**	Chuck	Winn •			Kathy	Miller	

Quorum

Eastern San Joaquin Groundwater Authority Board of Directors
December 8, 2021

II.A.1 Vote

Agency Name	Director First	Director Last		Alternate First	Alternate Last	
Cal Water	Jeremiah	**Mecham**	Y			
Central Delta Water Agency	George	**Biagi, Jr.**		Dante	**Nomellini**	
Central San Joaquin Water Conservation District	Grant	**Thompson**		Reid	**Roberts**	
City of Lodi	Alan	**Nakanishi**		Charlie	**Swimley**	
City of Manteca	David	**Breitenbucher**	Y			
City of Stockton	Dan	**Wright**	Y	Mel Paul	**Lytle Canepa**	
Eastside San Joaquin GSA	Russ	**Thomas**		Walter	**Ward**	Y
Linden County Water District	Myron	**Blanton**	Y	Steven	**Lagorio**	
Lockeford Community Services District	Mike	**Henry**	Y	Joseph Eric	**Salzman Schmid**	
North San Joaquin Water Conservation District	Tom	**Flinn**		Joe	**Valente**	Y
Oakdale Irrigation District	Eric	**Thorburn, P.E.**	Y			
South Delta Water Agency	John	**Herrick, Esq.**		Jerry	**Robinson**	
South San Joaquin Groundwater Sustainability Agency	Robert	**Holmes**	Y	Brandon	**Nakagawa**	
Woodbridge Irrigation District	Andy	**Christensen**				
San Joaquin County Public Works **Secretary (1)**	Kris	**Balaji**				
Stockton East Water District **Vice Chair (2)**	Melvin	**Panizza**	Y	Andrew	**Watkins**	
San Joaquin County **Chairman (3)**	Chuck	**Winn**	Y	Kathy	**Miller**	

Motion: Wright
2nd: Mecham
Approved

Eastern San Joaquin Groundwater Authority Board of Directors
December 8, 2021

II. A. 2 Vote

Agency Name	Director First	Director Last		Alternate First	Alternate Last	
Cal Water	Jeremiah	Mecham	Y			
Central Delta Water Agency	George	Biagi, Jr.		Dante	Nomellini	
Central San Joaquin Water Conservation District	Grant	Thompson		Reid	Roberts	
City of Lodi	Alan	Nakanishi		Charlie	Swimley	
City of Manteca	David	Breitenbucher	Y			
City of Stockton	Dan	Wright	Y	Mel Paul	Lytle Canepa	
Eastside San Joaquin GSA	Russ	Thomas		Walter	Ward	Y
Linden County Water District	Myron	Blanton	Y	Steven	Lagorio	
Lockeford Community Services District	Mike	Henry	Y	Joseph Eric	Salzman Schmid	
North San Joaquin Water Conservation District	Tom	Flinn		Joe	Valente	Y
Oakdale Irrigation District	Eric	Thorburn, P.E.	Y			
South Delta Water Agency	John	Herrick, Esq.		Jerry	Robinson	
South San Joaquin Groundwater Sustainability Agency	Robert	Holmes	Y	Brandon	Nakagawa	
Woodbridge Irrigation District	Andy	Christensen				
San Joaquin County Public Works **Secretary (1)**	Kris	Balaji				
Stockton East Water District **Vice Chair (2)**	Melvin	Panizza	Y	Andrew	Watkins	
San Joaquin County **Chairman (3)**	Chuck	Winn	Y	Kathy	Miller	

Motion: Wright
2nd: Mecham
Approved

Eastern San Joaquin Groundwater Authority Board of Directors
December 8, 2021

II. A. 3 vote

Agency Name	Director First	Director Last		Alternate First	Alternate Last	
Cal Water	Jeremiah	Mecham	Y			
Central Delta Water Agency	George	Biagi, Jr.		Dante	Nomellini	
Central San Joaquin Water Conservation District	Grant	Thompson		Reid	Roberts	
City of Lodi	Alan	Nakanishi		Charlie	Swimley	
City of Manteca	David	Breitenbucher	Y			
City of Stockton	Dan	Wright	Y	Mel Paul	Lytle Canepa	
Eastside San Joaquin GSA	Russ	Thomas		Walter	Ward	Y
Linden County Water District	Myron	Blanton	Y	Steven	Lagorio	
Lockeford Community Services District	Mike	Henry	Y	Joseph Eric	Salzman Schmid	
North San Joaquin Water Conservation District	Tom	Flinn		Joe	Valente	Y
Oakdale Irrigation District	Eric	Thorburn, P.E.	Y			
South Delta Water Agency	John	Herrick, Esq.		Jerry	Robinson	
South San Joaquin Groundwater Sustainability Agency	Robert	Holmes	Y	Brandon	Nakagawa	
Woodbridge Irrigation District	Andy	Christensen				
San Joaquin County Public Works **Secretary (1)**	Kris	Balaji				
Stockton East Water District **Vice Chair (2)**	Melvin	Panizza	Y	Andrew	Watkins	
San Joaquin County **Chairman (3)**	Chuck	Winn	Y	Kathy	Miller	

Motion: Valente
2nd: Holmes
Approved

Eastern San Joaquin Groundwater Authority Board of Directors

December 8, 2021

II.A.5 a|b|c Vote

Agency Name	Director First	Director Last			Alternate First	Alternate Last	
Cal Water	Jeremiah	**Mecham**	Y				
Central Delta Water Agency	George	**Biagi, Jr.**			Dante	**Nomellini**	
Central San Joaquin Water Conservation District	Grant	**Thompson**			Reid	**Roberts**	
City of Lodi	Alan	**Nakanishi**			Charlie	**Swimley**	
City of Manteca	David	**Breitenbucher**	Y				
City of Stockton	Dan	**Wright**	Y		Mel Paul	**Lytle** **Canepa**	
Eastside San Joaquin GSA	Russ	**Thomas**			Walter	**Ward**	Y
Linden County Water District	Myron	**Blanton**	Y		Steven	**Lagorio**	
Lockeford Community Services District	Mike	**Henry**	Y		Joseph Eric	**Salzman** **Schmid**	
North San Joaquin Water Conservation District	Tom	**Flinn**			Joe	**Valente**	Y
Oakdale Irrigation District	Eric	**Thorburn, P.E.**	Y				
South Delta Water Agency	John	**Herrick, Esq.**			Jerry	**Robinson**	
South San Joaquin Groundwater Sustainability Agency	Robert	**Holmes**	Y		Brandon	**Nakagawa**	
Woodbridge Irrigation District	Andy	**Christensen**					
San Joaquin County Public Works **Secretary (1)**	Kris	**Balaji**					
Stockton East Water District **Vice Chair (2)**	Melvin	**Panizza**	Y		Andrew	**Watkins**	
San Joaquin County **Chairman (3)**	Chuck	**Winn**	Y		Kathy	**Miller**	

Motion: Wright
2nd: Holmes
Approved

Eastern San Joaquin Groundwater Authority Board of Directors

December 8, 2021

II.A.5.d Vote

Agency Name	Director First	Director Last		Alternate First	Alternate Last	
Cal Water	Jeremiah	**Mecham**	Y			
Central Delta Water Agency	George	**Biagi, Jr.**		Dante	**Nomellini**	
Central San Joaquin Water Conservation District	Grant	**Thompson**		Reid	**Roberts**	
City of Lodi	Alan	**Nakanishi**		Charlie	**Swimley**	
City of Manteca	David	**Breitenbucher**	Y			
City of Stockton	Dan	**Wright**	Y	Mel Paul	**Lytle Canepa**	
Eastside San Joaquin GSA	Russ	**Thomas**		Walter	**Ward**	Y
Linden County Water District	Myron	**Blanton**	Y	Steven	**Lagorio**	
Lockeford Community Services District	Mike	**Henry**	Y	Joseph Eric	**Salzman Schmid**	
North San Joaquin Water Conservation District	Tom	**Flinn**		Joe	**Valente**	Y
Oakdale Irrigation District	Eric	**Thorburn, P.E.**	Y			
South Delta Water Agency	John	**Herrick, Esq.**		Jerry	**Robinson**	
South San Joaquin Groundwater Sustainability Agency	Robert	**Holmes**	Y	Brandon	**Nakagawa**	
Woodbridge Irrigation District	Andy	**Christensen**				
San Joaquin County Public Works **Secretary (1)**	Kris	**Balaji**				
Stockton East Water District **Vice Chair (2)**	Melvin	**Panizza**	Y	Andrew	**Watkins**	
San Joaquin County **Chairman (3)**	Chuck	**Winn**	Y	Kathy	**Miller**	

Motion - Holmes
2nd - Valente
Approved

BEFORE THE BOARD OF DIRECTORS OF
EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

R E S O L U T I O N

R-22-##

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY (ESJGWA) DETERMINING TO CONDUCT MEETINGS OF THE ESJGWA BOARD OF DIRECTORS USING TELECONFERENCING PURSUANT TO GOVERNMENT CODE 54953 AS AMENDED BY AB 361 FOR THE PERIOD FEBRUARY 9, 2022 TO MARCH 8, 2022.

\- - - - - - - - - - - - -

WHEREAS, the Eastern San Joaquin Groundwater Authority (the "Authority") Board of Directors (the "Board") is committed to preserving and nurturing public access and participation in meetingsof the Board of Directors; and

WHEREAS, all meetings the Authority's legislative bodies are open and public, as required by the Ralph M. Brown Act (Cal. Gov. Code 54950 – 54963) (the "Brown Act"), so thatany member of the public may attend, participate, and watch the Authority's legislative bodies conduct their business; and

WHEREAS, the Brown Act, Government Code section 54953(e), as amended by AB 361 (2021), makes provisions for remote teleconferencing participation in meetings by members of a legislative body, without compliance with the requirements of Government Code section 54953(b)(3), subject to the existence of certain conditions; and

WHEREAS, a required condition is that a state of emergency is declared by the Governor pursuant to Government Code section 8625, proclaiming the existence of conditions of disaster or of extreme peril to the safety of persons and property within the state caused by conditions as described in Government Code section 8558; and

WHEREAS, it is further required that state or local officials have imposed or recommended measures to promote social distancing, or the legislative body meeting in person would present imminent risks to the health and safety of attendees; and

WHEREAS, on March 4, 2020, the Governor proclaimed a State of Emergency to exist in California as a result of the threat of COVID-19; and

WHEREAS, Cal-OSHA adopted emergency regulations (Section 3205) imposing requirements on California employers, including measures to promote social distancing; and

WHEREAS, an Order of the San Joaquin County Public Health Officer acknowledges that close contact to other persons increases the risk of transmission of COVID-19; and

WHEREAS, currently the dominant strain of COVID-19 in the country, is more transmissible than prior variants of the virus, may cause more severe illness, and that even fully vaccinated individuals can spread the virus to others resulting in rapid and alarming rates of COVID-19 cases and hospitalizations, therefore, meeting in person would present imminent risksto the health or safety of attendees.

NOW, THEREFORE, BE IT RESOLVED by the Board as follows:

Section 1. Recitals. The Recitals set forth above are true and correct and are incorporated into this Resolution by this reference.

