

San Joaquin County Drought Resilience Plan

Administrative Final



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Prepared for:
San Joaquin County

Prepared by:
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Abbreviations and Acronyms

°F	degrees Fahrenheit
ACS	American Community Survey
CDAG	County Drought Advisory Group
County	San Joaquin County
CWC	California Water Code
DAWG	Drought Advisory Work Group
DRP	Drought Resilience Plan
DWR	California Department of Water Resources
DWWMP	drinking water well mitigation program
EHD	Environmental Health Department
EIDWD	Emergency and Interim Drinking Water Distribution
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
GSA	groundwater sustainability agency
GSP	groundwater sustainability plan
HSC	California Health and Safety Code
LTMSA	long-term mitigation strategy and action
NGO	non-governmental organization
OES	Office of Emergency Services
OSWCR	DWR’s Online System for Well Completion Reports
PFAS	per- and polyfluoroalkyl substances
PIO	public information officer

PLSS	Public Land Survey Section
SAFER	Safe and Affordable Funding for Equity and Resilience
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act
SSWS	state small water system
STRA	short-term response action
State	State of California
State Water Board	State Water Resources Control Board
VOC	volatile organic compound
WSVE	Water Shortage Vulnerability Explorer

1.0 Introduction

The San Joaquin County (County) Drought Resilience Plan (DRP) documents how the County, its Drought Advisory Work Group (DAWG) members, and other entities with water supply and drought management responsibilities will address water supply vulnerabilities for two types of systems in the County: domestic wells, as defined in California Health and Safety Code (HSC) Section 116681(i) and California Water Code (CWC) Section 10609.51(d), and state small water systems (SSWS), as defined in HSC Section 116275(n) and CWC Section 10609.51(l). The County DRP was prepared pursuant to Senate Bill (SB) 552: Drought Planning for Small Water Suppliers, State Small Water Systems, and Domestic Well Communities. This County DRP was developed by the County with funding and technical support provided by the California Department of Water Resources (DWR) Drought Resilience Planning Assistance Program.

1.1 Document Organization

Organization of this document draws from DWR's *County Drought Resilience Plan Guidebook* (DWR 2023). The guidebook is a resource for counties to use in developing a county DRP, specifically for SSWSs and domestic wells. Consistent with the guidebook, the County DRP is organized into seven chapters, as follows:

- **Chapter 1, Introduction**, provides an overview of the legislation relating to SB 552 and the development of the County DRP. It also includes background on County demographics and geography and an overview of domestic wells and SSWSs within the County's jurisdiction.
- **Chapter 2, County Drought Advisory Work Group**, provides an overview of the DAWG, including its development process and charter, membership, roles, purpose, and meeting frequency.
- **Chapter 3, Drought and Water Shortage Risk Assessment**, characterizes the vulnerability of domestic wells and SSWSs within the County to drought and water shortage. This chapter also presents the approach and data used to assess vulnerability. It highlights areas within the County that have a higher risk of drought and water shortage where domestic wells and SSWSs are present. Additionally, data gaps are identified to help inform potential long-term strategies.
- **Chapter 4, Short-Term Response Actions**, details the proposed short-term response actions (STRA) for emergency and interim drought solutions, including specific actions, local response triggers, and public engagement.
- **Chapter 5, Long-Term Mitigation Strategies and Actions**, details the proposed long-term mitigation strategies and actions (LTMSA) for improving the water supply resilience of domestic wells and SSWSs.
- **Chapter 6, Implementation Considerations**, presents a roadmap for implementing STRAs and LTMSAs consistent with the mission and authority of involved agencies. This includes identifying agencies and entities responsible for implementation, the status of implementation, funding, authorization for implementation, and anticipated schedule. This section also summarizes the level of multi-agency collaboration identified by agencies to support implementation.
- **Chapter 7, References**, provides a list of references used in this plan.

1.2 Legislative Requirements

Signed into law in September 2021 by Governor Gavin Newsom, SB 552 (Hertzberg)¹ obligated the State of California (State) and local governments to share the responsibility for preparing for and responding to a water shortage event. These new requirements are expected to improve the ability of Californians to manage future droughts and help prevent catastrophic impacts on drinking water for communities vulnerable to the effects of climate change. The bill outlines the new requirements for small water suppliers, county governments, DWR, and the State Water Resources Control Board (State Water Board) to implement more proactive drought planning and be better prepared for future water shortage events or dry years.

SB 552 also implements legislation on water conservation and drought planning (SB 606 [Hertzberg] and Assembly Bill 1668 [Friedman], as amended; collectively referred to as “the 2018 legislation”) passed by the State Legislature. The 2018 legislation provides a new framework for urban water use efficiency; directives for eliminating water waste; additional requirements for strengthening local drought resilience for urban areas, vulnerable small water suppliers, and rural communities; and recommendations for improving agricultural water use efficiency and drought planning.

Water users protected under SB 552 include:

- **Small Water Supplier:** A community water system serving 15 to 2,999 service connections, inclusive, that provides less than 3,000 acre-feet of water annually (CWC Section 10609.51(k)).
- **Community Water System:** A public water system that serves at least 15 service connections used by yearlong residents or regularly serves at least 25 yearlong residents of the area served by the system, as defined in HSC Section 116275(i) and Section 10609.51(a).
- **SSWS:** A system for the provision of piped water to the public for human consumption that serves at least 5, but not more than 14, service connections and does not regularly serve drinking water to more than an average of 25 individuals daily for more than 60 days out of the year, as defined in HSC Section 116275(n) and Section 10609.51(m).
- **Domestic Well:** A groundwater well used to supply water for the domestic needs of an individual residence or a water system that is not a public water system and that has no more than four service connections, as defined in HSC Section 116681(i) and CWC Section 10609.51(d).

¹ In 2018, DWR convened a County Drought Advisory Group (CDAG) to assist in a vulnerability assessment and to develop recommended actions for improving drought planning for small water suppliers and rural communities. The CDAG consisted of representatives from counties and other local agencies, small water systems, tribes, academics, non-profit organizations, and other interested parties. The CDAG’s recommendations were provided to the legislature in March 2021 and served as the basis for SB 552. DWR has also established a standing drought and water shortage interagency task force, in coordination with the State Water Board and other relevant state agencies, to facilitate proactive state planning and coordination for pre-drought planning, emergency response, and post-drought management, consistent with SB 552. The interagency task force, called the Drought Resilience Interagency and Partners Collaborative, serves as a public forum with State and non-State agency members to advance drought strategies and continue building resilience to the increasingly arid conditions California faces. More information is available at: [Drought Resilience Interagency & Partners Collaborative](#).

- **Nontransient Noncommunity Water System:** A public water system that is not a community water system and that regularly serves at least 25 of the same persons for over 6 months per year, as defined in HSC Section 116275(k) and Section 10609.51(f).

Among the water users protected under SB 552, this County DRP addresses water shortage vulnerabilities for domestic wells and SSWs. Other water users protected under SB 552 not covered by this County DRP have separate requirements to address water shortage vulnerabilities.

1.2.1 County Agency Requirements

This plan fulfills county requirements for preparation of a plan that addresses potential drought and water shortage risk and proposed interim and long-term solutions for domestic wells and SSWs within a county's jurisdiction (CWC Section 10609.70). While measures to protect small water suppliers and nontransient noncommunity water systems are not within the scope of this County DRP, this plan considers integration opportunities consistent with the intent of SB 552. Applicable county requirements are:

- Establish a standing County Drought and Water Shortage Task Force (CWC Section 10609.70(a))
- Develop a plan that considers, at a minimum, each of the following (CWC Section 10609.70(b)):
 - 1) Consolidations for existing water systems and domestic wells
 - 2) Domestic well drinking water mitigation programs
 - 3) Provision of emergency and interim drinking water solutions
 - 4) Analysis of the steps necessary to implement the plan
 - 5) Analysis of local, State, and federal funding sources available to implement the plan

1.2.2 State Agency Involvement and Implementation

SB 552 defined the following series of requirements for the State Water Board and DWR:

State Water Resources Control Board (CWC Section 10609.70(c)):

The state board shall work with counties, groundwater sustainability agencies, technical assistance providers, nonprofit organizations, community-based organizations, and the public to address state small water system and domestic well community drought and emergency water shortage resiliency needs, including both of the following:

- (1) Proactive communication to domestic well communities before a drought occurs, such as information on local bottled water and water tank providers.*
- (2) Funding for installation of basic drought and emergency water shortage resiliency infrastructure, such as well monitoring devices.*

California Department of Water Resources (CWC Section 10609.80(a)):

The department shall take both of the following actions to support implementation of the recommendations of its County Drought Advisory Group:

- (1) Maintain, in partnership with the state board and other relevant state agencies, the risk vulnerability tool developed as part of the County Drought Advisory Group*

process and continue to refine existing data and gather new data for the tool, including, but not limited to, data on all of the following:

(A) Small water suppliers and nontransient noncommunity water systems serving a school.

(B) State small water systems and rural communities.

(C) Domestic wells and other self-supplied residents.

(2) Update the risk vulnerability tool for small water suppliers and rural communities periodically, by doing all of the following:

(A) Revise the indicators and construction of the scoring as more data becomes readily available.

(B) Make existing and new data publicly available on the California Open Data internet web portal.

(C) In consultation with other relevant state agencies, identify deficits in data quality and availability and develop recommendations to address these gaps.

(b) (1) The department, in collaboration with the state board and relevant state agencies, shall establish a standing interagency drought and water shortage task force to facilitate proactive state planning and coordination, both for predrought planning and post-drought emergency response, to develop strategies to enhance collaboration between various fields, and to consider all types of water users.

(2) The interagency drought and water shortage task force shall include representatives from local governments, community-based organizations, nonprofit technical assistance providers, the public, and experts in land use planning, water resiliency, and water infrastructure.

1.3 Purpose of San Joaquin County Drought Resilience Plan

The County DRP documents how the County, DAWG members, and other entities with water supply and drought management responsibilities intend to address water supply vulnerabilities of water users protected under SB 552 in the County. It is presented as a single document for ease of reference and to facilitate future updates. It describes the water shortage vulnerabilities present in the County; the responses to identified vulnerabilities; and the policy, financial, and regulatory considerations necessary for the implementation of the County DRP. Implementation of the County DRP is led by the County Office of Emergency Services (OES) in close coordination with other departments, including the County Department of Public Works, and the County Department of Environmental Health.

The County DRP was developed by the County with funding and technical support provided by DWR's Drought Resilience Planning Assistance Program and conforms to the legislative requirements of SB 552.

1.4 San Joaquin County Overview

San Joaquin County, encompassing nearly 920,000 acres, is in California's central San Joaquin Valley. The Sierra Nevada foothills are located along the eastern boundary, and the Diablo Range defines the

southwest corner of the County. The Sacramento-San Joaquin Delta's (Delta's) legal boundaries include a large portion of the County. The County seat, Stockton, is located 50 miles from Sacramento.

1.4.1 Demographics

Selected demographics of the County are summarized in Table 1–1 per the 2020 census and 2022 American Community Survey (ACS) data (U.S. Census Bureau 2020).

Table 1–1. Summary of Population, Median Household Income and Poverty Demographics by Major City/Town in San Joaquin County

Town/City/Region	Population	Median Household Income	Person in Poverty (%)
Lathrop	38,596	\$118,605	8.6
Mountain House	28,795	\$171,675	2.7
Stockton	320,877	\$76,191	16.3
Tracy	98,215	\$123,525	4.4
Manteca	93,733	\$91,533	10.9
Lodi	67,093	\$82,342	14.1
Ripon	15,753	\$120,061	3.5
Escalon	7,232	\$86,875	9.5
San Joaquin County	805,856	\$87,418	12.3
California	39,529,101	\$95,521	12.0

- Population:** The County has a population of 816,108 people (U.S. Census Bureau 2024). It is a rural area composed of small communities; all residents live in rural areas or towns. Notable towns include Lathrop, Mountain House, Tracy, and Manteca.
- Age:** The County has a median age of 35.2 years. A total of 13.5 percent of the population is 65 years and older in the County.
- Ethnicity:** The three largest ethnic groups in the County are Hispanic or Latino (325,725 people), White (267,338 people), and Non-Hispanic White (215,520 people).
- Language Spoken at Home:** Per 2022 ACS 1-year estimates, 56.6 percent of the County's population speaks English only at home and 43.4 percent speak a language other than English at home. Of those who speak a language other than English at home, 40.7 percent speak English less than "very well." The largest non-English language groups are Spanish (206,877 people), Asian and Pacific Islander languages (68,526 people), and Indo-European languages (39,705 people).
- Household Income:** The median household income of the County, per the 2022 ACS 1-year estimates, is \$86,056. This is slightly below the State average of \$91,551.
- Education:** The County has a lower-than-average percentage of residents 25 years or older with a bachelor's degree or higher, at around 22.9 percent compared to 37 percent for California overall.
- Poverty Level:** About 12.1 percent of the population in the County lives below the poverty line, a number that is slightly lower than the national average of 12.2 percent. The largest

demographic living in poverty is residents under 18 years of age, followed by those 65 years and older, and then those between 18 and 65.