Section 2. Finding of Imminent Risk to Health or Safety of Attendees. The Board hereby finds that the circumstances of the current State of Emergency proclaimed by the Governor on March 4, 2020, and finds that the current dominant strain of COVID-19 in the country, is more transmissible than prior variants of the virus, may cause more severe illness, and that even fully vaccinated individuals can spread the virus to others resulting in rapid and alarming rates of COVID-19 cases and hospitalizations has caused, and will continue to cause, conditions of peril to the safety of persons, thereby presenting an imminent risk to health and/or safety to the Authority's staff and attendees of the Authority's public meetings; and

Section 3. Teleconference Meetings. The Board does hereby determines as a result of the State of Emergency proclaimed by the Governor, and the recommended measures to promote social distancing made by State and local officials that the Board may conduct their meetings without compliance with paragraph (3) of subdivision (b) of Government Code section 54953, as authorized by subdivision (e)(1)(A) and (B) of section 54953, and shall comply with the requirements to provide the public with access tothe meetings as prescribed in paragraph (2) of subdivision (e) of section 54953; and

Section 4. Direction to Staff. The Authority staff are hereby authorized and directed to take all actions necessary to carry out the intent and purpose of this Resolution including, conducting open and public meetings in accordance with Government Code section 54953(e) and other applicable provisions of the Brown Act.

Section 5. Effective Date of Resolution. This Resolution shall take effect immediately upon its adoption.

PASSED AND ADOPTED____________________, by the following vote of the Board of Directors of the Eastern San Joaquin Groundwater Authority, to wit:

AYES:

NOES:

ABSENT:

________________________	________________________
CHUCK WINN Chairman	ATTEST: KRIS BALAJI, PMP. P.E. Secretary

BEFORE THE BOARD OF DIRECTORS OF THE
EASTERN SAN JOAQUIN GROUNDWATER AUTHORITY

RESOLUTION R-22-____

RESOLUTION APPROVING SUBMITTAL OF A GRANT APPLICATION AND SPENDING PLAN TO THE DEPARTMENT OF WATER RESOURCES FOR THE SUSTAINABLE GROUNDATER MANAGEMENT ACT IMPLEMENTATION GRANT UNDER THE SUSTAINABLE GROUNDWATER PLANNING GRANT PROGRAM

WHEREAS, the Eastern San Joaquin Groundwater Authority ("ESJGWA") is a Joint Powers Authority created pursuant to California statute, and which is a public entity separate and apart from the Members; and

WHEREAS, the ESJGWA was formed to provide coordination among the Members to develop and implement a Groundwater Sustainability Plan ("GSP") for the Eastern San Joaquin Subbasin ("Basin") in accordance with the Sustainable Groundwater Management Act of 2014 ("SGMA"); and

WHEREAS, the ESJGWA has coordinated among the Members the development of a GSP covering the entire Basin, and submitted it to the Department of Water Resources ("DWR") for their review and acceptance; and

WHEREAS, DWR is accepting SMGA Implementation grant applications with an accompanying spending plan from Critically Overdrafted Basins ("CODs") for the Sustainable Groundwater Management Grant Program; and

WHEREAS, only one application and accompanying spending plan will be accepted by DWR per COD Basin and the applicant must meet the eligibility requirements listed within the Proposal Solicitation Package (PSP) and the 2021 Guidelines; and,

WHEREAS, the Eastern San Joaquin Subbasin (ESJ Subbasin), DWR Basin No. 5-22.01 has, been designated by DWR as a Critically Overdrafted Basin, and the GWA eligible to submit a grant application and accompanying spending plan for up to $10 million on behalf of the ESJ Subbasin; and

WHERAS, after DWR's acceptance, the ESJGWA will be eligible for a minimum grant award of $3.9 million, and an additional $3.7 million, if requested, for tasks and activities that include (1) geophysical investigation(s) of groundwater basins to identify recharge potential, (2) early implementation of existing regional flood management plans that incorporate groundwater recharge, and (3) projects that would complement efforts of a local GSP, that provide floodplain expansion to benefit groundwater recharge or habitat; and

WHEREAS, in February 2022, at a regularly scheduled ESJGWA board meeting, the GSAs in the Basin reviewed a Spending Plan that included the North System Improvements Project sponsored by the North San Joaquin Water Conservation District, and the Eastern San Joaquin Geophysical Investigations and Groundwater Recharge Program sponsored by the San Joaquin County; and

WHEREAS, the City of Stockton submitted the Stockton Geophysical Survey for the Groundwater Recharge Improvements Project which fit into the criteria identified in the DWR Proposal Solicitation Package and helped the competitiveness of the ESJ application; and

WHEREAS, each of the project proponents has adopted resolutions as local project sponsors; and

WHEREAS, as stipulated in the DWR PSP, a review committee comprising the GWA Technical Advisory Committee (TAC) members has reviewed and scored the aforementioned projects, and both projects have been qualified by the TAC for inclusion in the Spending Plan.

NOW, THEREFORE, BE IT RESOLVED that the Eastern San Joaquin Groundwater Authority supports the Spending Plan, grant application, and the projects contained therein, and accepts the application as the sole application to be submitted on behalf of the ESJ Subbasin.

NOW, THEREFORE, BE IT FURTHER RESOLVED that this Board of Directors of the Eastern San Joaquin Groundwater Authority hereby approves submittal of an application containing the Spending Plan attached hereto (Exhibit A) to the California Department of Water Resources for the Sustainable Groundwater Management Act Implementation Grant, under the Sustainable Groundwater Management Program, and entering into an agreement to receive said funds.

NOW, THEREFORE, BE IT FURTHER RESOLVED that the Secretary of the Eastern San Joaquin Groundwater Authority or designee is hereby directed and authorized to prepare the necessary data, conduct investigations, file such application, execute a grant agreement and any subsequent amendments thereto with California Department of Water Resources, and take other actions as necessary and appropriate to obtain Grant funding and complete the projects within the application.

PASSED and ADOPTED this 9th day of February, 2022 by the following vote of the Board of Directors of the Eastern San Joaquin Groundwater Authority, to wit:

AYES:

NOES:

ABSENT:

ATTEST: KRIS BALAJI, PMP, P.E.
Secretary of the
Eastern San Joaquin
Groundwater Authority

CHUCK WINN, Chairman
Board of Directors of the
Eastern San Joaquin
Groundwater Authority

Attachment 5.1

CALIFORNIA DEPARTMENT OF WATER RESOURCES

SUSTAINABLE GROUNDWATER MANAGEMENT OFFICE

715 P Street | Sacramento, CA 95814 | P.O. Box 942836 | Sacramento, CA 94236-0001

January 28, 2022

Kris Balaji, PMP, P.E.
Eastern San Joaquin Subbasin Plan Administrator
1810 E. Hazelton Avenue
Stockton, CA 95201
kbalaji@sjgov.org

RE: Incomplete Determination of the 2020 Eastern San Joaquin Subbasin Groundwater Sustainability Plan

Dear Kris Balaji,

The Department of Water Resources (Department) has evaluated the groundwater sustainability plan (GSP) submitted for the Eastern San Joaquin Subbasin (Subbasin) and has determined that the GSP is incomplete. The Department based its determination on recommendations from the Staff Report, included as an enclosure to the attached Statement of Findings, which describes that the Eastern San Joaquin Subbasin GSP does not satisfy the objectives of the Sustainable Groundwater Management Act (SGMA) nor substantially comply with the GSP Regulations. The Staff Report also provides corrective actions which the Department recommends to address the identified deficiencies.

The Subbasin's Groundwater Sustainability Agencies (GSAs) have 180 days, the maximum allowed by GSP Regulations, to address the identified deficiencies. Where addressing the deficiencies requires modification of the GSP, the GSAs must adopt those modifications into the Subbasin's GSP or otherwise demonstrate that those modifications are part of the GSP before resubmitting it to the Department for evaluation no later than July 27, 2022. The Department understands that much work has occurred to advance sustainable groundwater management since the GSAs submitted the GSP in January 2020. To the extent to which those efforts are related or responsive to the Department's identified deficiencies, we encourage you to document that as part of your resubmittal. The Department prepared a Frequently Asked Questions document to provide general information and guidance on the process of addressing deficiencies in an incomplete determination.

Department staff will work expeditiously to review the revised components of your GSP resubmittal. If the revisions address the identified deficiencies, the Department will determine that the GSP is approved. In that scenario, Department staff will identify additional recommended corrective actions that the GSAs should address early in implementing their GSP (i.e., no later than the first required periodic evaluation). Among other items, those recommendations will include for the GSAs to provide more detail on their plans and schedules to address data gaps. Those recommendations will also call for significantly expanded documentation of the plans and schedules to implement specific projects and management actions. Regardless of those recommended corrective actions, the Department expects the first periodic evaluations, required no later than January 2025 – one-quarter of the way through the 20-year implementation period – to document significant progress toward achieving sustainable groundwater management.

If the GSAs cannot address the deficiencies identified in this letter by July 27, 2022, then the Department, after consultation with the State Water Resources Control Board, will determine the GSP to be inadequate. In that scenario, the State Water Resources Control Board may identify additional deficiencies that the GSAs would need to address in the state intervention processes outlined in SGMA.

Please contact Sustainable Groundwater Management staff by emailing sgmps@water.ca.gov if you have any questions about the Department's assessment, implementation of your GSP, or to arrange a meeting with the Department.

Thank You,

Paul Gosselin

Paul Gosselin
Deputy Director of Sustainable Groundwater Management

Attachment:

1. Statement of Findings Regarding the Determination of Incomplete Status of the San Joaquin Valley - Eastern San Joaquin Subbasin Groundwater Sustainability Plan

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

STATEMENT OF FINDINGS REGARDING THE DETERMINATION OF INCOMPLETE STATUS OF THE SAN JOAQUIN VALLEY – EASTERN SAN JOAQUIN SUBBASIN GROUNDWATER SUSTAINABILITY PLAN

The Department of Water Resources (Department) is required to evaluate whether a submitted groundwater sustainability plan (GSP or Plan) conforms to specific requirements of the Sustainable Groundwater Management Act (SGMA or Act), is likely to achieve the sustainability goal for the basin covered by the Plan, and whether the Plan adversely affects the ability of an adjacent basin to implement its GSP or impedes achievement of sustainability goals in an adjacent basin. (Water Code § 10733.) The Department is directed to issue an assessment of the Plan within two years of its submission. (Water Code § 10733.4.) This Statement of Findings explains the Department's decision regarding the Plan submitted by the Eastern San Joaquin Groundwater Authority (Authority), which is a joint powers authority formed by the 16 groundwater sustainability agencies (GSAs) located within the San Joaquin Valley – Eastern San Joaquin Subbasin (No. 5-022.01).

Department management has reviewed the enclosed Staff Report, which recommends that the identified deficiencies should preclude approval of the GSP. Based on its review of the Staff Report, Department management is satisfied that staff have conducted a thorough evaluation and assessment of the Plan and concurs with, and hereby adopts, staff's recommendation and all the corrective actions provided. The Department thus deems the Plan incomplete based on the Staff Report and the findings contained herein.

A. The GSP has not defined sustainable management criteria (SMC) for the chronic lowering of groundwater levels in the manner required by SGMA and the GSP Regulations.

    1. The GSP lacks sufficient justification for identifying that undesirable results for chronic lowering of groundwater levels (and by proxy land subsidence and depletion of interconnected surface waters) can only occur in consecutive non-dry water year types.

        i. The GSP's proposed water-year type requirement in the definition of the undesirable result for chronic lowering of groundwater levels (i.e., two consecutive non-dry years) is not consistent with the intent of SGMA and could potentially allow for unmanaged and continued lowering of groundwater levels under certain hydrologic or climatic conditions that have occurred historically.

ii. While SGMA states that "overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods", the GSP fails to identify specific extraction and groundwater recharge management actions the GSAs would implement or otherwise describe how the Subbasin would be managed to offset, by increases in groundwater levels or storage during other periods, dry year reductions of groundwater levels or storage.

iii. The GSP does not explain or disclose the potential impacts anticipated during extended drier climate conditions, as allowed by the water-year type requirement used to define undesirable results. In other words, the proposed management program may lead to potential effects on domestic wells or other beneficial uses and users during prolonged dry- or below-normal periods, and that information should, at a minimum, be disclosed and considered in the GSP.

iv. Although SGMA states that groundwater level declines during drought periods are not necessarily an undesirable result for chronic lowering of groundwater levels (if properly managed and offset), the statute does not include a similar exception for subsidence or stream depletion during periods of drought. The greatest impacts to infrastructure from land subsidence and beneficial uses of surface water from depletions of interconnected surface water are likely to occur when groundwater levels are lowest, which would likely be during dry and critically dry water years, and the GSP does not provide an evaluation of these potential impacts.

2. The GSP lacks sufficient explanation for its chronic lowering of groundwater levels minimum thresholds and undesirable results.

   i. Apart from an analysis of potential impacts to domestic and municipal wells going dry, the GSP does not address how groundwater level SMCs are protective of other potential undesirable results identified by the GSAs, including reductions in pumping capacity or increased pumping costs for shallow groundwater users, or adverse impacts to environmental uses and users.

ii. The GSP only considers an undesirable result to occur for groundwater levels in the Subbasin when at least 25 percent of representative monitoring wells (5 of 20 wells) fall below their minimum threshold value for two consecutive non-dry water years. The GSP does not justify or discuss how the GSAs developed this 25 percent threshold or show how the potential impacts allowed by this requirement would not be significant and unreasonable.

iii. The GSP does not explain how the proposed minimum thresholds for the chronic lowering of groundwater levels, which allow groundwater levels to fall below historic lows, will be sufficient to avoid undesirable results related to groundwater quality.

B. The GSP does not provide enough information to support the use of the chronic lowering of groundwater level SMCs and representative monitoring network as a proxy for land subsidence.

1. The GSP does not identify specific infrastructure locations, such as flood control or water conveyance facilities, and the rate and extent of subsidence that would substantially interfere with those land surface uses and may lead to undesirable results.

   i. Without the identification of specific infrastructure potentially at risk due to land subsidence, the GSP's proposed groundwater level monitoring network cannot be determined to be adequate.

2. The GSP does not provide adequate evidence to demonstrate a significant correlation between groundwater levels and land subsidence in the Subbasin, particularly relating to the potential for groundwater levels to decline below historic lows.

   i. Without additional evaluation of potential groundwater level declines allowed by the chronic lowering of groundwater level SMCs, in addition to an analysis of dewatered subsurface materials related to those declines, the GSP does not provide enough information for the Department to conclude that the use of groundwater level SMCs as proxy for land subsidence would protect against undesirable results.

Based on the above, the GSP submitted by the Authority for the San Joaquin Valley – Eastern San Joaquin Subbasin is determined to be incomplete because the GSP does not satisfy the requirements of SGMA, nor does it substantially comply with the GSP Regulations. The corrective actions provided in the Staff Report are intended to address the deficiencies that, at this time, preclude approval. The Authority has up to 180 days to address the deficiencies outlined above and detailed in the Staff Report. Once the Authority resubmits its Plan, the Department will review the revised GSP to evaluate whether the deficiencies were adequately addressed. Should the Authority fail to take sufficient actions to correct the deficiencies identified by the Department in this assessment, the Department shall disapprove the Plan if, after consultation with the State Water Resource Control Board, the Department determines the Plan inadequate pursuant to 23 CCR § 355.2(e)(3)(C).

Signed:

Karla Nemeth, Director
Date: January 28, 2022

Enclosure: Groundwater Sustainability Plan Assessment Staff Report – San Joaquin Valley – Eastern San Joaquin Subbasin

State of California
Department of Water Resources
Sustainable Groundwater Management Program
Groundwater Sustainability Plan Assessment Staff Report

Groundwater Basin Name:	San Joaquin Valley – Eastern San Joaquin Subbasin (No. 5-022.01)
Submitting Agencies:	Central Delta Water Agency GSA; Central San Joaquin Water Conservation District GSA; City of Lodi GSA; City of Manteca GSA; City of Stockton GSA; County of San Joaquin GSA - Eastern San Joaquin 1; County of San Joaquin GSA - Eastern San Joaquin 2; Eastside San Joaquin GSA; Linden County Water District GSA; Lockeford Community Service District GSA; North San Joaquin Water Conservation District GSA; Oakdale Irrigation District GSA; South Delta Water Agency GSA; South San Joaquin GSA; Stockton East Water District GSA; Woodbridge Irrigation District GSA
Recommendation:	Incomplete
Date:	January 28, 2022

The Sustainable Groundwater Management Act (SGMA)[1] allows for any of the three following planning scenarios: a single groundwater sustainability plan (GSP) developed and implemented by a single groundwater sustainability agency (GSA); a single GSP developed and implemented by multiple GSAs; and multiple GSPs implemented by multiple GSAs and coordinated pursuant to a single coordination agreement.[2] Here, as presented in this staff report, a single GSP covering the entire basin was adopted and submitted to the Department of Water Resources (Department) for review.[3]

The Central Delta Water Agency GSA, Central San Joaquin Water Conservation District GSA, City of Lodi GSA, City of Manteca GSA, City of Stockton GSA, County of San Joaquin GSA - Eastern San Joaquin 1, County of San Joaquin GSA - Eastern San Joaquin 2, Eastside San Joaquin GSA, Linden County Water District GSA, Lockeford Community Service District GSA, North San Joaquin Water Conservation District GSA, Oakdale Irrigation District GSA, South Delta Water Agency GSA, South San Joaquin GSA, Stockton East Water District GSA, and Woodbridge Irrigation District GSA (collectively, the GSAs) jointly submitted the Eastern San Joaquin Groundwater Subbasin Groundwater Sustainability Plan (GSP or Plan) to the Department for evaluation and

[1] Water Code § 10720 *et seq*.
[2] Water Code § 10727.
[3] Water Code §§ 10727(b)(1), 10733.4; 23 CCR § 355.2.

assessment as required by SGMA and the GSP Regulations.[4] The GSP covers the entire Eastern San Joaquin Subbasin (Subbasin) for the implementation of SGMA.

Evaluation and assessment by the Department is based on whether the adopted and submitted GSP, either individually or in coordination with other adopted and submitted GSPs, complies with SGMA and substantially complies with GSP Regulations. Department staff base their assessment on information submitted as part of an adopted GSP, public comments submitted to the Department, and other materials, data, and reports that are relevant to conducting a thorough assessment.[5] Department staff have evaluated the GSP and have identified deficiencies that staff recommend should preclude its approval.[6] In addition, consistent with the GSP Regulations, Department staff have provided corrective actions[7] that the GSAs should review while determining how and whether to address the deficiencies. The deficiencies and corrective actions are explained in greater detail in Section 3 of this staff report, and are generally related to the need to define sustainable management criteria in the manner required by SGMA and the GSP Regulations.

This assessment includes four sections:

- **Section 1 – Evaluation Criteria:** Describes the legislative requirements and the Department's evaluation criteria.
- **Section 2 – Required Conditions:** Describes the submission requirements, GSP completeness, and basin coverage required for a GSP to be evaluated by the Department.
- **Section 3 – Plan Evaluation:** Provides a detailed assessment of deficiencies identified in the GSP which may be capable of being corrected by the GSAs. Consistent with the GSP Regulations, Department staff have provided corrective actions for the GSAs to address the deficiencies.
- **Section 4 – Staff Recommendation:** Provides the recommendation of Department staff regarding the Department's determination.

[4] 23 CCR § 350 *et seq*.
[5] SGMA requires that the Department assess a Plan within two years of its submission by a GSA. However, the Department notes that ongoing litigation raises challenges to the Plan. This assessment is limited to technical review of the submitted Plan, as required by SGMA, and is not intended and should not be read as a comment on the litigation or the legal or factual claims raised by the parties.
[6] 23 CCR § 355.2(e)(2).
[7] 23 CCR § 355.2(e)(2)(B).

1 EVALUATION CRITERIA

The Department evaluates whether a GSP conforms to the statutory requirements of SGMA[8] and is likely to achieve the basin's sustainability goal.[9] To achieve the sustainability goal, the GSP must demonstrate that implementation of its groundwater sustainability program will lead to sustainable groundwater management, which means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results.[10] Undesirable results are required to be defined quantitatively by the GSAs overlying a basin and occur when significant and unreasonable effects for any of the applicable sustainability indicators are caused by groundwater conditions occurring throughout the basin.[11] The Department is also required to evaluate whether the GSP will adversely affect the ability of an adjacent basin to implement its groundwater sustainability program or achieve its sustainability goal.[12]

To evaluate a GSP, the Department must first determine a GSP was submitted by the statutory deadline,[13] is complete,[14] and covers the entire basin.[15] For those GSAs choosing to develop multiple GSPs, the GSPs must be coordinated pursuant to a single coordination agreement that covers the entire basin.[16] If these conditions are satisfied, the Department evaluates the GSP to determine whether it complies with SGMA and substantially complies with the GSP Regulations.[17] As stated in the GSP Regulations, "[s]ubstantial compliance means that the supporting information is sufficiently detailed and the analyses sufficiently thorough and reasonable, in the judgment of the Department, to evaluate the Plan, and the Department determines that any discrepancy would not materially affect the ability of the Agency to achieve the sustainability goal for the basin, or the ability of the Department to evaluate the likelihood of the Plan to attain that goal."[18]

When evaluating whether implementation of the GSP is likely to achieve the sustainability goal for the basin, Department staff review the information provided and relied upon in the GSP for sufficiency, credibility, and consistency with scientific and engineering professional standards of practice.[19] The Department's review considers whether there is a reasonable relationship between the information provided by the GSA and the

[8] Water Code §§ 10727.2, 10727.4.
[9] Water Code §§ 10733(a).
[10] Water Code § 10721(v).
[11] 23 CCR § 354.26 *et seq*.
[12] Water Code § 10733(c).
[13] Water Code § 10720.7; 23 CCR § 355.4(a)(1).
[14] 23 CCR §§ 355.4(a)(2).
[15] 23 CCR § 355.4(a)(3).
[16] Water Code §§ 10727(b)(3), 10727.6; 23 CCR § 357.4.
[17] 23 CCR § 350 *et seq*.
[18] 23 CCR § 355.4(b).
[19] 23 CCR § 351(h).

assumptions and conclusions presented in the GSP, including whether the interests of the beneficial uses and users of groundwater in the basin have been considered; whether sustainable management criteria and projects and management actions described in the GSP are commensurate with the level of understanding of the basin setting; and whether those projects and management actions are feasible and likely to prevent undesirable results.[20] The Department also considers whether the GSA has the legal authority and financial resources necessary to implement the GSP.[21]