1.4.2 Geography

The County is situated between the Sierra Nevada to the east and San Francisco Bay Area to the west, placing it in the center of the State Water Project and Central Valley Project operations. Additionally, a significant portion of the County lies within the legal boundaries of the Delta, a key feature California's water supply.

1.4.2.1 Hydrology

The County is part of the San Joaquin River Hydrological Region and includes the four Hydrologic Unit Code (HUC) 8 water basins: Upper Mokelumne, Upper Calaveras, Rock Creek-French Camp Slough, and San Joaquin Delta. Major waterways and reservoirs include the San Joaquin River, Consumnes River, Tuolumne River, Merced River, Calaveras River, New Hogan Reservoir, Don Pedro Reservoir, and Camanche Reservoir, as shown in Figure 1-1. There are 39 waterbodies within the County identified on the State Water Board's Clean Water Act Section 303(d) list of impaired waters (State Water Board 2022), as summarized in Table 1-2. The 303(d) list identifies waterbodies that do not meet applicable water quality standards and specifies the pollutant or condition responsible for impairment. The list is updated periodically by the State Water Board. The County also has three groundwater basins; the Eastern San Joaquin and Tracy groundwater basins which are largely within County boundaries, and the Delta-Mendota Subbasin, which includes a small portion of the southern end of the County (Figure 3-8).

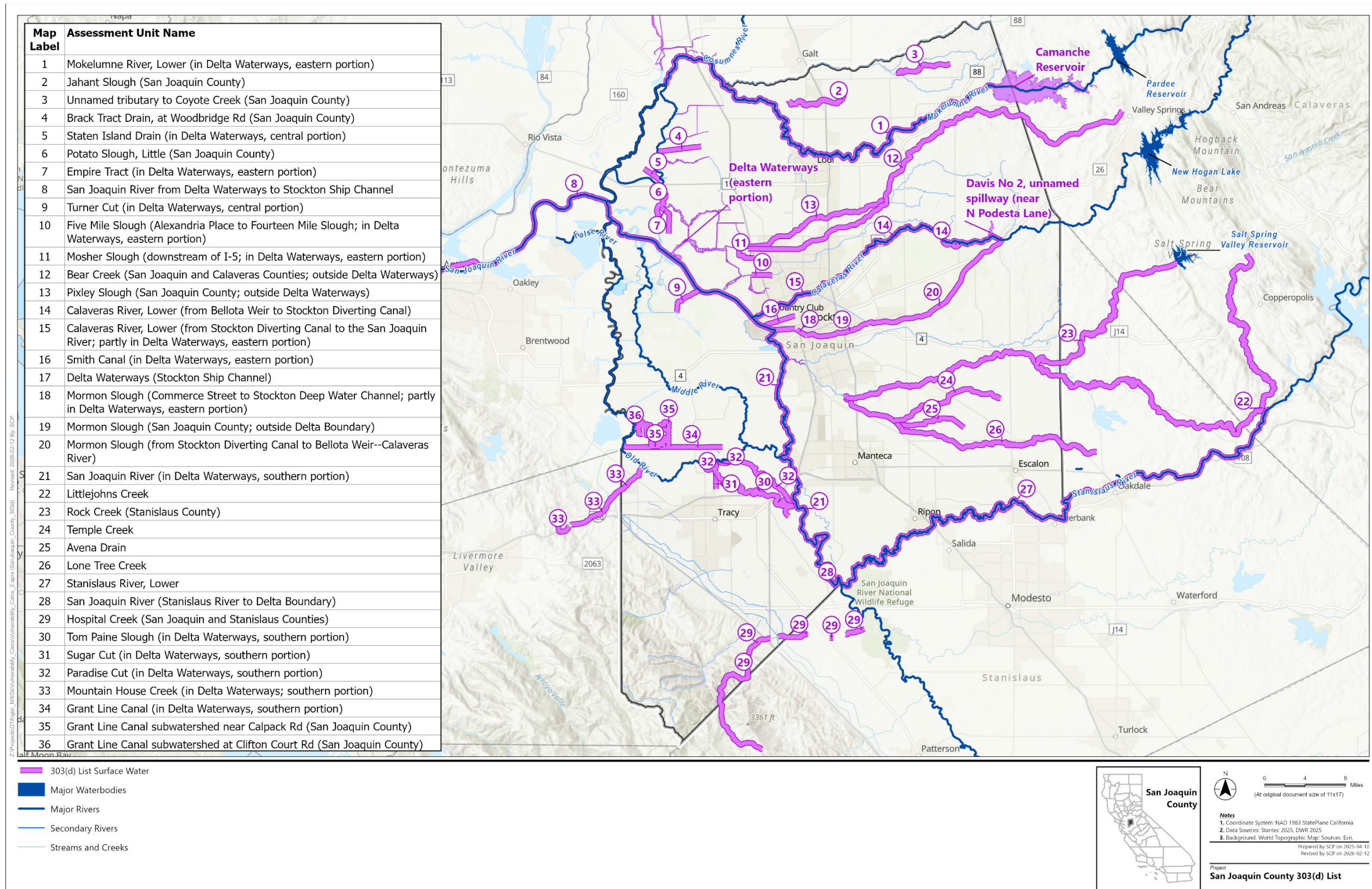


Figure 1-1. Major Surface Water Sources in San Joaquin County

Table 1–2. Summary of 303(d)-Listed Waterbodies in San Joaquin County

Waterbody Name	303 (d) List Category	Impaired?	Threatened?
Camanche Reservoir	5	Yes	No
Davis No 2, unnamed spillway (near N Podesta Lane)	5	Yes	No
Delta Waterways (eastern portion)	5	Yes	No
Avena Drain	5	Yes	No
Bear Creek (San Joaquin and Calaveras counties; outside Delta Waterways)	5	Yes	No
Brack Tract Drain, at Woodbridge Road (San Joaquin County)	5	Yes	No
Calaveras River, Lower (from Bellota Weir to Stockton Diverting Canal)	5	Yes	No
Calaveras River, Lower (from Stockton Diverting Canal to the San Joaquin River; partly in Delta Waterways, eastern portion)	5	Yes	No
Delta Waterways (Stockton Ship Channel)	5	Yes	No
Empire Tract (in Delta Waterways, eastern portion)	5	Yes	No
Five Mile Slough (Alexandria Place to Fourteen Mile Slough; in Delta Waterways, eastern portion)	5	Yes	No
Grant Line Canal (in Delta Waterways, southern portion)	5	Yes	No
Grant Line Canal subwatershed at Clifton Court Road (San Joaquin County)	5	Yes	No
Grant Line Canal subwatershed near Calpack Road (San Joaquin County)	5	Yes	No
Hospital Creek (San Joaquin and Stanislaus Counties)	5	Yes	No
Jahant Slough (San Joaquin County)	5	Yes	No
Littlejohns Creek	5	Yes	No
Lone Tree Creek	5	Yes	No
Mokelumne River, Lower (in Delta Waterways, eastern portion)	5	Yes	No
Mormon Slough (Commerce Street to Stockton Deep Water Channel; partly in Delta Waterways, eastern portion)	5	Yes	No
Mormon Slough (from Stockton Diverting Canal to Bellota Weir – Calaveras River)	5	Yes	No
Mormon Slough (San Joaquin County; outside Delta Boundary)	5	Yes	No
Mosher Slough (downstream of Interstate 5; in Delta Waterways, eastern portion)	5	Yes	No
Mountain House Creek (in Delta Waterways; southern portion)	5	Yes	No
Paradise Cut (in Delta Waterways, southern portion)	5	Yes	No
Pixley Slough (San Joaquin County; outside Delta Waterways)	5	Yes	No
Potato Slough, Little (San Joaquin County)	5	Yes	No
Rock Creek (Stanislaus County)	5	Yes	No

Waterbody Name	303 (d) List Category	Impaired?	Threatened?
San Joaquin River (in Delta Waterways, southern portion)	5	Yes	No
San Joaquin River (Stanislaus River to Delta Boundary)	5	Yes	No
San Joaquin River from Delta Waterways to Stockton Ship Channel	5	Yes	No
Smith Canal (in Delta Waterways, eastern portion)	5	Yes	No
Stanislaus River, Lower	5	Yes	No
Staten Island Drain (in Delta Waterways, central portion)	5	Yes	No
Sugar Cut (in Delta Waterways, southern portion)	5	Yes	No
Temple Creek	5	Yes	No
Tom Paine Slough (in Delta Waterways, southern portion)	5	Yes	No
Turner Cut (in Delta Waterways, central portion)	5	Yes	No
Unnamed tributary to Coyote Creek (San Joaquin County)	5	Yes	No

Source: State Water Board 2022

Key:

303(d) = Clean Water Act Section 303(d) Impaired Water

1.4.2.2 Precipitation

Precipitation in the County is highly seasonal with most precipitation occurring in the winter as rain and nearly no precipitation during the summer. Precipitation weather station data from 1991-2020 shows an average annual precipitation of 12.72 inches near Tracy-Carbona, 17.81 inches in Acampo and 17.29 inches in Stockton (NOAA 2021a, 2021b, 2021c).

In addition to total annual precipitation, the timing and intensity of rainfall events can influence how precipitation contributes to groundwater recharge. High-intensity rainfall events may increase surface runoff and reduce the amount of water that infiltrates into soils, while lower-intensity, longer-duration precipitation events are generally more conducive to groundwater recharge.

Recent annual totals further illustrate the County's exposure to interannual variability. For example, recorded precipitation in Stockton totaled approximately 16.9 inches in 2023, 15.2 inches in 2024, and 14.0 inches in 2025 (NOAA 2026). While these values fall within the historical range, the fluctuation of several inches from year to year demonstrates how relatively small shifts in annual precipitation can influence groundwater recharge, irrigation demand, and drought vulnerability across the County.

1.4.2.3 Topography

Topography within the County is shown in Figure 1-2. The average elevation of most of the County is between 0 and 2,000 feet above mean sea level. The terrain on the northern side of the County is flatter and lower in elevation compared to the southern end approaching the Diablo Range foothills. This topography can influence precipitation, with more precipitation typically falling in higher terrain than in the valleys.

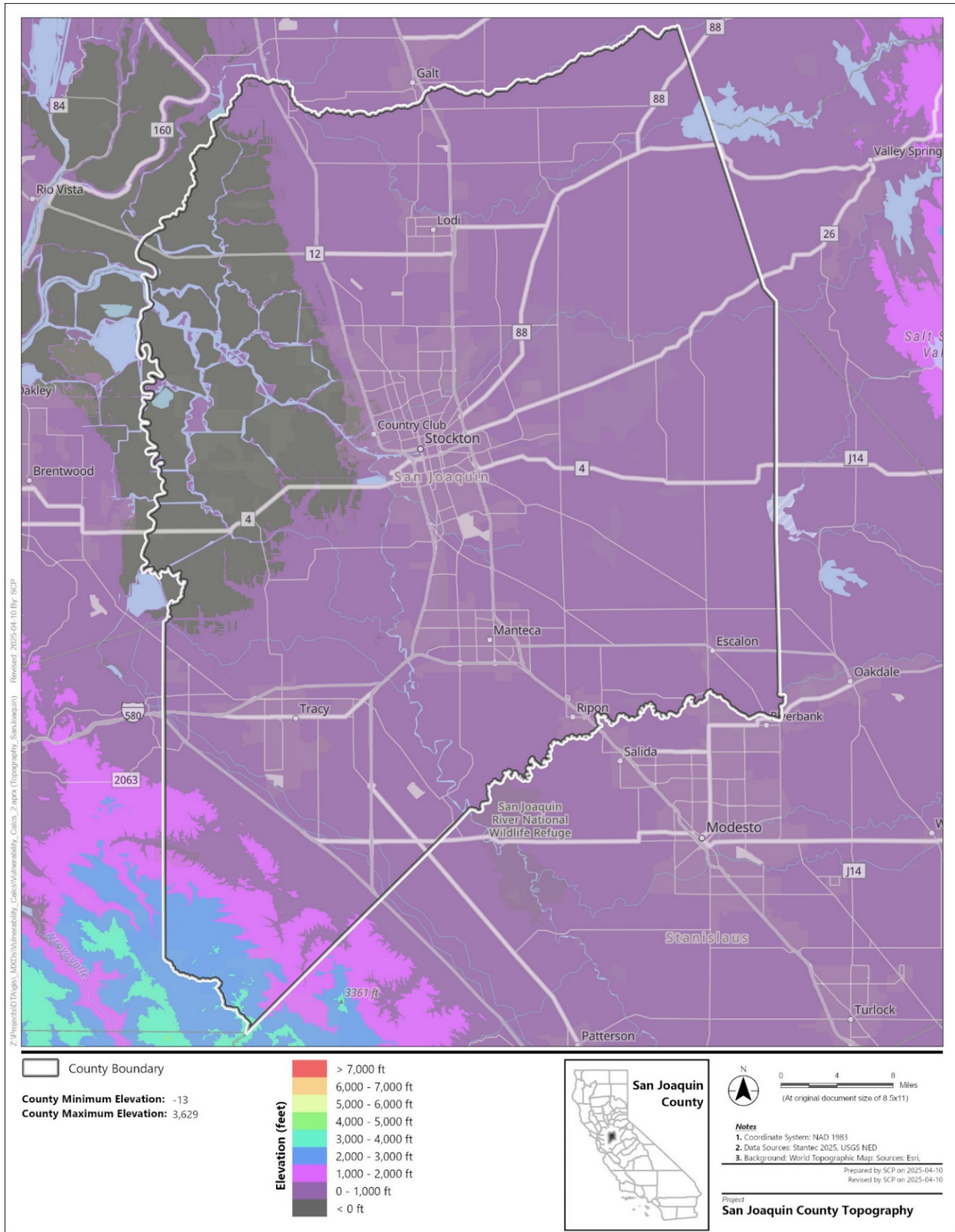


Figure 1-2. Topography of San Joaquin County

1.4.2.4 Land Use

Figure 1-3 shows land use within the County. Most urban development is concentrated around Stockton. The County has land use regulatory authority over all unincorporated land in the County, which is approximately 90 percent of all land in the County. The County's land use regulatory authority includes all areas except land within the city limits of Escalon, Lathrop, Lodi, Manteca, Ripon, Stockton, Tracy, and Mountain House. It also excludes land owned or managed by either State or federal governments (e.g., state parks, national parks, Bureau of Land Management areas, and tribal lands) and areas not falling under County jurisdiction (e.g., public schools and prisons) (San Joaquin County 2016).

Most of the land in the County is designated as "General Agriculture (A/G)," with the County containing a high concentration of vineyards, while the eastern and southern portions of the County are dominated by deciduous fruit and nut production (DWR 2022). Moving outward from Stockton, most of the County land is used for agriculture. Other major urban areas include the cities of Lodi, Manteca, and Tracy.

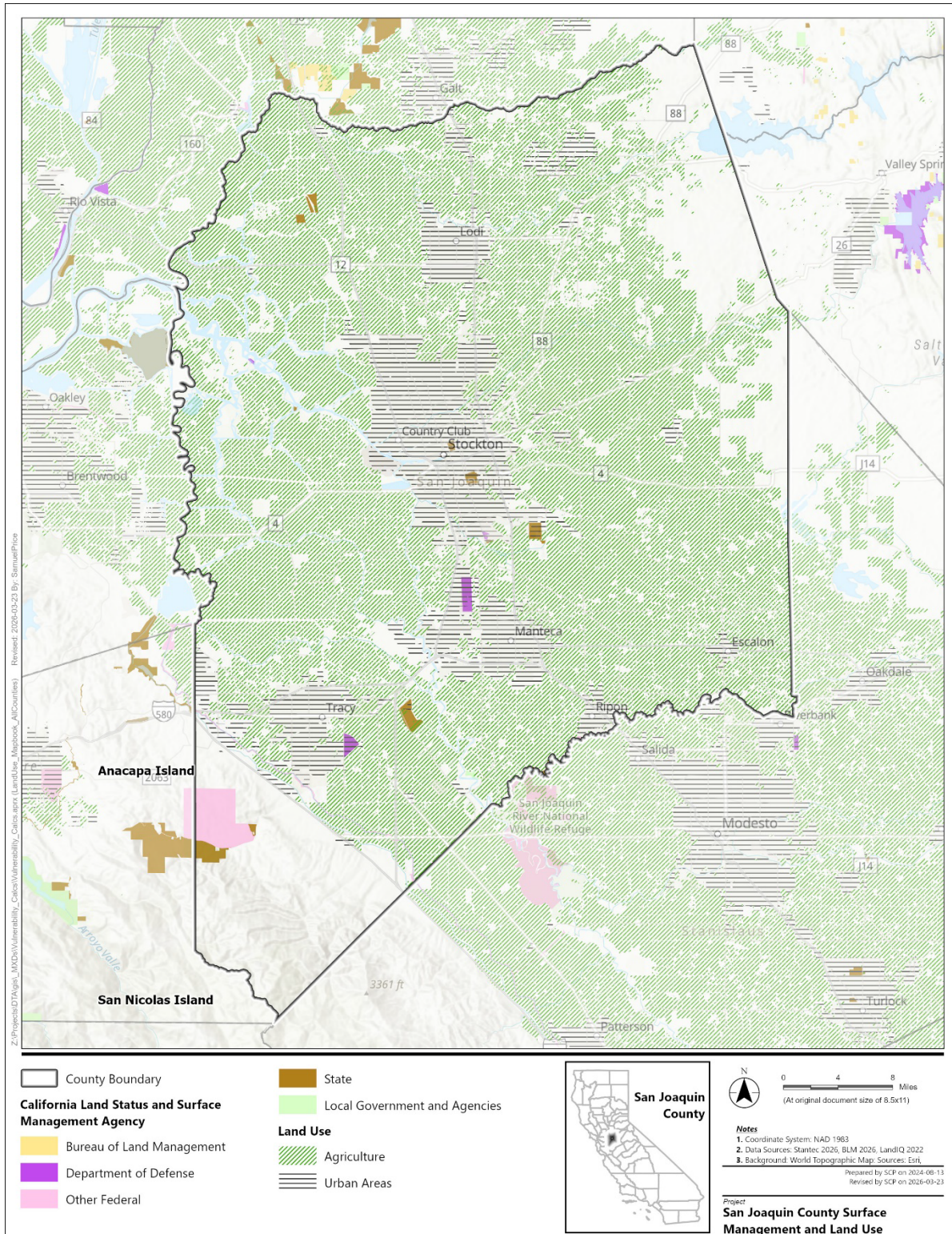


Figure 1-3. Land Use Within San Joaquin County

1.4.2.5 **Geology**

The County is at the northern end of the San Joaquin Valley, a sedimentary basin containing clay, silt, sand, and gravel deposits. The area is flat, with rolling hills. There is a large occurrence of fractured rock near the Diablo Range near Tracy. The area has also been found to have several potentially active faults (San Joaquin Council of Governments 2018).

1.4.3 **Water Landscape: Supply, Use, and Management**

Water supplies for domestic, industrial, agricultural, and environmental uses within the County are described below.

Water Supplies:

- **Groundwater:** Groundwater represents the primary water supply resource for beneficial uses in the County. The County is part of the San Joaquin Valley Basin and contains the Eastern San Joaquin Subbasin (DWR Basin Number 5-022.01), Tracy Subbasin (DWR Basin Number 5-022.15) and Delta-Mendota Subbasin (DWR Basin Number 05-22.07) (DWR 2013). The remainder of the groundwater resources include fractured rock regions, whose supply is dependent on atmospheric conditions. The County's urban use is 85 percent groundwater (DWR 2013).
- **Surface Water:** Surface water supplies come from the San Joaquin River and its numerous streams and tributaries such as the Mokelumne and Calaveras rivers. The County contains Camanche Reservoir, which also lies within Amador and Calaveras counties. Many agricultural and municipal users receive their water from irrigation districts throughout the County.

Water Uses:

- **Agriculture:** Agriculture is the primary user of water in the County. Agriculture alone uses an average of 354.1 thousand acre-feet of groundwater in the County (DWR 2013). Top agriculture crops in the County include almonds, milk, grapes, walnuts, blueberries, and hay, along with livestock (San Joaquin County 2023b).
- **Municipal and Domestic:** County staff have recorded 280 active public water systems within the County, primarily serving noncommunity populations (State Water Board 2022). In addition, many primary residences, vacation homes, recreational resorts, and campgrounds use domestic wells and SSWS for water supply.

Water Management Actions:

- **Groundwater Sustainability Plan (GSP):** The Tracy and Eastern San Joaquin subbasins are medium- and high-priority groundwater basins, respectively, subject to the Sustainable Groundwater Management Act (SGMA). GSPs have been approved by the State for both subbasins; in the Tracy subbasin, the GSP is managed by a coordinating committee consisting of the six groundwater sustainability agencies (GSA) in that subbasin. The Eastern San Joaquin subbasin is managed by a joint powers authority, the Eastern San Joaquin Groundwater Authority, which consists of 16 GSAs including the unincorporated County. A very small portion of the Delta-Mendota Subbasin also extends into the southwest corner of the County. The Delta-Mendota and Eastern San Joaquin basins are classified as critically overdrafted subbasins, as defined by DWR.

- **Drought and Water Shortage Hazard Annex:** The County developed this plan to provide guidance and information to emergency operations during drought or water shortage conditions. It outlines emergency coordination procedures, including the potential assembly of the Agricultural Drought Task Force when directed by the Director of the Office of Emergency Services (San Joaquin County 2020).

1.4.3.1 Groundwater Detail

On a periodic basis, the Department of Water Resources publishes a Bulletin 118 Updates which inventory and identify the boundaries of groundwater basins in California. As of the latest 2020 report, the County contains three Bulletin 118 subbasins: the San Joaquin Valley – Eastern San Joaquin Groundwater Basin (DWR Basin Number 5-022.01), the San Joaquin Valley – Tracy Groundwater Basin (DWR Basin Number 5-022.15), and a small part of the northwestern portion of the County lies within the San Joaquin Valley – Delta-Mendota Groundwater Basin (DWR Basin Number 5-022.07).² Analysis completed by DWR to support implementation of SGMA classified the Eastern San Joaquin and Delta-Mendota subbasins as critically overdrafted, high-priority subbasins and the Tracy subbasin as a medium-priority subbasin. SGMA defines a critically overdrafted basin as one where significant adverse overdraft of groundwater with related environmental, social, or economic impacts would occur if present water management practices were to continue.

Passed in 2014, SGMA represents a statewide framework to protect groundwater resources over the long term. SGMA resulted in local public agencies, pursuant to CWC Section 10721(n), forming GSAs in high- and medium-priority basins and developing GSPs to avoid undesirable results and mitigate overdraft within 20 years. The Eastern San Joaquin Subbasin is managed by 16 GSA members (including San Joaquin County GSA) and prepared a GSP that was adopted in 2023. The Tracy Subbasin is managed by six GSAs, with San Joaquin County being the designated lead agency. Their GSP was adopted in 2022. Between the Eastern San Joaquin and Tracy subbasins, there are 180 GSP monitoring wells in the County (shown in Figure 1-4). The GSPs identified management actions to improve groundwater sustainability, including aquifer recharge projects, water use efficiency and conservation measures, expansion of surface water distribution for conjunctive use, and improvements to well ordinances (ESJ GWA 2024; GEI Consultants 2021). Table 1–3 summarizes the management actions to which the GSAs have committed.

² While San Joaquin County is not a groundwater sustainability agency within that subbasin, groundwater management activities occurring within the Delta-Mendota Subbasin may influence groundwater conditions within portions of the County.

Table 1–3. Groundwater Sustainability Agency Management Actions and Projects in San Joaquin County

Groundwater Sustainability Plan Name	Groundwater Sustainability Agency Plan Manager	Management Actions and Projects Categories
Eastern San Joaquin Groundwater Sustainability Plan (ESJ GWA 2024)	Eastern San Joaquin Groundwater Authority – Executive Director	<ol style="list-style-type: none"> 1. Recharge <ol style="list-style-type: none"> a. Implementation of groundwater recharge including direct and in-lieu recharge projects, the use of recycled water for recharge, stormwater capture and recharge, and water transfers to facilitate recharge 2. Water Use Efficiency and Conservation <ol style="list-style-type: none"> a. Installation of advanced metering infrastructure and the pressurization of South San Joaquin Irrigation District facilities 3. Domestic Well Mitigation <ol style="list-style-type: none"> a. Development and implementation of a domestic well mitigation program to address potential impacts to domestic wells associated with groundwater management actions.
Tracy Subbasin Groundwater Sustainability Plan (GEI Consultants 2021)	San Joaquin County Department of Public Works	<ol style="list-style-type: none"> 1. Conjunctive Use <ol style="list-style-type: none"> a. Expansion of distribution facilities to provide surface water to areas that are reliant on groundwater 2. Modifying Well Ordinance <ol style="list-style-type: none"> a. Creation of surface water depletion protection zones near rivers and sloughs b. Establishment of well spacing requirements for high-capacity irrigation or municipal wells from domestic wells

1.4.4 Water Systems Within San Joaquin County's Jurisdiction

CWC Section 10609.70 requires county DRPs to address domestic wells and SSWSs. Figure 1-5 shows the locations of domestic wells and SSWSs within the County, and Table 1–4 summarizes how many domestic wells and SSWSs are in the Bulletin 118 basins and fractured rock areas. In addition, the figure and table show domestic wells that are outside the County but still within groundwater basins that are within the County.