To the extent that overdraft is present in a basin, the Department evaluates whether the GSP provides a reasonable assessment of the overdraft and includes reasonable means to mitigate it.[22] When applicable, the Department will assess whether coordination agreements have been adopted by all relevant parties and satisfy the requirements of SGMA and the GSP Regulations.[23] The Department also considers whether the GSP provides reasonable measures and schedules to eliminate identified data gaps.[24] Lastly, the Department's review considers the comments submitted on the GSP and evaluates whether the GSA adequately responded to the comments that raise credible technical or policy issues with the GSP.[25]

The Department is required to evaluate the GSP within two years of its submittal date and issue a written assessment.[26] The assessment is required to include a determination of the GSP's status.[27] The GSP Regulations provide three options for determining the status of a GSP: approved,[28] incomplete,[29] or inadequate.[30]

After review of the GSP, Department staff may find that the information provided is not sufficiently detailed, or the analyses not sufficiently thorough and reasonable, to evaluate whether the GSP is likely to achieve the sustainability goal for the basin. If the Department determines the deficiencies precluding approval may be capable of being corrected by the GSA in a timely manner,[31] the Department will determine the status of the GSP to be incomplete. A formerly deemed incomplete GSP may be resubmitted to the Department for reevaluation after all deficiencies have been addressed by the GSA within 180 days after the Department makes its incomplete determination. The Department will review the revised GSP to evaluate whether the identified deficiencies were sufficiently addressed. Depending on the outcome of that evaluation, the Department may determine the resubmitted GSP is approved. Alternatively, the Department may find a formerly deemed

[20] 23 CCR §§ 355.4(b)(1), (3), (4) and (5).
[21] 23 CCR § 355.4(b)(9).
[22] 23 CCR § 355.4(b)(6).
[23] 23 CCR § 355.4(b)(8).
[24] 23 CCR § 355.4(b)(2).
[25] 23 CCR § 355.4(b)(10).
[26] Water Code § 10733.4(d); 23 CCR § 355.2(e).
[27] *Ibid*.
[28] 23 CCR § 355.2(e)(1).
[29] 23 CCR § 355.2(e)(2).
[30] 23 CCR § 355.2(e)(3).
[31] 23 CCR § 355.2 (e)(2)(B)(i).

incomplete GSP is inadequate if, after consultation with the State Water Resources Control Board, it determines that the GSA has not taken sufficient actions to correct any identified deficiencies.[32]

Even when the Department determines a GSP is approved, indicating that it satisfies the requirements of SGMA and is in substantial compliance with the GSP Regulations, the Department may still recommend corrective actions.[33] Recommended corrective actions are intended to facilitate progress in achieving the sustainability goal within the basin and the Department's future evaluations, and to allow the Department to better evaluate whether implementation of the GSP adversely affects adjacent basins. While the issues addressed by the recommended corrective actions in an approved GSP do not, at the time the determination was made, preclude its approval, the Department recommends that the issues be addressed to ensure the GSP's implementation continues to be consistent with SGMA and the Department is able to assess progress in achieving the basin's sustainability goal.[34] Unless otherwise noted, the Department proposes that recommended corrective actions be addressed by the submission date for the first five-year assessment.[35]

The staff assessment of the GSP involves the review of information presented by the GSA, including models and assumptions, and an evaluation of that information based on scientific reasonableness. In conducting its assessment, the Department does not recalculate or reevaluate technical information provided in the GSP or perform its own geologic or engineering analysis of that information. The recommendation to approve a GSP does not signify that Department staff, were they to exercise the professional judgment required to develop a GSP for the basin, would make the same assumptions and interpretations as those contained in the GSP, but simply that Department staff have determined that the assumptions and interpretations relied upon by the submitting GSA are supported by adequate, credible evidence, and are scientifically reasonable.

Lastly, the Department's review of an approved GSP is a continual process. Both SGMA and the GSP Regulations provide the Department with the ongoing authority and duty to review the implementation of the GSP.[36] Also, GSAs have an ongoing duty to reassess their GSPs, provide annual reports to the Department and, when necessary, update or amend their GSPs.[37] The passage of time or new information may make what is reasonable and feasible at the time of this review to not be so in the future. The emphasis of the Department's periodic reviews will be to assess the progress toward achieving the sustainability goal for the basin and whether GSP implementation adversely affects the ability of adjacent basins to achieve its sustainability goals.

[32] 23 CCR § 355.2 (e)(3)(C).
[33] Water Code § 10733.4(d).
[34] Water Code § 10733.8.
[35] 23 CCR § 356.4.
[36] Water Code § 10733.8; 23 CCR § 355.6 *et seq*.
[37] Water Code §§ 10728 *et seq.*, 10728.2.

2 Required Conditions

A GSP, to be evaluated by the Department, must be submitted within the applicable statutory deadline.[38] The GSP must also be complete and must, either on its own or in coordination with other GSPs, cover the entire basin. If a GSP is determined to be incomplete, Department staff may require corrective actions that address minor or potentially significant deficiencies identified in the GSP. The GSAs in a basin, whether developing a single GSP covering the basin or multiple GSPs, must sufficiently address those required corrective actions within the time provided, not to exceed 180 days, for the GSP to be reevaluated by the Department and potentially approved.

2.1 Submission Deadline

SGMA required basins categorized as high- or medium-priority as of January 1, 2017 and that were subject to critical conditions of overdraft to submit a GSP no later than January 31, 2020.[39]

The GSAs submitted the GSP for the Eastern San Joaquin Subbasin on January 29, 2020, in compliance with the statutory deadline.

2.2 Completeness

GSP Regulations specify that the Department shall evaluate a GSP if that GSP is complete and includes the information required by SGMA and the GSP Regulations.[40]

The GSAs submitted an adopted GSP for the entire Subbasin. Department staff found the GSP to be complete and include the required information, sufficient to warrant an evaluation by the Department. The Department posted the GSP to its website on January 31, 2020.

2.3 Basin Coverage

A GSP, either on its own or in coordination with other GSPs, must cover the entire basin.[41] A GSP that intends to cover the entire basin may be presumed to do so if the basin is fully contained within the jurisdictional boundaries of the submitting GSAs.

The GSP intends to manage the entire Eastern San Joaquin Subbasin and the jurisdictional boundaries of the submitting GSAs cover the entire Subbasin.

[38] Water Code § 10720.7.
[39] Water Code § 10720.7(a)(1).
[40] 23 CCR § 355.4(a)(2).
[41] Water Code § 10727(b); 23 CCR § 355.4(a)(3).

3 Plan Evaluation

As stated in Section 355.4 of the GSP Regulations, a basin "shall be sustainably managed within 20 years of the applicable statutory deadline consistent with the objectives of the Act." The Department's assessment is based on a number of related factors including whether the elements of a GSP were developed in the manner required by the GSP Regulations, whether the GSP was developed using appropriate data and methodologies and whether its conclusions are scientifically reasonable, and whether the GSP, through the implementation of clearly defined and technically feasible projects and management actions, is likely to achieve a tenable sustainability goal for the basin.

Department staff have identified deficiencies in the GSP, the most serious of which preclude staff from recommending approval of the GSP at this time. Department staff believe the GSAs may be able to correct the identified deficiencies within 180 days. Consistent with the GSP Regulations, Department staff are providing corrective actions related to the deficiencies, detailed below, including the general regulatory background, the specific deficiency identified in the GSP, and the specific actions to address the deficiency.

3.1 Deficiency 1. The GSP lacks sufficient justification for determining that undesirable results for chronic lowering of groundwater levels, subsidence, and depletion of interconnected surface waters can only occur in consecutive non-dry water year types. The GSP also lacks sufficient explanation for its minimum thresholds and undesirable results for chronic lowering of groundwater levels.

3.1.1 Background

Related to this deficiency, SGMA defines the term "Undesirable Result," in part, as one or more of the following effects caused by groundwater conditions occurring throughout the basin:[42]

- Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon. Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods.

[42] Water Code § 10721(x).

- Significant and unreasonable land subsidence that substantially interferes with surface land uses.
- Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.

3.1.2 Deficiency Details

1 Department staff identified two areas of concern, described below, which, if not addressed, should preclude approval of the GSP. Regarding the first area of concern, the GSP identifies that an undesirable result occurs "when at least 25 percent of representative monitoring wells used to monitor groundwater levels (5 of 20 wells in the Subbasin) fall below their minimum level thresholds for two consecutive years that are categorized as non-dry years (below-normal, above-normal, or wet), according to the San Joaquin Valley Water Year Hydrologic Classification." The GSP further states that "the lowering of groundwater levels during consecutive dry or critically-dry years is not considered to be unreasonable, and would therefore not be considered an undesirable result, unless the levels do not rebound to above the thresholds following those consecutive non-dry years."[43]

1.1 Department staff find that the water-year type requirement in the definition of the undesirable result for chronic lowering of groundwater levels (i.e., two consecutive non-dry years) is not consistent with SGMA. The water-year type requirement could potentially allow for unmanaged and continued lowering of groundwater levels under certain hydrologic or climatic conditions that have occurred historically. A review of historical San Joaquin Valley water-year type classifications[44] indicates the potential for dry periods without the occurrence of a second consecutive non-dry year to persist for greater than ten years (see, e.g., the 11 years from water years 1985 through 1995). Department staff also note that consecutive non-dry years (i.e., below normal, above normal, or wet years) occurred in only five of the last twenty water years from 2001 through 2020. Because of this definition, GSAs in the Subbasin could disregard potential impacts of groundwater level declines below the minimum thresholds during extended periods of dry years, even if interrupted by individual normal or wet years.

1.2 Department staff also find this methodology inconsistent with other portions of the GSP. For example, while describing measurable objectives for groundwater levels, the GSP states, "the margin of operational flexibility is intended to accommodate droughts, climate change, conjunctive use operations, or other groundwater management activities. The margin of operational flexibility is defined as the difference between the minimum threshold and the measurable objective."[45] Based on these statements, it appears the minimum thresholds already accommodate drought conditions, so it is unclear why the

[43] ESJ GSP, p. 253.
[44] Chronological Reconstructed Sacramento and San Joaquin Valley Water Year Hydrologic Classification Indices, Water Year 1901 through 2020. California Department of Water Resources, https://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST.
[45] ESJ GSP, p. 259.

GSP's definition of undesirable results further excludes minimum threshold exceedances during dry water years. (See Corrective Action 1a.)

1.3 SGMA states that "overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods."[46] If the GSAs intended to incorporate this concept into their definition of the undesirable result for chronic lowering of groundwater levels, the GSP fails to identify specific extraction and groundwater recharge management actions the GSAs would implement[47] or otherwise describe how the Subbasin would be managed to offset, by increases in groundwater levels or storage during other periods, dry year reductions of groundwater storage. The GSP identifies many projects that, once implemented, may lead to the elimination of long-term overdraft conditions in the Subbasin. However, the GSP does not sufficiently detail how projects and management actions, in conjunction with the proposed chronic lowering of groundwater levels sustainable management criteria, will offset drought-related groundwater reductions and avoid significant and unreasonable impacts when groundwater level minimum thresholds are potentially exceeded for an extended period in the absence of two consecutive non-dry years. (See Corrective Action 1b.)

As noted above, the GSP states that minimum thresholds developed for chronic lowering of groundwater levels serve as proxies for subsidence[48] and depletion of interconnected surface waters.[49] Therefore, Department staff assume the GSAs intend to apply the same water-year type criteria to undesirable results for those sustainability indicators (i.e., land subsidence or depletion of interconnected surface water undesirable results do not occur until groundwater levels exceed the thresholds for two consecutive non-dry water years).
1.4 However, where SGMA acknowledges that groundwater level declines during drought periods are not necessarily sufficient to cause an undesirable result for chronic lowering of groundwater levels (if basin management offsets those depletions in other periods), SGMA does not provide a similar exception for subsidence or stream depletion during periods of drought. (See Corrective Action 1c.)

2 Department staff's second area of concern is the GSP's evaluation of the effects of the proposed minimum thresholds and undesirable results on beneficial uses and users of groundwater. The GSP describes that the chronic lowering of groundwater levels could cause undesirable results such as wells going dry, reductions in pumping capacities, increased pumping costs, the need for deeper well installations or lowering of pumps, and adverse impacts to environmental uses and users.[50] The GSP builds an analysis of domestic wells going dry into its minimum thresholds, thereby considering the factors of

---

[46] Water Code § 10721(x)(1).
[47] 23 CCR § 354.44(b)(9).
[48] ESJ GSP, p. 270.
[49] ESJ GSP, p. 271.
[50] ESJ GSP, p. 253.

2.1 wells going dry and the need for deeper well installations. However, it does not address how the management criteria address the other factors identified by the GSAs as potential undesirable results including reductions in pumping capacity or increased pumping costs for shallow groundwater users, or adverse impacts to environmental uses and users.

The GSAs set minimum thresholds in the Subbasin at the shallower of the 10th percentile domestic [or municipal] well depth or the historical low groundwater levels with a subtracted buffer value, which the GSP states allows for operational flexibility.[51] These minimum threshold values would generally allow groundwater levels to decline below historic lows; minimum thresholds defined using the buffer value approach allow twice the historical drawdown from the shallowest recorded groundwater levels.[52] Aside from the
2.2 GSP's domestic well analysis, the only description of how minimum thresholds were developed and evaluated to avoid undesirable results appears to be the statements that "for the majority of the Subbasin, GSA representatives identified no undesirable results, even if groundwater were to reach historical low groundwater levels" and that no GSA indicated undesirable results would occur "if the minimum threshold was set deeper than the [historic low] based on their understanding."[53] The GSP provides no further explanation or description of how the individual GSAs concluded that there would be no undesirable results based on the minimum thresholds.

The GSP only considers an undesirable result to occur for groundwater levels in the Subbasin when at least 25 percent of representative monitoring wells (5 of 20 wells) fall below their minimum threshold value for two consecutive non-dry water years.[54] The GSP
2.3 does not justify or discuss how the GSAs developed the 25 percent threshold, nor does it explain or disclose the potential impacts anticipated during extended drier climate conditions using this threshold (e.g., what impacts may occur if a cluster comprising only 20 percent of monitoring wells fall below their minimum thresholds for an extended period?). In other words, the proposed management program may lead to potential effects on domestic wells or other beneficial uses and users during prolonged dry- or below-normal periods, and that information should, at a minimum, be disclosed and considered in the GSP. (See Corrective Action 1d.)

If, after considering this deficiency, the GSAs retain minimum thresholds that allow for continued lowering of groundwater levels, it is reasonable to assume that some groundwater well impacts (e.g., loss of production capacity, increased pumping costs, etc.) will occur during the implementation of the GSP. SGMA requires GSAs to consider the interests of all groundwater uses and users and to implement their GSPs to mitigate overdraft conditions.[55] Implementing specific projects and management actions to prevent undesirable results may achieve sustainable groundwater management of the basin. The GSAs should describe how projects and management actions would address

[51] ESJ GSP, p. 254-255.
[52] ESJ GSP, p. 258.
[53] ESJ GSP, p. 255.
[54] ESJ GSP, p. 253.
[55] 23 CCR §§ 355.4(b)(4), 355.4(b)(6).

2.4 drinking water impacts due to continued overdraft between the start of GSP implementation and the achievement of the sustainability goal. If the GSP does not include projects or management actions to address drinking water impacts, the GSP should contain a thorough discussion, with supporting facts and rationale, explaining how and why GSAs determined not to include actions to address those impacts from continued groundwater lowering below pre-SGMA levels. (See Corrective Action 1e.)

Additionally, related to the groundwater level declines allowed for by the GSP's minimum
2.5 thresholds, the GSP does not explain how those groundwater level declines relate to the degradation of groundwater quality sustainability indicator. In the GSP, GSAs must describe, among other items, the relationship between minimum thresholds for a given sustainability indicator (in this case, chronic lowering of groundwater levels) and the other sustainability indicators.[56] The GSAs generally commit to monitoring a wide range of water quality constituents, but they have only developed sustainable management criteria for total dissolved solids based on the claim that they have not observed a causal nexus between groundwater management and degradation associated with other constituents. While Department staff are not aware of evidence sufficient to conclude that the GSAs acted unreasonably by focusing only on total dissolved solids, it is clear that the GSAs did not consider, or at least did not document, the potential for any kind of water quality degradation to occur due to further lowering of groundwater levels beyond the historic lows. (See Corrective Action 1f.)

3.1.3 Corrective Action

The GSAs must provide more detailed explanation and justification regarding the selection of the sustainable management criteria for groundwater levels, particularly the undesirable results and minimum thresholds, and the effects of those criteria on the interests of beneficial uses and users of groundwater. Department staff recommend the GSAs consider and address the following:

1a. Department staff believe the management approach described in the GSP, which couples minimum thresholds and measurable objectives that account for operational flexibility during dry periods with a definition of undesirable results that disregards minimum threshold exceedances in all years except consecutive below normal, above normal, or wet years, to be inconsistent with sustainable groundwater management under SGMA. Therefore, the GSAs should remove the water-year type requirement from the GSP's undesirable result definition.

1b. The GSP should be revised to include specific projects and management actions the GSAs would implement to offset drought-year groundwater level declines.

1c. The GSAs should thoroughly explain how their management approach and minimum thresholds avoid undesirable results for subsidence and depletion of interconnected surface waters, in light of the fact that SGMA does not include an

[56] 23 CCR § 354.28(b)(2).

allowance or exemption for conditions that occur during periods of drought for those sustainability indicators.

1d. Removing the water-year type requirement from the definition of an undesirable result (item a, above) would result in a GSP with groundwater level minimum thresholds designed to be generally protective of 90 percent of domestic wells regardless of regional hydrologic conditions. In that scenario, the GSAs should explain the rationale for determining that groundwater levels can exceed those thresholds at 25 percent of monitoring sites for two consecutive years before the effects would be considered significant and unreasonable. The GSAs should also explain how other factors they identified as "potential undesirable results" (e.g., adverse impacts to environmental uses and users) were considered when developing and selecting minimum thresholds and describe anticipated effects of the thresholds on beneficial uses and users of groundwater. Furthermore, the GSAs should explain whether other drinking water users that may rely on shallow wells, such as public water systems and state small water systems, were considered in the GSAs' site-specific thresholds. If not, the GSAs should conduct outreach with those users and incorporate their shallow wells, as applicable, into the consideration of site-specific minimum thresholds and measurable objectives.

1e. The GSAs should revise the GSP to describe how they would address drinking water impacts caused by continued overdraft during the period between the start of GSP implementation and achieving the sustainability goal. If the GSP does not include projects or management actions to address those impacts, the GSP should contain a thorough discussion, with supporting facts and rationale, explaining how and why the GSAs determined not to include specific actions to address drinking water impacts from continued groundwater lowering below pre-SGMA levels.

1f. The GSP should be revised to explain how the GSAs will assess groundwater quality degradation in areas where further groundwater level decline, below historic lows, is allowed via the minimum thresholds. The GSAs should further describe how they will coordinate with the appropriate groundwater users, including drinking water, environmental, and irrigation users as identified in the GSP. The GSAs should also discuss efforts to coordinate with water quality regulatory agencies and programs in the Subbasin to understand and develop a process for determining if continued lowering of groundwater levels is resulting in degraded water quality (e.g., increased concentrations of constituents of concern) in the Subbasin during GSP implementation.

3 3.2 DEFICIENCY 2. THE GSP DOES NOT PROVIDE ENOUGH INFORMATION TO SUPPORT THE USE OF THE CHRONIC LOWERING OF GROUNDWATER LEVEL SUSTAINABLE MANAGEMENT CRITERIA AND REPRESENTATIVE MONITORING NETWORK AS A PROXY FOR LAND SUBSIDENCE.

3.2.1 Background

The GSP Regulations state that minimum thresholds for land subsidence should identify the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results. These quantitative values should be supported by: [57]

- The identification of land uses or property interests potentially affected by land subsidence;
- An explanation of how impacts to those land uses or property interests were considered when establishing minimum thresholds;
- Maps or graphs showing the rates and extents of land subsidence defined by the minimum thresholds.

The GSP Regulations allow the use of groundwater elevations as a proxy for land subsidence. However, GSAs must demonstrate a significant correlation between groundwater levels and land subsidence and must demonstrate that groundwater level minimum thresholds represent a reasonable proxy for avoiding land subsidence undesirable results. Additionally, the GSAs must demonstrate how the monitoring network is adequate to identify undesirable results for both metrics.

3.2.2 Deficiency Details

3.1 Department staff find that the GSP does not adequately identify or define minimum thresholds and undesirable results for land subsidence. The GSP also does not provide adequate justification and explanation for using the groundwater level minimum thresholds and representative monitoring network as a proxy for land subsidence.

3.2 Generally, the GSP identifies that irrecoverable loss of groundwater storage and damage to infrastructure, including water conveyance facilities and flood control facilities, are potential impacts of land subsidence.[58] However, the GSP does not identify specific infrastructure locations, particularly those associated with public safety, in the Subbasin and the rate and extent of subsidence that would substantially interfere with those land surface uses and may lead to undesirable results. Additionally, without identifying infrastructure considered at risk for interference from land subsidence, Department staff cannot evaluate whether the groundwater level representative monitoring network is adequate to detect potential subsidence-related impacts.

[57] 23 CCR § 354.28(c)(5).
[58] ESJ GSP, p. 269.

3.3 Department staff find the GSP does not provide adequate evidence to demonstrate a significant correlation between groundwater levels and land subsidence in the Subbasin. Without explaining this correlation, the Department cannot evaluate whether the groundwater level minimum thresholds and associated conditions required for identifying an undesirable result would protect against significant and unreasonable impacts related to land subsidence. The GSP states a significant correlation exists between groundwater levels and land subsidence, with lowering groundwater levels driving further land
3.4 subsidence.[59] Department staff agree with this general statement. However, the GSP fails to provide adequate evidence to evaluate further this correlation, specifically concerning potential subsidence that could be caused by groundwater levels falling below historic lows, as would be allowed by the groundwater level minimum thresholds set in the GSP.