Table 1–4. Summary of Domestic Wells and State Small Water Systems Within San Joaquin County by Groundwater Sustainability Agency

Map ID	GSA ID	GSA Name	Partial or Full	Post-1977	Pre-1977	Wells in Basin (Not in County)	SSWS
1	159	North San Joaquin Water Conservation District GSA	Full	1,709	402	0	3
2	142	County of San Joaquin GSA – Eastern San Joaquin 1	Full	259	74	0	2
3	140	Lockeford Community Service District GSA	Full	9	7	0	0
4	151	Woodbridge Irrigation District GSA	Full	250	110	0	0
5	152	City of Lodi GSA	Full	44	45	0	1
6	201	Central Delta Water Agency GSA	Full	31	15	0	2
7	99	Linden County Water District GSA	Full	6	1	0	0
8	116	Stockton East Water District GSA	Full	1,497	337	0	8
9	288	Eastside San Joaquin GSA	Partial	0	0	1,668	0
10	137	City of Stockton GSA	Full	247	138	0	3
11	389	County of San Joaquin GSA – Eastern San Joaquin 2 ¹	Full	63	60	0	1
12	189	Central San Joaquin Water Conservation District GSA	Full	453	133	0	0
13	146	County of San Joaquin GSA – Tracy	Full	832	155	0	2
14	228	Oakdale Irrigation District GSA	Partial	258	41	807	0
15	183	City of Lathrop GSA	Full	63	63	0	2
16	343	Stewart Tract GSA	Full	22	10	0	0
17	91	City of Manteca GSA	Full	198	61	0	1
18	249	South San Joaquin GSA	Partial	1,682	315	6	2
19	208	South Delta Water Agency GSA	Full	160	17	0	0
20	286	Byron-Bethany Irrigation District GSA – Tracy	Partial	322	48	31	0
21	157	City of Tracy GSA	Full	211	39	0	0
22	149	Banta-Carbona Irrigation District GSA	Full	252	11	0	0
23	13	West Stanislaus Irrigation District GSA	Partial	12	2	100	0

Map ID	GSA ID	GSA Name	Partial or Full	Post-1977	Pre-1977	Wells in Basin (Not in County)	SSWS
24	301	DM-II GSA	Partial	30	1	104	0
N/A	N/A	Area not Covered by GSA		21	2	N/A	0
Totals				8,631	2,087	2,716	27

Note:

¹ County of San Joaquin GSA No. 2 Eastern San Joaquin is the California Water Service Company's service area within the unincorporated County. Cal Water is precluded by law from forming a GSA because it is investor owned; however, through a memorandum of understanding with the County, Cal Water retains some voting rights on the Eastern San Joaquin Groundwater Authority.

Key:

County = San Joaquin County

GSA = groundwater sustainability agency

SSWS = state small water system

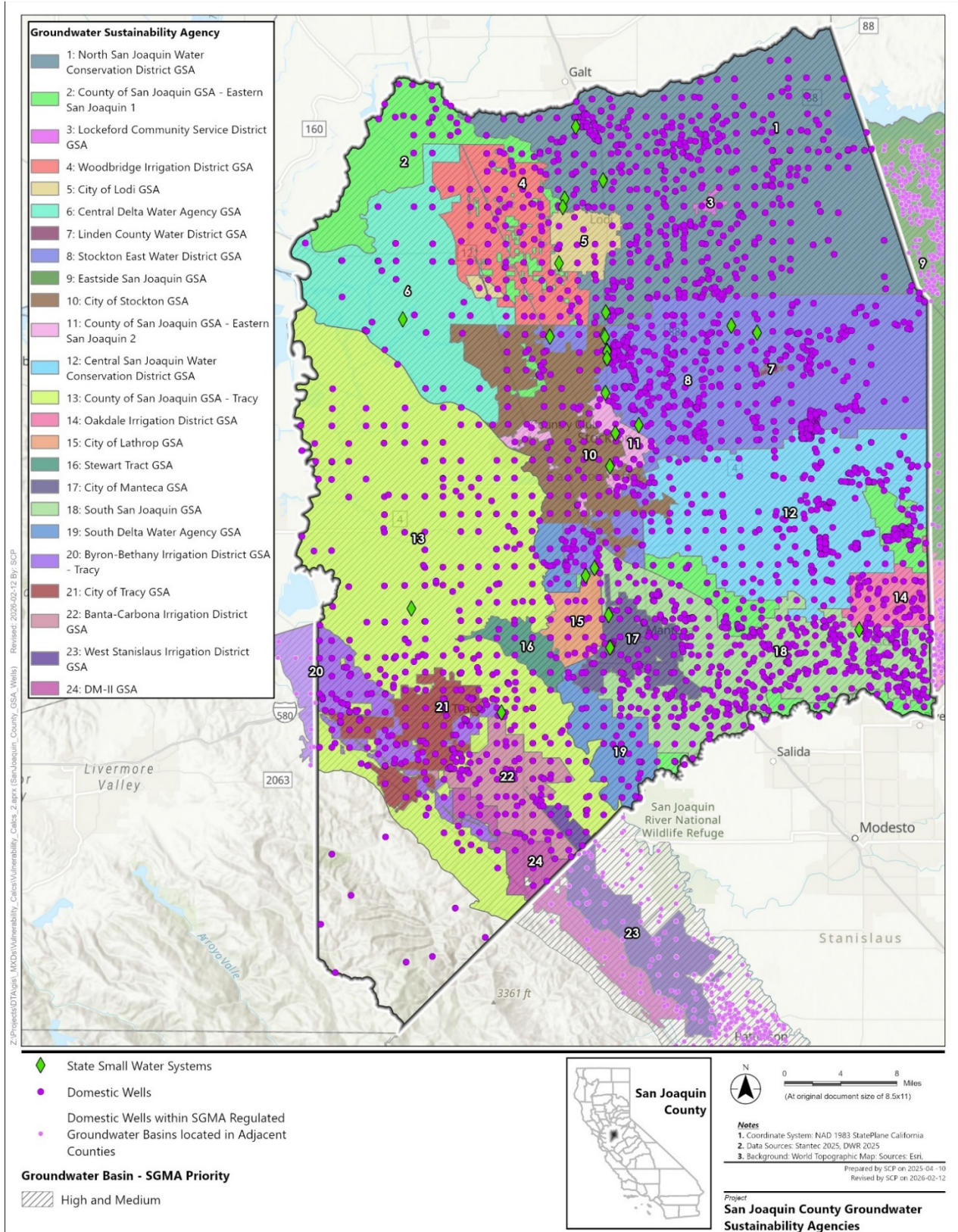


Figure 1-5. Locations of Domestic Wells and State Small Water Systems in San Joaquin County

2.0 Drought Advisory Work Group

This section describes the DAWG, which the County convened to support coordination and communication during development and implementation of the County DRP. The DAWG facilitates communication and collaboration among the State, local governments, GSAs, community-based organizations, local water suppliers, and local residents regarding drought preparedness for domestic wells and SSWS. This chapter serves as the DAWG Charter.

2.1 Purpose and Goals

The purpose of the DAWG Charter is to:

- Establish the authority, scope, and structure of the DAWG, an ad hoc body established pursuant to SB 552 and CWC Section 10609.70
- Define the organization structure of the DAWG for development, revision, and implementation of the County DRP
- Describe additional DAWG communication and engagement efforts related to the County DRP
- Establish additional information needed for establishing the DAWG within the County's ad hoc committee framework

The DAWG seeks to achieve the following goals:

- Facilitate drought and water shortage preparedness for domestic wells and SSWSs within the County's jurisdiction under the Steering Committee's direction.
- Support coordination and communication among staff of relevant County departments, local water agencies, local water suppliers, GSAs, and others representing the concerns of domestic wells and SSWS users
- Provide input to support development of a County DRP that addresses drought and water shortage preparedness and responsiveness for domestic wells and SSWSs within the County's jurisdiction
- Support implementation of the County DRP by offering feedback, stakeholder perspectives, and other considerations to inform the Steering Committee's decision-making.

2.2 Legislative Direction

In September 2021, SB 552 (Hertzberg) was enacted to address, among other things, water shortage risks faced by small water suppliers and domestic well users during drought and water shortage events. Under SB 552, counties are required to prepare a county DRP to achieve meaningful and long-term improvements in water resilience for domestic well and SSWS communities.

Passage of SB 552 mandates establishment of a standing task force to cultivate the continued practices of drought planning and improving long-term water resilience. Composition of the task force is guided by CWC Section 10609.70 (a)(1) and (2):

(a)(1) A county shall establish a standing county drought and water shortage task force to facilitate drought and water shortage preparedness for state small water systems and domestic wells within the county's jurisdiction, and shall invite representatives from the

state and other local governments, including groundwater sustainability agencies, and community-based organizations, local water suppliers, and local residents, to participate in the task force.

(2) In lieu of the task force required by paragraph (1), a county may establish an alternative process that facilitates drought and water shortage preparedness for state small water systems and domestic wells within the county's jurisdiction. The alternative process shall provide opportunities for coordinating and communicating with the state and other local governments, community-based organizations, local water suppliers, and local residents on a regular basis and during drought or water shortage emergencies.

The County has leveraged its existing Agricultural Drought Task Force, which was originally convened in the 1980s to support drought coordination efforts and has continued to be convened as needed during drought conditions and water supply planning discussions. The use of this group will now transition to the DAWG. For the purposes of SB 552, participation in the DAWG was modified to include a smaller list of representatives from the stakeholder groups identified in California Water Code Section 10609.70(a)(1). The County convened the DAWG to facilitate coordination and communication among agencies and stakeholders regarding drought preparedness for domestic wells and state small water systems. Since the DAWG functions as coordination forum, it is not subject to the Brown Act, however, the Steering Committee may choose to invite the public as needed.

2.3 Organization

The DAWG is a coordination forum that supports discussion of drought preparedness and water supply reliability issues affecting domestic wells and SSWS. The DAWG provides input and recommendations but does not hold decision-making authority. Figure 2-1 illustrates how the DAWG fits within the decision-making framework led by the County Board of Supervisors and County staff.

2.3.1 County Board of Supervisors

The County Board of Supervisors adopts the County DRP and approves implementation of actions requiring board-level decisions and funding actions. The County Board of Supervisors also reviews recommendations provided by the steering committee and the DAWG.

2.3.2 Steering Committee

The steering committee consists of County offices and departments responsible for preparation, revision, and implementation of the County DRP. The steering committee is led by County OES. Additional participating County departments include the County Department of Environmental Health and the County Department of Public Works. The steering committee may be supported by additional entities as needed.

The steering committee is responsible for:

- Leading and managing preparation and revision of the County DRP
- Convening, collaborating, and responding to informational needs of the DAWG in relation to the preparation, revision, implementation, and adoption of the County DRP
- Supporting the DAWG in the conduct of annual and emergency meetings

- Coordinating revision and adoption of the County DRP with the County Board of Supervisors consistent with County policies and regulations
- Leading and coordinating implementation of the County DRP by County agencies and other partner agencies
- In collaboration with the DAWG, leading communication and engagement activities with County DRP interested parties
- Evaluating and accepting non-County parties as steering committee members where such parties serve as implementation partners for the County DRP

2.3.3 Drought Advisory Work Group

As noted in Section 2.2, the DAWG is a coordination forum convened by the County to support drought preparedness planning in accordance with CWC Section 10609.70(a)(1). The County invited representatives from the following interest groups to participate in the DAWG:

- State and other local government entities, including GSAs
- Community-based organizations
- Local water suppliers
- Local residents, including operators of domestic wells and SWSs

The DAWG may be convened periodically to support implementation and future updates of the County DRP.