The GSP's justification for using the proposed groundwater level minimum thresholds as a proxy for land subsidence appears to rely mainly on an incomplete analysis and a data set with significant data gaps. The GSP states there are no historical records of significant and unreasonable land subsidence in the Subbasin.[60] The GSP also states that there is a lack of direct land subsidence monitoring in the Subbasin.[61] The GSP uses this absence of historical records to assert that historically dewatered geologic units are not compressible and, therefore, not at risk for land subsidence. Although groundwater level minimum thresholds are set below historic lows, the GSP states that the GSAs do not expect further declines in groundwater levels to dewater materials deeper than 205 feet below ground surface (the deepest groundwater level minimum threshold value in the Subbasin).[62] The GSP states that subsurface materials encountered up to this depth are the same [non-compressible] geologic units that have been historically dewatered.

3.5 Department staff find multiple aspects of this justification speculative and not supported by the best available science. First, the GSP presents no analysis of historic groundwater levels or historically dewatered subsurface materials to support the conclusion that the
3.6 geologic units are not compressible. Second, the GSP does not provide an analysis showing how additional declines in groundwater levels would only affect subsurface
3.7 materials similar to those which have been historically dewatered. Third, the GSP is unclear on whether the conditions required to identify an undesirable result for chronic lowering of groundwater levels in the Subbasin are also required to identify an undesirable result for land subsidence. Management under the GSP could allow groundwater level minimum thresholds to be exceeded in periods where two consecutive non-dry years do not occur, which is inconsistent with the claim that only materials up to the deepest groundwater level minimum threshold (205 feet below ground surface) will be dewatered.

Department staff note that the Legislature intended that implementation of SGMA would avoid or minimize subsidence.[63] Without analysis examining how allowable groundwater

---

[59] ESJ GSP, p. 270.
[60] ESJ GSP, p. 269.
[61] ESJ GSP, p. 270.
[62] ESJ GSP, p. 270.
[63] Water Code § 10720.1(e).

levels below those historically experienced in the Subbasin may affect land subsidence, Department staff cannot determine if the GSP adequately avoids or minimizes land subsidence, and the GSP does not provide sufficient evidence to conclude that the proposed chronic lowering of groundwater level minimum thresholds are adequate to detect and avoid land subsidence undesirable results.

3.2.3 Corrective Action

The GSAs must provide detailed information to demonstrate how the use of the chronic lowering of groundwater level minimum thresholds are sufficient as a proxy to detect and avoid significant and unreasonable land subsidence that substantially interferes with surface land uses. Alternatively, the GSAs could commit to utilizing direct monitoring for subsidence, e.g., with remotely sensed subsidence data provided by the Department. In that case, the GSAs should develop sustainable management criteria based on rates and extents of subsidence. Department staff suggest the GSAs consider and address the following issues:

2a. The GSAs should revise the GSP to identify the total extent and rates of subsidence that critical infrastructure in the Subbasin can tolerate during GSP implementation. Support this identification with information on the effects of subsidence on land surface beneficial uses and users and the amount of subsidence that would substantially interfere with those uses and users.

2b. The GSAs should revise the GSP to document a significant correlation between groundwater levels and specific amounts or rates of land subsidence. The analysis should account for potential subsidence related to groundwater level declines below historical lows and further declines that would exceed minimum threshold levels (i.e., during non-consecutive non-dry years, if applicable based on the resolution to Deficiency 1, above). This analysis should demonstrate that groundwater level declines allowed during GSP implementation are preventative of the rates and extent of land subsidence considered significant and unreasonable based on the identified infrastructure of concern. If there is not sufficient data to establish a correlation, the GSAs should consider other options such as direct monitoring of land subsidence (e.g., remotely sensed data provided by the Department, extensometers, GPS stations, etc.) until such time that the GSAs can establish a correlation.

2c. The GSAs should explain how the groundwater level representative monitoring network is sufficient to detect significant and unreasonable rates or extents of subsidence that may substantially interfere with land uses, specifically any identified infrastructure of concern. If the groundwater level monitoring network alone is not adequate, based on specific infrastructure locations, Department staff suggest incorporating continued analysis of available InSAR data to cover areas with data gaps.

4 STAFF RECOMMENDATION

Department staff believe that the deficiencies identified in this assessment should preclude approval of the GSP for the Eastern San Joaquin Subbasin. Department staff recommend that the GSP be determined incomplete.

PDF Comment No.	DWR Comment on Deficiency	DWR Corrective Action	Category	Response
1	**Deficiency 1: The GSP lacks sufficient justification for determining that undesirable results for chronic lowering of groundwater levels, subsidence, and depletion of interconnected surface waters can only occur in consecutive non-dry water year types. The GSP also lacks sufficient explanation for its minimum thresholds and undesirable results for chronic lowering of groundwater levels.** **The first potential deficiency relates to the GSP's requirement of two consecutive non-dry (i.e., below normal, above normal, or wet) water-year types and the exclusion of dry and critically dry water-year types in the identification of undesirable results for chronic lowering of groundwater levels, and, by proxy, land subsidence and depletions of interconnected surface water.**	**Corrective Action 1** **The GSAs must provide more detailed explanation and justification regarding the selection of the sustainable management criteria for groundwater levels, particularly the undesirable results and minimum thresholds, and the effects of those criteria on the interests of beneficial uses and users of groundwater.**		
1	**Regarding the first area of concern, the GSP identifies that an undesirable result occurs "when at least 25 percent of representative monitoring wells used to monitor groundwater levels (5 of 20 wells in the Subbasin) fall below their minimum level thresholds for two consecutive years that are categorized as non-dry years (below-normal, above-normal, or wet), according to the San Joaquin Valley Water Year Hydrologic Classification."**			
1.1	The water-year type requirement in the definition of the undesirable result for chronic lowering of groundwater levels (i.e., two consecutive non-dry years) is not consistent with the intent of SGMA... Because of this definition, GSAs in the Subbasin could disregard potential impacts of groundwater level declines below the minimum thresholds during extended periods of dry years, even if interrupted by individual normal or wet years.	a) Department staff believe the management approach described in the GSP, which couples minimum thresholds and measurable objectives that account for operational flexibility during dry periods with a definition of undesirable results that disregards minimum threshold exceedances in all years except consecutive below normal, above normal, or wet years, to be inconsistent with the objectives of SGMA. Therefore, the GSAs should remove the water-year type requirement from the GSP's undesirable result definition.	Clarification/ Additional Information	Recommend preparing separate GWL TM as appendix to the GSP that describes how the MT was developed and the logic/reasoning behind the water year-type designation; but perhaps reconsider keeping the dry-year designation. (Note, if you remove the dry-year designation, then a lot of these comments go away, especially wrt subsidence and ISW)
1.2	It appears the minimum thresholds already accommodate drought conditions, so it is unclear why the GSP's definition of undesirable results further excludes minimum threshold exceedances during dry water years. (See Corrective Action 1a.)		Amend GSP to remove reference to water year type? Is this the easiest? Why would it matter?	Recommend removing water year type from SMC definition.

PDF Comment No.	DWR Comment on Deficiency	DWR Corrective Action	Category	Response
1.3	GSP does not sufficiently detail how projects and management actions, in conjunction with the proposed chronic lowering of groundwater levels sustainable management criteria, will offset drought-related groundwater reductions and avoid significant and unreasonable impacts when groundwater level minimum thresholds are potentially exceeded for an extended period in the absence of two consecutive non-dry years. (See Corrective Action 1b.)	b) The GSP should be revised to include specific projects and management actions the GSAs would implement to offset drought-year groundwater level declines.	Push Back	Groundwater level declines during dry years is 'normal' and expected. The important measure is that the water levels recover during non-dry years. The goal here is basin sustainability over the long term, so should not have projects that specifically offset drought-year groundwater level declines. The GSP provides a solution/ set of projects to address long-term groundwater sustainability of the basin by specifically targeting the basin's annual overdraft. Several drought conditions over the modeling period were considered when quantifying this annual overdraft. Hence, the GWA will be indirectly addressing overdraft through a more long-term approach (rather than a short-term drought response) via the implementation of the
1.4	SGMA acknowledges that groundwater level declines during drought periods are not necessarily sufficient to cause an undesirable result for chronic lowering of groundwater levels (if basin management offsets those depletions in other periods), SGMA does not provide a similar exception for subsidence or stream depletion during periods of drought. (See Corrective Action 1c.)	c) The GSAs should thoroughly explain how their management approach and minimum thresholds avoid undesirable results for subsidence and depletion of interconnected surface waters, in light of the fact that SGMA does not include an allowance or exemption for those conditions to continue in periods of drought.	Additional technical analysis to demonstrate effectiveness of MTs for subsidence and ISW Can we use the model to demonstrate groundwater levels do not fall below clay layers?	Regs say "Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon. Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods." Note that there is not similar language for subsidence and/or ISW. Prepare separate Subsidence/ISW TM documenting additional analysis to demonstrate how the MTs as currently set avoid undesirable results for subsidence and/or ISW in dry periods
2	**Department staff's second area of concern is the GSP's evaluation of the effects of the proposed minimum thresholds and**			
2.1	The GSP builds an analysis of domestic wells going dry into its minimum thresholds, thereby considering the factors of wells going dry and the need for deeper well installations. However, it does not address how the management criteria address the other factors identified by the GSAs as potential undesirable results, including reductions in pumping capacity or increased pumping costs for shallow groundwater users, or adverse impacts to environmental uses and users.	d) Removing the water-year type requirement from the definition of an undesirable result (item a, above) would result in a GSP with groundwater level minimum thresholds designed to be generally protective of 90 percent of domestic wells regardless of regional hydrologic conditions. In that scenario, the GSAs should explain the rationale for determining that groundwater levels can exceed those thresholds at 25 percent of monitoring sites for two consecutive years before the effects would be considered	Clarification/ Additional Information	Previously-mentioned GWL TM can provide the additional information describing how the 25% threshold was selected and demonstrating compliance with regs re: impacts on shallow domestic wells at threshold