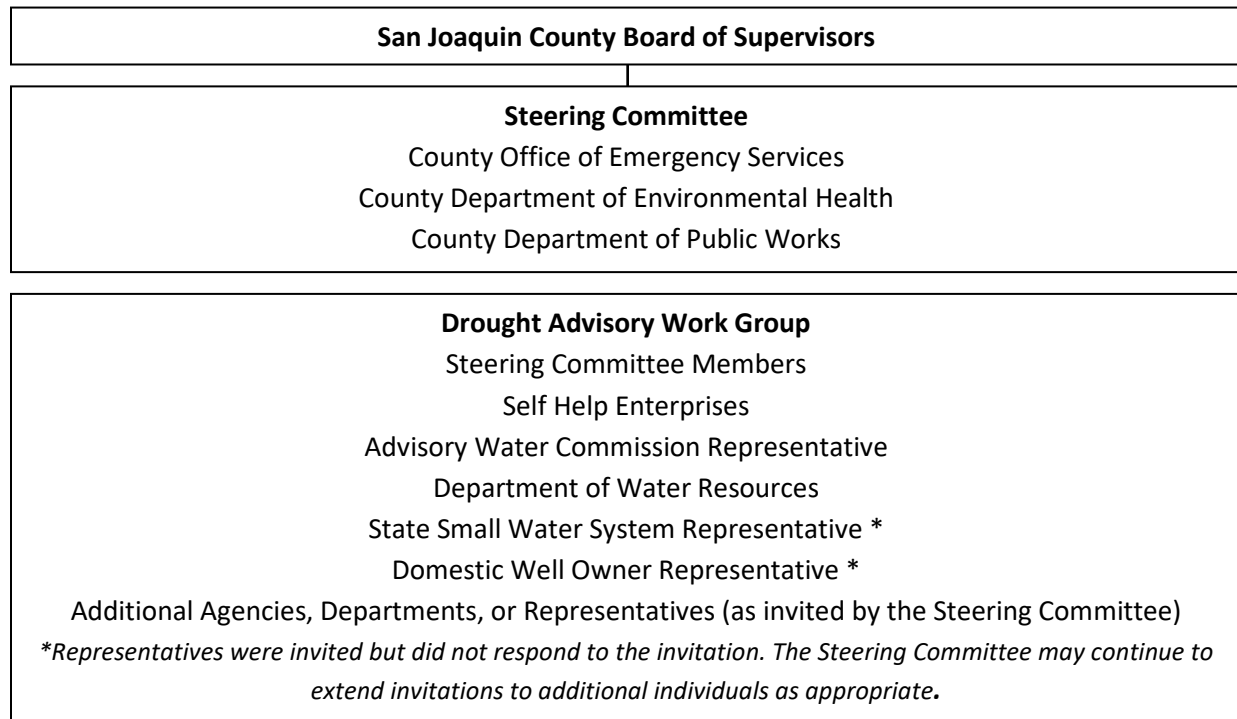


Figure 2-1. Structure of Parties Involved in San Joaquin County Drought Resilience Plan Development and Implementation

2.4 Communication and Engagement

To facilitate communication and collaboration both on a regular basis and during drought or water shortage emergencies, County OES would implement a series of communication and engagement activities. These activities provide opportunities for broad community awareness among County DRP interested parties. The activities to be completed by County staff include:

- **County Website:** The County established a website ([Office of Emergency Services | sjgov.org](https://www.sjgov.org/office-of-emergency-services)) that throughout County DRP development, hosted draft documents, notifications of upcoming presentations, and other relevant information for DRP development. To foster open dialogue with the community, the site provides a point of contact that interested parties can contact with questions and comments.
- **OES List Serv:** The County has an established listserv managed by County OES. The listserv can be used to notify the public of upcoming meetings, public review periods, and other information during DRP development and implementation.
- **Notifications:** The County would use various channels to notify and inform community members and interested parties about County DRP updates including via newsletter, social media, press releases, the County website, and community bulletin boards.
- **Education Campaigns:** The DAWG, in collaboration with the County and other relevant entities, could create educational campaigns aimed at raising awareness about water conservation, drought preparedness, and sustainable water management practices. These campaigns may include informational materials, public service announcements, links to additional information on the website, and partnerships with entities such as school districts, special districts, municipalities, tribal entities, and community partners to increase awareness and promote best practices.
- **Communication and Engagement Activities:** County staff could provide periodic updates to the County Board of Supervisors, offering milestone updates and opportunities for public engagement to ensure broad-based input and feedback. Public outreach efforts may include townhall meetings, workshops, and informational presentations to keep the community informed and engaged.

During the development of the County DRP, the following communication and engagement strategies were completed:

- Three meetings were held with the DAWG to provide feedback on the County DRP development process. The meetings were open to the public.
- The Draft DRP was posted on the County website ([Office of Emergency Services | sjgov.org](https://www.sjgov.org/office-of-emergency-services)) during development along with County OES contact information so members of the public could provide input.

3.0 Drought and Water Shortage Risk Assessment

A drought and water shortage risk assessment (risk assessment) was prepared during development of this County DRP as directed in CWC Section 10609.70(b). This risk assessment identifies regions in the County with domestic wells and SWSs that are vulnerable water shortage and characterizes physical and social hazards. The outcome of the risk assessment serves to inform development and implementation of STRAs that respond to emergency and interim water shortage events and development and implementation of LTMSAs that reduce the vulnerability to water shortages (see Chapters 4 and 5). This chapter presents the risk assessment results for the County.

The risk assessment presented in this County DRP does not replace the regulatory requirements of the Federal Emergency Management Agency (FEMA). The County DRP could make the County eligible for FEMA's Pre-Disaster Mitigation and Hazard Mitigation Grant programs. However, if a jurisdiction is also seeking approval of a risk assessment within the local hazard mitigation plan, it should follow the requirements outlined in the FEMA *Local Mitigation Planning Handbook* (FEMA 2013).

3.1 Terminology

The County DRP adapted the following definitions from the FEMA *Local Mitigation Planning Handbook*³ (FEMA 2013) within the context of drought and water shortage planning:

- **Community Assets:** The people, structures, facilities, and systems that have value to the community. The minimum assets considered as part of the SB 552 DRP include domestic wells, SWSs, and populations relying on those water supplies.
- **Hazard:** A source of harm or difficulty created by a meteorological, environmental, geological, hydrological, or other event. In the context of SB 552, hazards are the natural, human-made, and social processes that can lead to water shortages in the County.
- **Impact:** The consequences or effects of a hazard related to drought and water shortages on the community and its assets.
- **Risk:** The potential for damage, loss, or other impacts (e.g., water shortage) created by the interaction of natural hazards with community assets and their physical and social vulnerabilities.
- **Risk Assessment:** Product or process that collects information and assigns values to risks for the purpose of informing priorities, developing or comparing courses of action, and informing decision-making.
- **Vulnerability:** Characteristics of community assets or populations that make them susceptible to damage from a given hazard. It includes both physical vulnerability and social vulnerability.

³ The terminology adapted from FEMA 2013 is applied to evaluate conditions that may contribute to water shortages affecting domestic wells and state small water systems, including drought and other factors influencing groundwater availability.

3.2 Risk Assessment Methodology

The nature and severity of hazards that can cause water shortages vary at regional and local scales due to differences in conditions, such as precipitation patterns, groundwater levels, topography, geology, infrastructure, and regulatory frameworks. Communities lacking access to reliable water sources are most vulnerable to water shortages caused by such hazards. To address this, a thorough risk assessment was completed that considered many physical and social hazard indicators.

The risk assessment followed four steps:

1. **Describe Major Hazards in the County:** Drought, climate change, and water quality hazards were summarized and described.
2. **Complete Draft Risk Assessment using DWR Water Shortage Vulnerability Explorer:** The Water Shortage Vulnerability Explorer (WSVE) is a geographic information system (GIS)-web application⁴ developed by DWR in consultation with the (CDAG). The WSVE Tool was used to (1) identify areas within the County where domestic wells and SSWSs are vulnerable to water supply shortages, and (2) characterize the hazards driving vulnerability. This information was included in a draft risk assessment. Additional details on the WSVE Tool and how it was applied in the risk assessment are included below.
3. **Cluster-Density Analysis:** The County requested a cluster-density analysis to further delineate vulnerable subregions as reference points to be monitored and consulted during implementation of this DRP (see Section 4.3.1). These subregions can be viewed as bellwether communities that can serve as early indicators for water conditions that could manifest elsewhere in the County. The purpose of the secondary analysis was not to identify the only areas with problems, but to pinpoint locations where reliance is both high and spatially concentrated, meaning large numbers of households could be affected simultaneously. The cluster-density analysis uses DWR's Online System for Well Completion Reports (OSWCR) domestic well data. Locations of SSWSs were also included to provide additional context. Additional details on the cluster-density analysis are in Section 3.2.2.
4. **Revise the Draft Risk Assessment:** County and DAWG feedback on the draft risk assessment was used to develop a revised risk assessment.
5. **Incorporate Results of the Revised Risk Assessment into the County DRP:** Information from the revised risk assessment was included in the County DRP (Section 3.4). Findings from the revised risk assessment were used by the County and DAWG to develop short-term actions and long-term strategies to improve water supply sustainability (Sections 4 and 5).

3.2.1 WSVE Tool

Developed by DWR in collaboration with the CDAG, the WSVE Tool is an online geospatial application that assesses water supply risk using physical (Table 3-1) and social (Table 3-2) vulnerability indicators. These indicators were selected by DWR and CDAG to reflect the hazards that could make a domestic well or SSWS vulnerable to water supply shortages.

⁴ [Water Shortage Vulnerability Explorer Tool](#)

The WSVE Tool calculates both a physical vulnerability score and a social vulnerability score, each combining the associated individual indicators. The process used by the WSVE Tool to calculate those total scores is summarized below.

- The physical vulnerability score was calculated at the Public Land Survey Section⁵ (PLSS) scale by normalizing the indicator value between 0 and 1, with 1 representing the highest possible vulnerability. Normalized scores were multiplied by a weighting factor from 1 to 5 that was assigned by DWR and CDAG to capture how some indicators contribute more to water shortage vulnerability than others.
- The social vulnerability score was calculated at the Census Block Group⁶ scale by normalizing the indicator value between 0 and 1 and summing the values together without additional weighting.

DWR periodically revises the WSVE Tool to incorporate improved data and/or updated methodology. Data for the risk assessment used the 2024 methodology.⁷ The detailed methodology that describes the WSVE indicators, data sources, and weighting factors is available on the California Natural Resource Agency's Open Data Portal.

3.2.2 Cluster-Density Analysis

The County requested a cluster-density analysis that generates clusters with a threshold of 100 wells with a 1-mile radius. Cluster names were associated with nearby communities, such as census-designated places or towns (both unincorporated and incorporated) (see Figure 3-9). Each community was evaluated for the well density, spatial distance between wells, well depth, and social and physical vulnerability index scores (Table 3-4). The County and DAWG reviewed the communities and confirmed that anecdotal information matched the identified vulnerable communities.

These subregions represent bellwether communities that can serve as early indicators for water conditions that could manifest elsewhere in the County. This list may be extended or reduced as drought response actions are implemented as a result of this County DRP.

⁵ A Public Land Survey Section is a geographic delineation of an area equivalent to 1 square mile.

⁶ A Census Block Group is a geographic unit with a population between 600 and 3,000 people. It is the smallest geographical unit for which the U.S. Census Bureau publishes data collected from a fraction of households.

⁷ [Water Shortage Vulnerability Explorer Tool](#)

Table 3–1. Water Shortage Vulnerability Explorer Indicators Used in the Development of Physical Vulnerability Score

Indicator Name ¹	Indicator Description
Climate Change	
Temperature Shift (RC1a)	Projected change in maximum temperatures by mid-century.
Saline Intrusion Projected (RC1b)	Spatial extent of projected 1-meter sea level rise by 2040 into coastal aquifers.
Wildfire Risk (RC1c)	Projected area burned by 2035–2064.
Current Environmental Conditions and Events	
2024 Precipitation (RC2a)	If water year 2024 precipitation was less than 70 percent of normal.
Multiple Dry Years (RC2aa)	Count of dry years within the last 5 years (2020–2024).
Wildfire Risk (RC2b)	U.S. Forest Service Wildfire Hazard Potential.
Geology (RC2c)	Fractured rock basin within the PLSS.
Water Quality Aquifer Risk (RC2i)	SAFER Needs Assessment 2024 water quality composite score.
Subsidence (RC2d)	Amount of subsidence as measured by remote sensing.
Basin Salt (RC2e)	Presence of saltwater intrusion into coastal aquifer.
Overdrafted Basin (RC2f)	SGMA critically overdrafted groundwater basin.
Chronic Declining Water Levels (RC2g)	Amount of declining groundwater levels over the last 20 years (water years 2003 to 2023).
Surrounding Land Use (RC2j)	Proportion of irrigated agriculture in PLSS.
Infrastructure Susceptibility	
Dry Domestic Well Susceptibility in Basins (RC3a)	Dry well susceptibility.
Domestic Well Density in Fractured Rock Areas (RC3c)	Density of well completion reports.
Record of Shortage	
Reported Household Outage on Domestic Well (RC5a)	Presence of one or more households with reported outages in PLSS.