PDF Comment No.	DWR Comment on Deficiency	DWR Corrective Action	Category	Response
2.2	Aside from the GSP's domestic well analysis, the only description of how minimum thresholds were evaluated to avoid undesirable results appears to be the statements that “for the majority of the Subbasin, GSA representatives identified no undesirable results, even if groundwater were to reach historical low groundwater levels” and that no GSA indicated undesirable results would occur “if the minimum threshold was set deeper than the [historic low] based on their understanding.” The GSP provides no further explanation or description of how the individual GSAs concluded that there would be no undesirable results based on the minimum thresholds.	significant and unreasonable. The GSAs should also explain how other factors they identified as "potential undesirable results" (e.g., adverse impacts to environmental uses and users) were considered when developing and selecting minimum thresholds and describe anticipated effects of the thresholds on beneficial uses and users of groundwater. Furthermore, the GSAs should explain whether other drinking water users that may rely on shallow wells, such as public water systems and state small water systems, were considered in the GSAs’ site-specific thresholds. If not, the GSAs should conduct outreach with those users and incorporate their shallow wells, as applicable, into the consideration of site-specific minimum thresholds and measurable objectives.	Clarification/ Additional Information and/or Additional Technical Analysis (depending on the data set used in setting the MTs)	Previously-mentioned GWL TM can provide the additional information (or technical analysis, as required) describing the data used in establishing the MTs for GWL and demonstrating the consideration of those depending on shallow wells
2.3	The GSP does not justify or discuss how the GSAs developed the 25 percent threshold, nor does it explain or disclose the potential impacts anticipated during extended drier climate conditions using this threshold (e.g., what impacts may occur if a cluster comprising only 20 percent of monitoring wells fall below their minimum thresholds for an extended period?). In other words, the proposed management program may lead to potential effects on domestic wells or other beneficial uses and users during prolonged dry- or below-normal periods, and that information should, at a minimum, be disclosed and considered in the GSP. (See Corrective Action 1d.)		Clarification/ Additional Information	Previously-mentioned GWL TM can provide the additional information describing the factors used in selecting MT and anticipated impacts of the 25% threshold on groundwater users (e.g. number of domestic wells going dry, impacts to GDEs from changes in GWL)
2.4	The GSAs should describe how projects and management actions would address drinking water impacts due to continued overdraft between the start of GSP implementation and the achievement of the sustainability goal. If the GSP does not include projects or management actions to address drinking water impacts, the GSP should contain a thorough discussion, with supporting facts and rationale, explaining how and why GSAs determined not to include actions to address those impacts from continued groundwater lowering below pre-SGMA levels. (See Corrective Action 1e.)	e) The GSAs should revise the GSP to describe how they would address drinking water impacts caused by continued overdraft during the period between the start of GSP implementation and achieving the sustainability goal. If the GSP does not include projects or management actions to address those impacts, the GSP should contain a thorough discussion, with supporting facts and rationale, explaining how and why the GSAs determined not to include specific actions to address drinking water impacts from continued groundwater lowering below pre-SGMA levels.	Push Back	The GSP regulations and SMC BMP notes that GWLs below MTs may occur during the 20 year implementation period. Per SGMA regulations, it's impacts occurring after sustainability is reached (after the 20 year implementation period) that require mitigation. Also consider removing the water year designation from the SMC definition

PDF Comment No.	DWR Comment on Deficiency	DWR Corrective Action	Category	Response
2.5	The GSP does not explain how those groundwater level declines relate to the degradation of groundwater quality sustainability indicator. GSAs must describe, among other items, the relationship between minimum thresholds for a given sustainability indicator (in this case, chronic lowering of groundwater levels) and the other sustainability indicators. The GSAs generally commit to monitoring a wide range of water quality constituents but they have only developed sustainable management criteria for total dissolved solids because they state they have not observed a causal nexus between groundwater management and degradation associated with the other constituents. While Department staff are not aware of evidence sufficient to conclude that the GSAs acted unreasonably by focusing on total dissolved solids, it is clear that the GSAs did not consider, or at least did not document, the potential for degradation to occur due to further lowering of groundwater levels beyond the historic lows. (See Corrective Action 1f.)	f) The GSP should be revised to explain how the GSAs will assess groundwater quality degradation in areas where further groundwater level decline, below historic lows, is allowed via the minimum thresholds. The GSAs should further describe how they will coordinate with the appropriate groundwater users, including drinking water, environmental, and irrigation users as identified in the GSP. The GSAs should also discuss efforts to coordinate with water quality regulatory agencies and programs in the Subbasin to understand and develop a process for determining if continued lowering of groundwater levels is resulting in degraded water quality (e.g., increased concentrations of constituents of concern) in the Subbasin during GSP implementation.	Clarification/ Additional Information	Modify GSP to more clearly address outreach/coordination requirements and to expand discussion on SMC for groundwater quality
3	**Deficiency 2: The GSP does not provide enough information to support the use of the chronic lowering of groundwater level sustainable management criteria and representative monitoring network as a proxy for land subsidence.** **GSAs must demonstrate a significant correlation between groundwater levels and land subsidence and must demonstrate that groundwater level minimum thresholds represent a reasonable proxy for avoiding land subsidence undesirable results. Additionally, the GSAs must demonstrate how the monitoring network is adequate to identify undesirable results for both metrics.**	**Corrective Action 2** **The GSAs must provide detailed information to demonstrate how the use of the chronic lowering of groundwater level minimum thresholds are sufficient as a proxy to detect and avoid significant and unreasonable land subsidence that substantially interferes with surface land uses. Alternatively, the GSAs could commit to utilizing direct monitoring for subsidence, e.g., with remotely sensed subsidence data provided by the Department. In that case, the GSAs should develop sustainable management criteria based on rates and extents of subsidence.**		Consider revising land subsidence monitoring network to include existing survey benchmarks as contained in UNAVCO's GAGE UNR's Geodesy websites (see Michelle Sneed email to Brandon Nakagawa). Also note that GSP says that InSAR surveys will be analyzed annual report
3.1	Department staff find that the GSP does not adequately identify or define minimum thresholds and undesirable results for land subsidence. The GSP also does not provide adequate justification and explanation for using the groundwater level minimum thresholds and representative monitoring network as a proxy for land subsidence.	a) The GSAs should revise the GSP to identify the total extent and rates of subsidence that critical infrastructure in the Subbasin can tolerate during GSP implementation. Support this identification with information on the effects of subsidence on land surface beneficial uses and users and the amount of subsidence that would substantially interfere with those uses and users.	Clarification/ Additional Information	Either in GSP or as separate TM, provide additional information to explain/justify approach for monitoring and analyzing for land subsidence

PDF Comment No.	DWR Comment on Deficiency	DWR Corrective Action	Category	Response
3.2	The GSP does not identify specific infrastructure locations, particularly those associated with public safety, in the Subbasin and the rate and extent of subsidence that would substantially interfere with those land surface uses and may lead to undesirable results.		Clarification/ Additional Information	Describe geology and causes of inelastic land subsidence to show that (1) subsidence w/ peat soils is different mechanimsm and (2) areas w/o Corcoran or other signficant clay layers are unlikely to subside. Need to focus on where Corcoran exists and sub-Corcoran pumping. Reach out to GSAs to identify 'critical' infrastructure and to assess the amount of differential settlement that can occur before the use of those conveyances are impacted. Modify GSP to add in this information and address this comment
3.3	The GSP does not provide adequate evidence to demonstrate a significant correlation between groundwater levels and land subsidence in the Subbasin.	b) The GSAs should revise the GSP to document a significant correlation between groundwater levels and specific amounts or rates of land subsidence. The analysis should account for potential subsidence related to groundwater level declines below historical lows and further declines that would exceed minimum threshold levels (i.e., during non-consecutive non-dry years, if applicable based on the resolution to Deficiency 1, above). This analysis should demonstrate that groundwater level declines allowed during GSP implementation are preventative of the rates and extent of land subsidence considered significant and unreasonable based on the identified infrastructure of concern. If there is not sufficient data to establish a correlation, the GSAs should consider other options such as direct monitoring of land subsidence (e.g., remotely sensed data provided by the Department, extensometers, GPS stations, etc.) until such time that the GSAs can establish a correlation.	Additional Technical Study	Do specific study to demonstrate linkages between GWL and subsidence or change subsidence montioring network to use existing survey benchmarks and InSAR analyses (see other GSPs for examples)
3.4	The GSP fails to provide adequate evidence to evaluate further this correlation, specifically concerning potential subsidence caused by groundwater levels falling below historic lows, as would be allowed by the groundwater level minimum thresholds set in the GSP.		Clarification/ Additional Information	Describe geology and causes of inelastic land subsidence to show that (1) subsidence w/ peat soils is different mechanimsm and (2) areas w/o Corcoran or other signficant clay layers are unlikely to subside. Need to focus on where Corcoran exists and sub-Corcoran pumping.
3.5	The GSP presents no analysis of historic groundwater levels or historically dewatered subsurface materials to support the conclusion that the geologic units are not compressible.		Clarification/ Additional Information and/or Additional Technical Analysis	Describe geology and causes of inelastic land subsidence to show that (1) subsidence w/ peat soils is different mechanimsm and (2) areas w/o Corcoran or other signficant clay layers are unlikely to subside. Need to focus on where Corcoran exists and sub-Corcoran pumping.

PDF Comment No.	DWR Comment on Deficiency	DWR Corrective Action	Category	Response
3.6	The GSP does not provide an evaluation showing how additional declines in groundwater levels would only affect subsurface materials similar to those which have been historically dewatered.	c) The GSAs should explain how the groundwater level representative monitoring network is sufficient to detect significant and unreasonable rates or extents of subsidence that may substantially interfere with land uses, specifically any identified infrastructure of concern. If the groundwater level monitoring network alone is not adequate, based on specific infrastructure locations, Department staff suggest incorporating continued analysis of available InSAR data to cover areas with data gaps.	Additional technical analysis	Mine existing land surface elevation databases and conduct analysis correlating historic groundwater elevations with land surface elevation data to see if a pattern exists. Include in this analysis documentation of subbasin geology and information relative to were subsidence is likely to occur based on hydrostratigraphy and the associated subsidence mechanisms (e.g., oxidation of peaty soils vs. sub-Corcoran pumping) Prepare TM summarizing technical analysis
3.7	The GSP is unclear on whether the conditions required to identify an undesirable result for chronic lowering of groundwater levels in the Subbasin are also required to identify an undesirable result for land subsidence. Management proposed in the GSP could allow groundwater level minimum thresholds to be exceeded in periods where two consecutive non-dry years do not occur, which does not support the claim that only materials up to the deepest groundwater level minimum threshold (205 feet below ground surface) will be dewatered.		Resell subsidence mntr network	Consider revising land subsidence monitoring network to include existing survey benchmarks as contained in UNAVCO's GAGE UNR's Geodesy websites (see Michelle Sneed email to Brandon Nakagawa). Also note that GSP says that InSAR surveys will be analyzed annually as part of GSP implementation

January 2022 DWR Updates (from DWR's North Central Region Office)

Grants

California Grants Portal

The California State Library, in partnership with the Department of Water Resources and other state grantmaking agencies, has launched the California Grants Portal – your one destination to find all state grant and loan opportunities provided on a first-come or competitive basis. Visit grants.ca.gov to find funding opportunities for you and your community.

DWR: DRAFT 2022 IRWM Grant Program Guidelines and Proposal Solicitation Package

We are pleased to announce the release of the DRAFT 2022 IRWM Grant Program Guidelines and Proposal Solicitation Package (GL/PSP) for the Proposition 1 - Round 2 IRWM Implementation. Release of the drafts commences a 60-day public comment period, which will close at 5:00 pm on February 8, 2021. This solicitation will make **approximately $192 million** in grant funding available for IRWM implementation projects. ***Please note that the draft identifies a March 2022 deadline for Cycle 1 as originally proposed in early 2021. DWR will update this deadline to later in 2022 in the final Proposal Solicitation Package based on the public comments collected.*** For more information on the Proposition 1 IRWM Implementation Grant Program, visit Implementation Grant Program or e-mail us at: dwr_irwm@water.ca.gov. Workshops will be held on the following days, click the date to register for the webinar: Northern CA, Tuesday 2/1/22 9:30-11:30 am; Central CA, Thursday 2/3/22 10:00-12:00 am; and Southern CA, Tuesday 2/8/22 9:30-11:30 am.