Notes:

¹ Abbreviations are included next to Indicator Name (i.e., “RC1a”) for clarity to underlying methodology

Key:

PLSS = Public Land Survey Section

SAFER = Safe and Affordable Funding for Equity and Resilience

SGMA = Sustainable Groundwater Management Act

Table 3–2. Water Shortage Vulnerability Explorer Indicators Used in the Development of Social Vulnerability Score

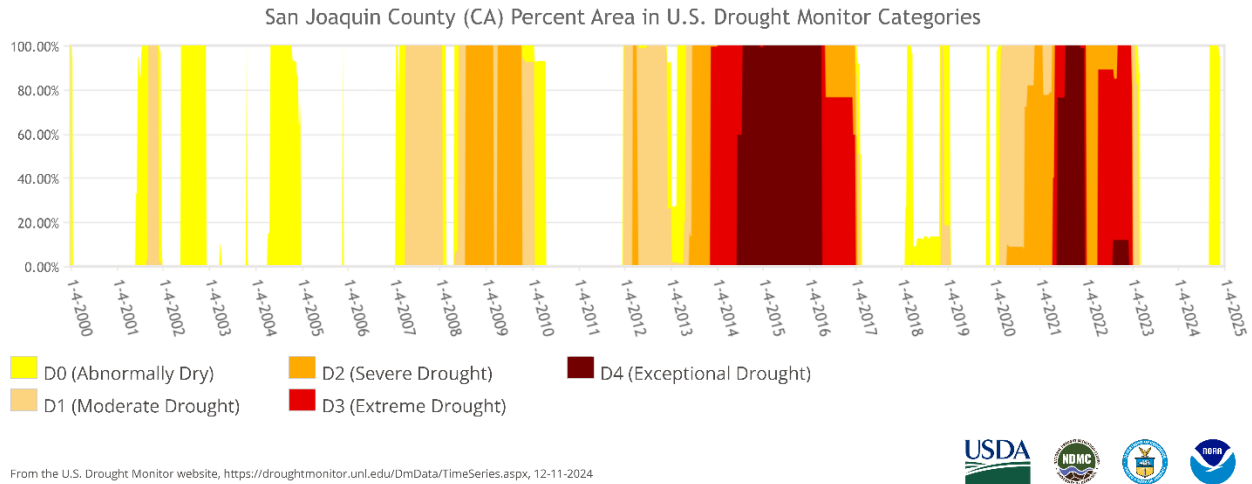
Indicator Name	Indicator Description
Socioeconomic Status	
Poverty Level	Percent of persons below poverty level.
Unemployment	Percent of persons aged 16 years of age or older that are unemployed.
Per Capita Income	Per capita income.
Language and Education	
Education Attainment	Percent of persons without a high school diploma.
English Language Proficiency	Percent of persons who speak little to no English.
Demographics	
Elderly Population	Percent of persons 65 years of age or older.
Non-Adult Population	Percent of persons 17 years of age or younger.
Minority Population	Percent of persons that are in a minority population.
Disability	Percent of persons 5 years of age or older with a disability.
Single Parent Households	Percent of single-parent households.
Housing and Transportation	
Multi-Unit-Housed Population	Percent of persons living in a multi-unit structure.
Mobile Home-Housed Population	Percent of persons living in a mobile home.
Crowded Conditions	Percent of persons living in conditions with more than one person per room.
No Vehicle Access	Percent of households with no vehicle available.
Housing and Transportation	
Persons of Color	Percent of persons that identify with a race other than White or identify ethnically as Hispanic or Latino.

3.3 Hazards in San Joaquin County

This section summarizes the recent drought, projected climate change, current water quality, and groundwater hazards in the County.

3.3.1 Drought

Since 2000, the County has experienced what the U.S. Drought Monitor categorizes as “Exceptional Drought,” as shown in Figure 3-1. The figure highlights the cyclical nature of droughts within the County, where periods of “Exceptional Drought” are followed by periods without drought. The longest drought that affected the County was from 2012 to 2017. Figure 3-1 also shows that drought can occur rapidly, sometimes within a single year.



Source: [Time Series | U.S. Drought Monitor](#), Accessed: 12/2024
Figure 3-1. Occurrence of Drought in San Joaquin County

3.3.2 Climate Change

According to California’s Fourth Climate Change Assessment, climate change has increased both average temperatures and the frequency and intensity of heat waves or extreme heat events. While global temperature increases are between 1.8 and 3.6 degrees Fahrenheit (°F), local observed increases that affect neighborhoods and ecosystems are more variable and often of greater magnitude.

Regional projections for the San Joaquin Valley suggest that average annual maximum temperatures in the valley could rise by 4 to 5°F under stabilized greenhouse gas emissions, and as much as 8°F under higher emissions scenarios, by the end of the century (Fernandez-Bou et al. 2021). Fernandez-Bou et al. (2021) also suggest that annual average maximum temperatures have already increased by about 1°F from 1950 to 2020 in the region. More extreme heat events will increase evaporative water loss from soils, rivers, canals, and reservoirs, heighten water demand from agriculture and urban users, and intensify public health impacts such as heat stress and reduced outdoor working hours for farm labor (Greene 2018).

Changes in precipitation patterns will further complicate water management. While overall annual precipitation is projected to change modestly, the timing and intensity of storms are expected to shift, with fewer large winter storms and more intense rainfall events occurring. Projected earlier snowmelt in the Sierra Nevada, the County’s primary surface water source, could shift peak streamflows and potentially lead to higher winter flows and greater flood risk, followed by reduced spring and summer flows, when agricultural and municipal demand is highest. These mismatches are likely to increase reliance on groundwater pumping, further stressing already overdrafted subbasins. In addition, extreme heat and reduced streamflows contribute to deteriorating water quality by concentrating pollutants and creating conditions favorable for harmful algal blooms in the Delta.

Anthropogenic climate change has contributed to the increase in areas burned in wildfires in the American West. Specifically, rising temperatures and increased periodic droughts increase the likelihood of wildfires. Wildfires can damage infrastructure and cause water quality issues, including those discussed in Section 3.3.3. In the County, increased wildfire risk exists primarily in areas along the eastern boundary as well as the southwestern foothills.

3.3.3 Water Quality

The County faces various water quality concerns regarding both surface and groundwater resources that support communities, agriculture, and ecosystems. The County's reliance on the Delta, extensive irrigated agriculture, and groundwater basins under stress from overdraft all contribute to complex water quality challenges. These include pressures from land use, natural geologic conditions, and a changing climate. Widespread and localized surface water and groundwater quality concerns are described in the following subsections.

3.3.3.1 Surface Water

Surface water quality in the County is influenced by multiple stressors. Extensive irrigated agriculture relies heavily on fertilizers, contributing to nutrient and nitrate loading through fertilizer use. Many residences in the County, especially in rural and unincorporated areas, use septic systems, which introduces the risk of contaminating surface and groundwater (USEPA 2023). These could contribute localized contamination to surface water (and groundwater) if systems are not properly maintained. Although septic systems are not as significant a source of water quality impairment compared to agriculture, they create localized concerns for small communities. Harmful algal blooms, driven by nutrient inputs from agriculture, reduced freshwater flows, and rising temperatures, are an additional water quality consideration in the Delta. According to the Delta Stewardship Council, recent monitoring indicates a downward trend in reported harmful algal bloom incidents (Delta Stewardship Council 2023).

3.3.3.2 Groundwater

Key groundwater quality constituents of interest identified in the San Joaquin Valley – Eastern San Joaquin Subbasin (DWR Basin Number 5-022.01) include salinity, arsenic, nitrates, and various point-source contaminants, including petroleum hydrocarbons, solvents, and emerging contaminants (ESJ GWA 2024). Constituents identified in localized concentrations throughout the County include salinity, chloride, total dissolved solids, nitrate, arsenic, point sources (including leaking underground storage tanks, landfills, dry cleaners, and others), methyl tertiary-butyl ether, perchloroethylene, trichloroethene, and petroleum hydrocarbons (diesel, gasoline, motor oil, or aviation fuel) and volatile organic compounds (VOCs).

Groundwater quality in the San Joaquin Valley – Tracy Subbasin (DWR Basin Number 5-022.15) is variable, with some localized areas of good water quality (GEI Consultants 2021). Problem constituents include total dissolved solids, nitrates, boron, chloride, iron, manganese, sulfate, human-caused contamination (including trihalomethanes, VOCs, and gasoline), dissolved organic carbon, methyl mercury, arsenic, 1,2,3-trichloropropane, gross alpha (radioactive elements), selenium, and hexavalent chromium.

Some of the elevated concentrations for select constituents are a result of naturally occurring conditions, although some areas exhibit degraded groundwater quality as a result of groundwater contamination. Key water quality constituents are summarized below.

- **Nitrate (and nitrite):** These constituents occur naturally in the environment and can also be introduced via fertilizers, mining, septic and landfill leaks, and animal and industrial waste (among other pathways). Ingestion of nitrates is known to cause methemoglobinemia in infants and may lead to some types of cancer (ATSDR 2017).

- **1,2,3-trichloropropane:** This constituent is an industrial chemical that may enter the hydrologic environment through spills or manufactured products such as paint removers. Limited data are available on its toxicology for humans; the chemical is listed as a likely carcinogen by USEPA (ATSDR 2021).
- **Arsenic:** This constituent is a metalloid that occurs naturally in the environment, including in soils and rock, and is also introduced by anthropogenic activities such as pesticide application and mining of metals. Ingestion of arsenic via drinking water has led to documented human deaths (ATSDR 2007).
- **Salinity:**⁸ High levels of salt are found in the Central Valley because of irrigated agriculture, food processing, and wastewater treatment and management practices. Salt leaching into groundwater impairs water quality, food production, and ecosystems (Cozad et al. 2024).
- **Per- and polyfluoroalkyl substances (PFAS):** Refers to chemicals that are long lasting in the environment. PFAS have been found in water, air, soil, and animals across the world. Studies have linked PFAS exposure to harmful health effects in people and animals (USEPA 2025).
- **Boron:** This constituent occurs naturally in the environment and can also be introduced via sewage, fertilizers, and herbicides. Acute exposure to high doses via ingestion (approximately 66 percent or higher than the average daily intake) has been documented to contribute to death (ATSDR 2010).
- **Chromium-6:** Chromium occurs naturally in the environment and has several forms, including chromium-6. Chromium-6 is listed as a carcinogen by the International Agency for Research on Cancer (ATSDR 2012a).
- **Manganese:** This constituent is a naturally occurring element found in rock, soil, water, and food. Chronic exposure to lower levels of manganese (as with occupational exposures) has been linked to deficits in the ability to perform rapid hand movements and some loss of coordination and balance, along with an increase in reported mild symptoms such as forgetfulness, anxiety, or insomnia (ATSDR 2012b).
- **Selenium:** This constituent occurs naturally in the environment. People are exposed to low levels of selenium daily through food, water, and air. Even if mildly excessive amounts of selenium are eaten over long periods, brittle hair and deformed nails can develop. In extreme cases, people may lose feelings and control in their arms and legs (ATSDR 2003).

⁸ Aquifers in San Joaquin County have historically been considered vulnerable to saltwater intrusion, particularly in areas experiencing significant overdraft near the Delta. Excessive pumping by urban and agricultural users can create a pressure imbalance that allows saline water to migrate inland, and earlier reports (e.g., San Joaquin County 2001) estimated intrusion advancing at a rate of approximately 150 feet per year. However, more recent evaluations, including evaluations using the WSVE Tool used for this risk assessment, indicate that saltwater intrusion is not currently anticipated to be a major countywide issue under climate change or sea level rise scenarios.

- **Methyl tertiary-butyl ether:** This constituent is a compound historically added to gasoline. Leaks from storage tanks introduce the chemical into soils and groundwater. No known human studies are available evaluating possibility of death and cancer following exposure (ATSDR 2023).
- **Elevated bacteriological levels:** Elevated bacteriological levels can be caused by seepage of sewage into well water and can lead to gastrointestinal disease (USEPA 2024).

3.4 Risk Assessment Results

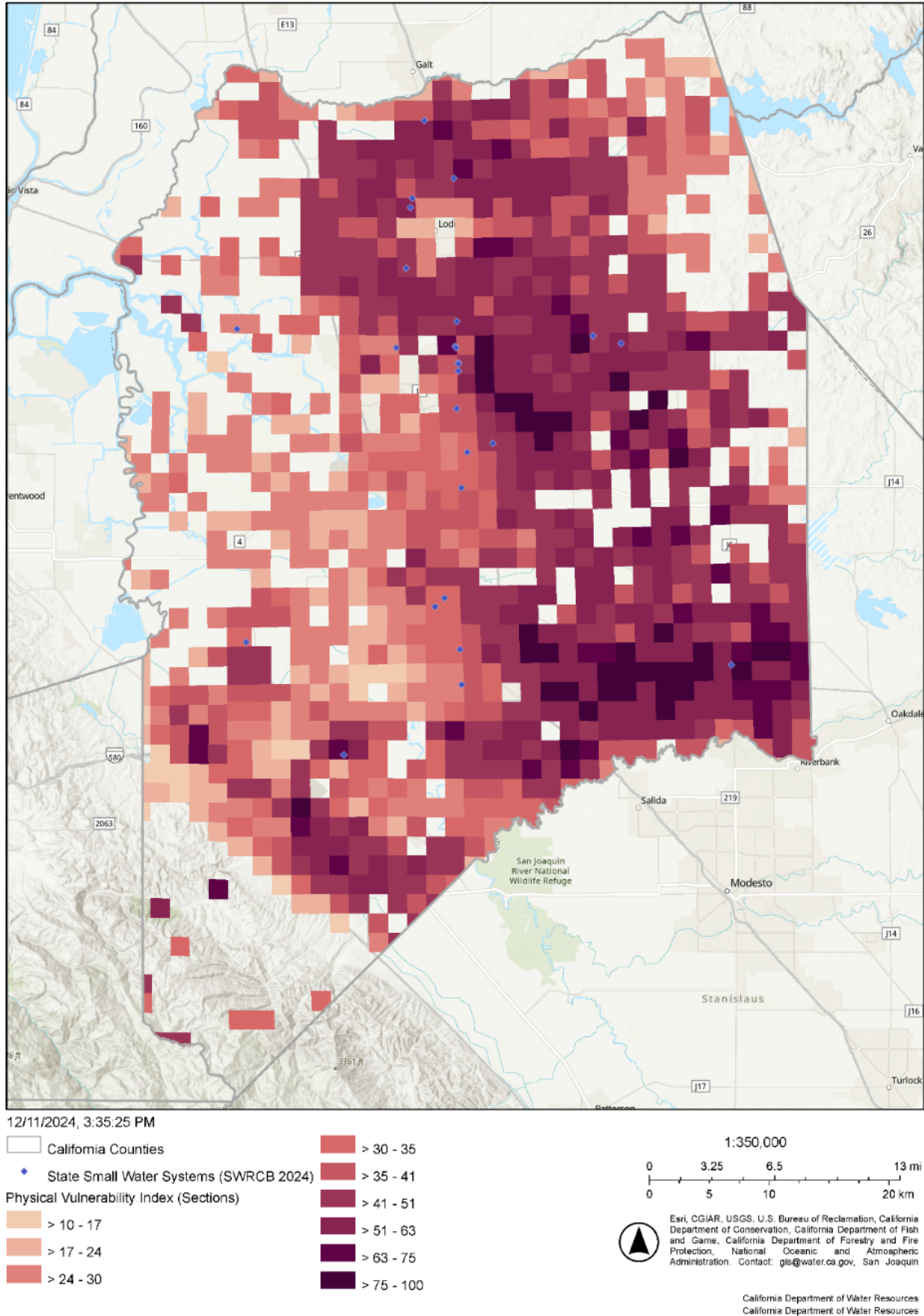
This section summarizes the risk assessment results, including the County’s physical and social vulnerability scores, followed by discussions of the individual indicators driving physical vulnerability. This information was used to help identify the regions of water supply shortage vulnerability described in Section 3.5.