DWR: FINAL SGMA Funding Guidelines and Proposal Solicitation Package

The California Department of Water Resources (DWR) has released the final Guidelines and Proposal Solicitation Package (PSP) for the Sustainable Groundwater Management (SGM) Grant Program's Sustainable Groundwater Management Act (SGMA) Implementation Funding. Over $350 million in grants will be available for planning and implementation projects to help regional groundwater agencies comply with the SGMA. **The Round 1 grant solicitation for Critically Overdrafted (COD) basins is now open.** Those potential applicants located within COD basins will be contacted by a SGM Grant Program team member to provide the required templates for applicants to use while applying for the grant program. The Round 1 solicitation will **end on February 18, 2022.**

DWR: $200 Million Drought Funding to Support Small Communities

DWR released guidelines for how small water systems may apply for funds as part of the Small Community Drought Relief Program. Eligible projects must be designed to benefit small communities (< 3,000 connections or 3,000 AFY) located in counties under Governor Newsom's drought emergency proclamations or which the SWRCB may determines that drought conditions necessitate urgent and immediate action. Small communities impacted by the drought are encouraged to apply as soon as possible as funds will be dispersed on a first come first serve basis and can submit applications or questions to SmallCommunityDrought@water.ca.gov. This grant will fund projects that provide immediate or interim drinking water supplies such as hauled or bottled water deliveries, deepening of wells, new or temporary water tank storage, new pipelines and connections to more reliable nearby systems, etc. No local cost share is required.

Department of Conservation: Multibenefit Land Repurposing Program DRAFT Guidelines open for comment

The Multi-Benefit Land Repurposing Program seeks to increase regional capacity to repurpose agricultural land to reduce reliance on groundwater while providing community health, economic wellbeing, water supply, habitat, renewable energy, and climate benefits. **A total of $50 million will be available**, with up to $10 million per basin. Draft Grant Guidelines and links to January public workshops (1/18, 1/19, & 1/20) can be found here. Public comments can be sent to shanna.atherton@conservation.ca.gov. **Public comment closes January 31, 2022 and application release expected 2/4/22 with submission due date of March 21, 2022.**

January 2022 DWR Updates (from DWR's North Central Region Office)

CalFire: Fire Prevention Grants Program FY 2021-2022

CAL FIRE's Fire Prevention Grants Program provides funding for fire prevention projects and activities in and near fire threatened communities. Funded activities include hazardous fuels reduction, wildfire prevention planning, and wildfire prevention education with an emphasis on improving public health and safety while reducing greenhouse gas emissions. **Approximately $120 Million available, no funding match required, application deadline is 2/9/22.** More information can be found here.

Other state & federal grant websites for resources that may be helpful are:

- California Financing Coordinating Committee -- https://cfcc.ca.gov/, and
- CalOES grants -- https://www.caloes.ca.gov/cal-oes-divisions/grants-management
- US EPA -- https://www.epa.gov/grants/specific-epa-grant-programs, and
- Economic Development Administration -- https://eda.gov/funding-opportunities/

Upcoming conferences, webinars, new reports and data

NEW: Webpage for CA Water Plan Update 2023 Published by DWR

DWR has unveiled the new webpage for California Water Plan Update 2023. The California Water Plan is updated every five years. It is the State's strategic plan for managing and developing California's water resources. Update 2023 will emphasize climate change adaptation, regional and watershed resilience, and water equity.

Progress Report Issued on Implementation of the Water Resilience Portfolio

The progress that has been made on implementing California's Water Resilience Portfolio is detailed in a new report from the State. The portfolio was released 18 months ago by Governor Newsom as a water policy blueprint to build climate resilience. The progress report summarizes work done on 142 actions outlined in the portfolio.

DWR and the State Water Resources Control Board have released new principles and strategies for groundwater management and drinking water wells. The document provides a framework for the development of drought-resistant communities. Approximately 82 percent of Californians rely on groundwater for some portion of their drinking water or other household uses. A Spanish version of the draft is available.

DWR: DRAFT Central Valley Flood Protection Plan (CVFPP) Conservation Strategy 2022

The Conservation Strategy is an integral component of the 2022 CVFPP Update. Its purpose is to provide actionable and measurable targets to improve riverine, aquatic, wetland, and riparian habitat in the flood system through the integration of ecological principles with flood risk reduction projects, operation and maintenance activities, institutional support, and other means (e.g., the removal of fish passage barriers). The Conservation Strategy also provides data, information, and guidance to floodplain managers to assist in the development of multi-benefit flood infrastructure improvement projects by integrating project components and management strategies that benefit native species and their habitats. The draft document is now available on DWR's website There will be a 60-day review period for the Draft Conservation Strategy; as such, **DWR will be accepting comments until February 10, 2022**. Comments can be submitted via the webform here or emailed to CScomments@water.ca.gov.

FIRO Workshop and Webinars in January and March

The next Forecast Informed Reservoir Operations (FIRO) Workshop will look at FIRO as a climate resiliency strategy. This is part of a webinar series hosted by the Center for Western Weather and Water Extremes. The workshop will be held Wednesday, Jan.12 and the 8th annual workshop will be held March 21-24 (tentative). More information can be found here.

January 2022 DWR Updates (from DWR's North Central Region Office)

DWR Released California's Groundwater Update 2020 (formerly Bulletin 118) and California's Groundwater Live Online

The Department of Water Resources (DWR) today released the final *California's Groundwater – Update 2020 (Bulletin-118)*, containing information on the condition of the State's groundwater, which is especially important with most of California facing ongoing drought conditions. DWR has also developed a companion web-based application called *California's Groundwater Live* (CalGW Live), leveraging the California Natural Resources Agency Open Data Platform (Open Data) to improve the access and timeliness of statewide groundwater information. The easy-to-use interface will make many of the data sets used in CalGW Update 2020 available in an interactive map format that will be updated regularly for viewing and downloading.

For more information, visit the updated California's Groundwater website Contact: CalGW@water.ca.gov

OpenET makes tracking water use data easier with satellite data

A space-based tool is ready to help track water in the western U.S. Using data from satellites, Open Evapotranspiration (OpenET) gives farmers and other water users information on how much of their water loss ends up as evapotranspiration. The OpenET data are available for 17 western states, including the Colorado River basin area.

Water Board: Drinking water needs assessments

For the first time, the State Water Resources Control Board has completed a comprehensive look at California water systems that are struggling to provide safe drinking water. The needs assessment identifies failing water systems and those at risk of failing. It also offers the most in-depth view of long-term drinking water safety the state has ever had. Details are available in this news release.

SGMA

GSP and Alternative Plan Periodic Evaluations Submittals

If you have questions or need assistance while submitting your 2022 GSP, Alternative Periodic Evaluation (5-year) Plan Update, or update to a previously submitted 2020 GSP, please contact us at GSPSubmittal@water.ca.gov. We have additional staff monitoring this account to provide prompt responses and help with document submittal to DWR's SGMA Portal. If your GSA POC is not current, or you are not sure, please visit the SGMA Portal to ensure that your contact information is up-to-date. When logged in, the Portal allows edits to be made to previously submitted contact information.

DWR Releases GSP Assessments for COD basins that submitted by January 2020

DWR has now released the assessment for all COD basins that submitted GSP's in January of 2020. This included the approval of GSPs for the Santa Cruz Mid-County Basin, the 180/400-Foot Aquifer Subbasin, North and South Yuba Subbasins, the Oxnard Subbasin and Pleasant Valley Basin, Las Posas Valley and Indian Wells Valley. The following subbasin's GSPs were found incomplete on 1/21/22: Westside Subbasin, Delta-Mendota Subbasin, Cuyama Valley Basin, and Paso Robles Subbasin and on 1/28/22: Eastern San Joaquin Subbasin, Merced Subbasin, Chowchilla Subbasin, Kings Subbasin, Kaweah Subbasin, Tulare Lake Subbasin, Tule Subbasin, and Kern County Subbasin. The release of incomplete determination begins a 180 day timeline to correct identified deficiencies that that precluded approval. These assessments and notification letters, along with other pertinent information, can be viewed here on the DWR SGMA Portal.

Week of Webinars on Statewide Groundwater Management Efforts

DWR is hosted a week of webinars on statewide groundwater management efforts. **All presentations were recorded, and the links are below and can also be found on the program webpage**.

- 2022 Groundwater Sustainability Plan (GSP) Submittal Workshop
- 2022 Alternative 5-year Update Submittal Workshop
- Resources for Sustainable Groundwater Management Act (SGMA) Implementation (found under the Sustainable Groundwater Management Program Events tab)
- Accessing Groundwater Data and Tools

January 2022 DWR Updates (from DWR's North Central Region Office)

Dry Well Reporting Site

There is a website available to report private wells going dry at https://mydrywatersupply.water.ca.gov/report/ This information reported to this site is intended to inform state and local agencies on drought impacts on household water supplies. The data reported on this site (excluding personal identifiable information) can be viewed on the SGMA data viewer or downloaded on the CNRA Atlas. Individuals or local agencies can report water shortages and a list of resources are included on the webpage. The reporting forms are available in both English and Spanish.

DWR is developing eight Proposition 68-funded technical projects

These projects include airborne electromagnetic surveys, improving groundwater elevation and quality monitoring networks, Statewide land use data collection, improved subsidence monitoring network, installing and maintaining stream gauges, maintaining and enhancing statewide well completion reports, managing and reporting sustainable groundwater information, and enhancing and maintaining DWR's modeling tools. Fact sheets on each project can be viewed under the "Prop 68" tab here.

- AEM webpage contains information on the how the process works, safety, schedule, data submission by GSAs, TAC, pilot study data and more. Public webinar was held **June 8th 12:00 – 1:00**, a recording can be viewed here and handouts can be downloaded here. **Sonoma Valley Basins were surveyed in November, 2021 and North San Joaquin and Southern Sacramento basins planned for surveying in April 2022.**
- 2018 Statewide Crop Mapping data dataset builds on the 2014 and 2016 statewide crop mapping datasets DWR previously released and includes multi-cropping information. The 2018 dataset includes agricultural land use and urban boundaries for all 58 counties in California. Water year 2019 is planned to be released in 2022.
- InSAR subsidence data is now available through October of 2020 and can be viewed on the SGMA data viewer. The updated GIS services and data reports are also available online. The next year of data, through Oct 2021 is expected to be released in February of 2022. Future data will be released on a quarterly basis.

Outreach and Educational Materials Available

DWR's SGMA Assistance and Engagement webpage has added new communication and engagement toolkit items including:

- A new video – Groundwater: California's Vital Resource now available in English, Spanish, Punjabi, and Hmong
- A Story Map for a non-technical audience – Groundwater: Understanding and Managing this Vital Resource
- Guidance on Engaging and Communicating with Underrepresented Groundwater Users
- SGMA Communications: Media Relations and Social Media, including DWR's Groundwater Media Contacts
- "DWR's Assistance Role in Groundwater Management" video: English and Spanish

CASGEM to Monitoring Network Module Transition Frequently Asked Questions Available

The CASGEM to Monitoring Network Module Transition Frequently Asked Questions (FAQ) document covers questions related to the Groundwater Monitoring Law, the California Statewide Groundwater Elevation Monitoring (CASGEM) Program, a GSP's required monitoring, the SGMA Portal's Monitoring Network Module (MNM), and a basin's or subbasin's transition from the CASGEM Online System to the SGMA Portal's Monitoring Network Module .

Facilitation Support Services (FSS): Funding still available

- GSA's developing GSPs are eligible to receive funding for identification and engagement of interested parties, meeting facilitation, interest-based negotiation/consensus building, and public outreach facilitation
- More information can be found here. New written translation services available in 10 languages for outreach materials (5,000 word maximum).