3.4.1 Total Physical Vulnerability and Social Vulnerability Scores

Physical vulnerability scores within the County are shown in Figure 3-2, with darker shaded areas (or PLSSs) indicating higher physical vulnerability. If an area is not shaded, it means there are no domestic wells and/or SWSs within the PLSS.

The central, eastern, and southern regions of the County show the highest levels of physical vulnerability, including areas around Stockton, Lodi, Manteca, Ripon, Escalon, and Tracy. In contrast, northwestern portions of the County near the Delta, as well as some areas along the northeastern boundary and the Coastal Range foothills, exhibit lower overall vulnerability.

3.0 Drought and Water Shortage Risk Assessment



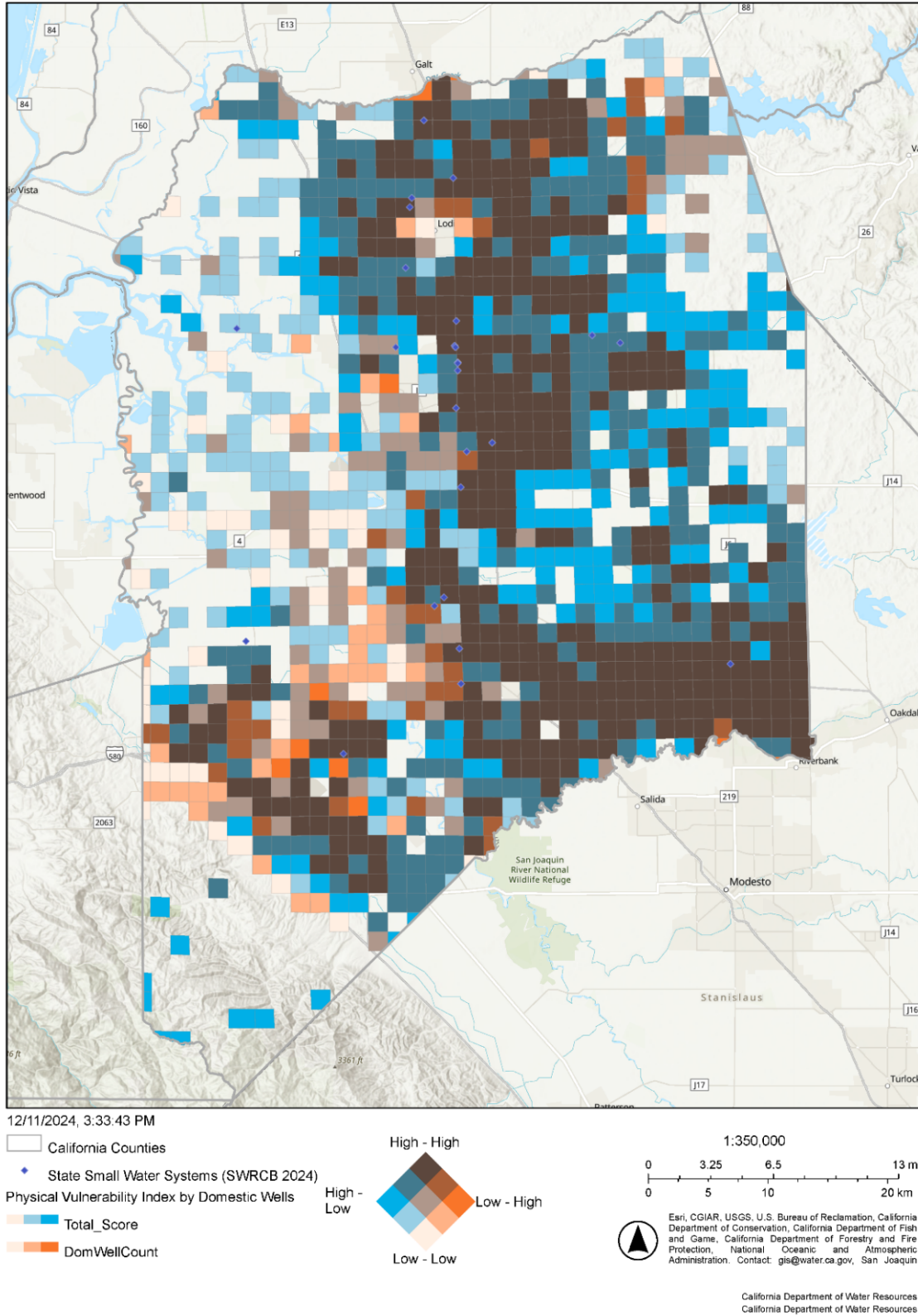
Source: Water Shortage Vulnerability Explorer Tool, [Water Shortage Vulnerability Explorer Tool](#), Accessed: 12/2024

Figure 3-2. Physical Vulnerability in San Joaquin County

Figure 3-3 displays the intersection of physical vulnerability and domestic well density within the County. A darker shaded area indicates a higher presence of domestic wells within an area with high physical vulnerability. A blue area has a higher physical vulnerability, but minimal domestic wells, and an orange area has a high number of domestic wells but low physical vulnerability. SWSs were overlaid in the map to see how these systems intersect with physical vulnerability and domestic wells. Many of the SWSs intersect PLSSs with high domestic well density. This figure also shows where short-term actions and long-term mitigation strategies are most likely to be needed because of the vulnerability to water supply shortages.

Areas within the County that exhibit both high physical vulnerability and a higher density of domestic wells include rural and unincorporated areas surrounding Stockton, Lodi, French Camp, Escalon, Ripon, and Tracy South. While incorporated cities such as Stockton and Lodi are primarily served by municipal water systems, clusters of domestic wells are present in adjacent unincorporated communities and fringe development areas where residents rely on private wells. The eastern foothill boundary and southwestern portions of the County also show high vulnerability, but with fewer domestic wells, meaning fewer residents are directly exposed despite environmental stressors. In the northwestern Delta region, overall vulnerability is lower, though scattered domestic well clusters may still face localized challenges. Taken together, unincorporated areas near Stockton, Lodi, French Camp, and Tracy represent the most critical hotspots where physical vulnerability and reliance on domestic wells intersect.

3.0 Drought and Water Shortage Risk Assessment



Source: Water Shortage Vulnerability Explorer Tool, [Water Shortage Vulnerability Explorer Tool](#), Accessed: 12/2024

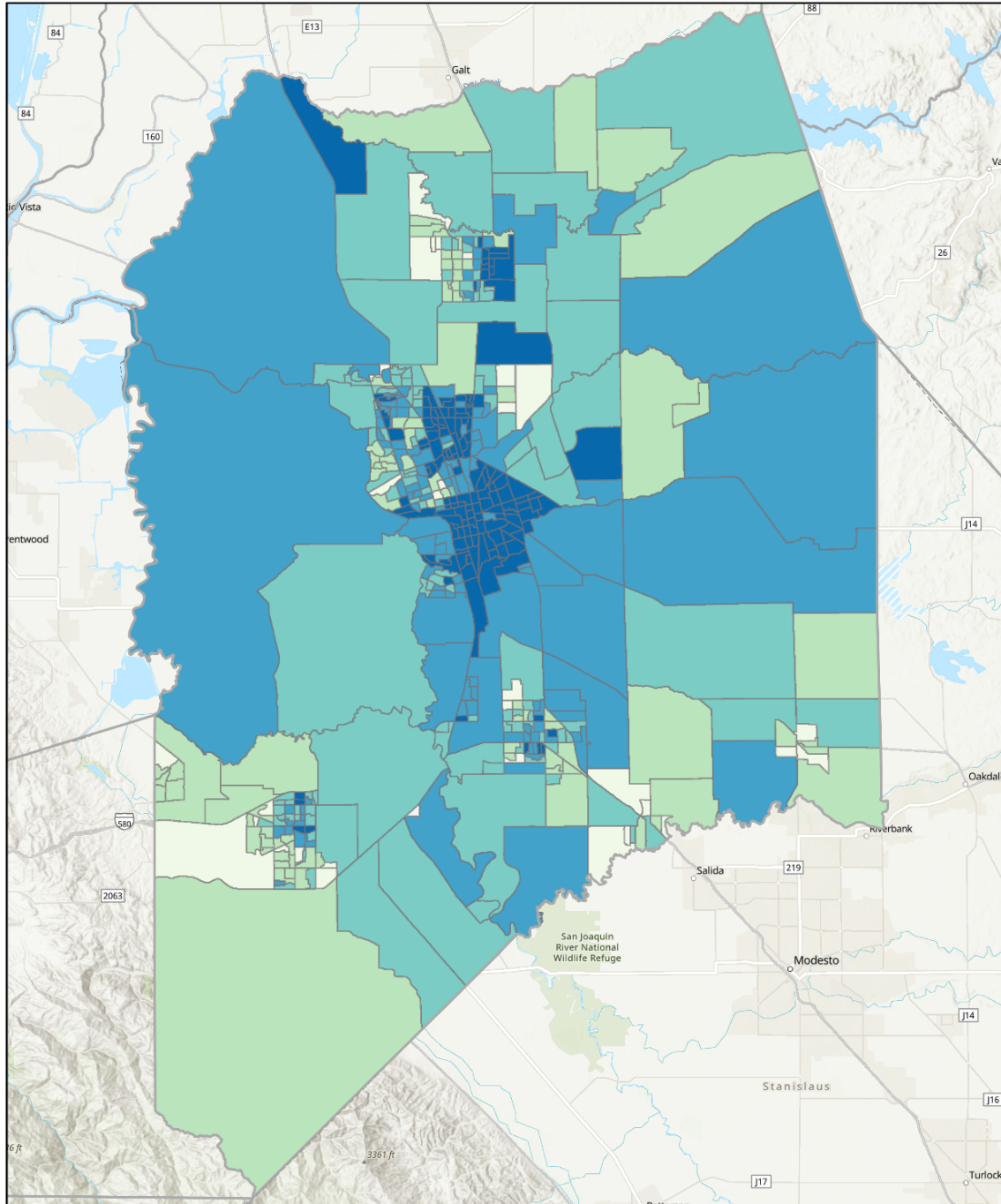
Figure 3-3. Intersection of Physical Vulnerability and Density of Domestic Wells and State Small Water Systems in San Joaquin County

Social vulnerability is also an important factor in assessing the risk of water supply shortage among communities reliant on domestic wells and SSWS, and in identifying where short-term actions and long-term strategies may be most needed. Social vulnerability scores in the County are depicted in Figure 3-4, with darker shaded areas indicating higher vulnerabilities. Comparing Figures 3-3 and 3-4 highlight how physical and social hazard compound risks for residents dependent on private wells or state small water systems.

While the highest overall social vulnerability scores occur within the urban core of Stockton, those areas are primarily served by municipal water systems and are therefore not the focus of this assessment. Instead, the most relevant areas are unincorporated and rural communities outside municipal service boundaries where domestic wells and SSWSs are present. In these areas, including portions of French Camp, Tracy South, and rural communities near Lodi, Escalon, Ripon, and Manteca, moderate to high social vulnerability overlaps with reliance on domestic wells. These communities are often characterized by agricultural land use, smaller and dispersed populations, and limited access to financial, technical, and infrastructure resources, which may constrain their ability to respond to water supply disruptions.

By contrast, some Delta-adjacent and foothill areas with domestic wells exhibit lower social vulnerability scores, suggesting comparatively fewer socioeconomic stressors despite potential physical risks. Focusing on areas where both social vulnerability and reliance on domestic wells or SSWSs intersect allows the County to prioritize outreach, monitoring, and mitigation resources more effectively.

3.0 Drought and Water Shortage Risk Assessment



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- California Counties
- Social Vulnerability Index (ACS 2017-2021)
 - Low Social Vulnerability
 - Medium-Low Social Vulnerability
 - Medium Social Vulnerability
 - Medium-High Social Vulnerability
 - High Social Vulnerability (Top 20%)

1:350,000

0 3.25 6.5 13 mi
0 5 10 20 km

Esi, CGIAR, USGS, U.S. Bureau of Reclamation, California Department of Conservation, California Department of Fish and Game, California Department of Forestry and Fire Protection, National Oceanic and Atmospheric Administration. Contact: gis@water.ca.gov, San Joaquin

California Department of Water Resources
California Department of Water Resources

Source: Water Shortage Vulnerability Explorer Tool, [Water Shortage Vulnerability Explorer Tool](#), Accessed: 12/2024

Figure 3-4. Social Vulnerability Scores by Census Block Group in San Joaquin County

3.4.2 Physical Vulnerability Indicators

This section describes factors that drive physical vulnerability for water shortage risk in greater detail. Understanding underlying drivers of vulnerability helps the County and DAWG develop informed response and planning measures for domestic wells and SSWs.

Within the County, the primary indicators driving physical vulnerability are dry well susceptibility, irrigated agriculture, water quality risk to aquifers, and presence of critically overdrafted basins. Details on these four indicators are included below.

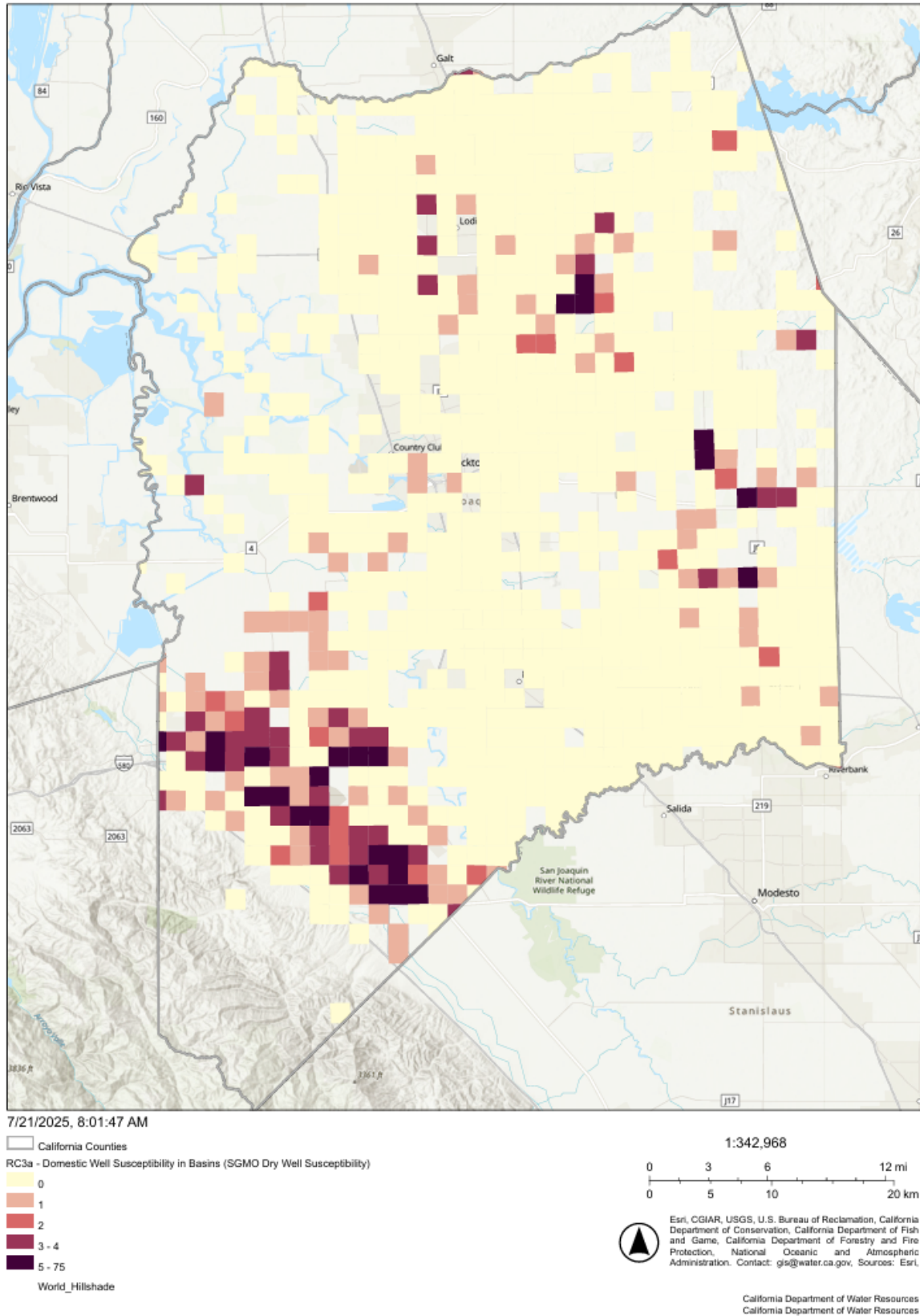
3.4.2.1 Dry Well Susceptibility

There are several areas in the County with a high density of domestic wells in alluvial basins, which increases susceptibility to experiencing well outages, particularly during dry periods. When precipitation is limited, groundwater recharge is reduced, and the demand for water remains constant or even increases. Under these conditions, the demand from multiple wells in close proximity to each other can accelerate the depletion of available groundwater, potentially leading to wells running dry or experiencing reduced water levels.

As illustrated in Figure 3-5, areas with comparatively higher densities of wells that could be susceptible to outages during a prolonged drought are located in the southwest region near and around the city of Tracy, west of the city of Lodi, east of the city of Stockton, and pockets of communities along the southeast section of the County. Here, vulnerability is driven largely by a combination of extensive irrigated agriculture, declining groundwater levels in the Eastern San Joaquin Subbasin, and clusters of domestic wells dependent on shallow aquifers. During droughts or consecutive dry years, when natural recharge is limited, reliance on groundwater during periods of reduced surface water availability can exacerbate declines, increasing risk to domestic wells.

Should wells in these high-density areas begin to go dry, they would serve as early indicators of emerging groundwater stress across the County, signaling that similar conditions could soon develop in other vulnerable subregions.

3.0 Drought and Water Shortage Risk Assessment



Source: Water Shortage Vulnerability Explorer Tool, [Water Shortage Vulnerability Explorer Tool](#), Accessed: 12/2024

Figure 3-5. Domestic Well Susceptibility in Alluvial Basins in San Joaquin County

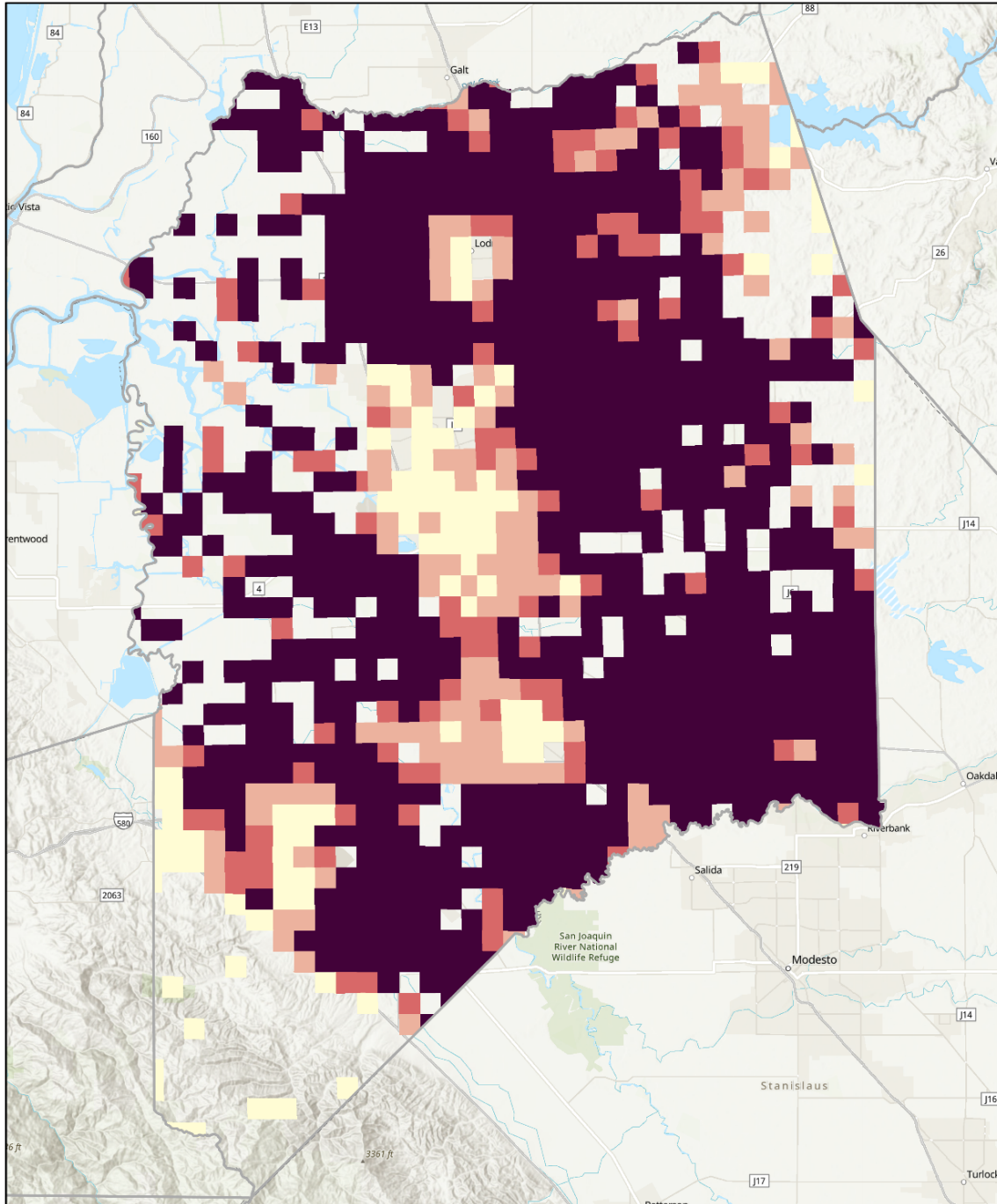
3.4.2.2 Amount of Irrigated Agriculture

The County consistently ranks as the seventh highest in California for gross agricultural production, making it a significant contributor to the region's economy. Due to this, a majority of the land area in the County is used for irrigated agriculture, where purple regions indicate at least 50% of the PLSS is farmland (Figure 3-6). Agriculture is the largest user of water in the County. When irrigation demands are met through groundwater pumping, domestic wells and SWSs that rely on the same source of groundwater face increased vulnerability. These pressures intensify during drought years, when reduced surface water allocations force agricultural users to rely more heavily on groundwater.

Except for the portion of the County that extends into the Coastal Range, the County overlies three alluvial groundwater subbasins that are subject to the SGMA. These regions, and their basin priority levels, are Tracy Subbasin (medium priority); Delta-Mendota Subbasin (critical overdraft); and Eastern San Joaquin Subbasin (critical overdraft). Areas in critical overdraft represent increased risk of domestic wells going dry and straining small system supplies. Legacy use of fertilizers and other agricultural inputs can contribute to nitrate and other nutrients that may degrade drinking water supplies.

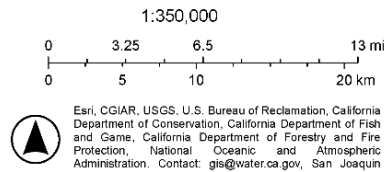
Communities most exposed to these overlapping pressures are located in the Central Valley floor around Stockton, Lodi, Manteca, Ripon, Escalon, and Tracy, where irrigated agriculture and high domestic well densities coincide. Should groundwater pumping intensify in these areas, declines in well performance could serve as early indicators of emerging groundwater stress and water quality degradation across other parts of the County.

3.0 Drought and Water Shortage Risk Assessment



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- California Counties
- RC2j - Amount of Irrigated Agriculture
- None
- Low
- Medium
- High



Esri, CGIAR, USGS, U.S. Bureau of Reclamation, California Department of Conservation, California Department of Fish and Game, California Department of Forestry and Fire Protection, National Oceanic and Atmospheric Administration. Contact: gis@water.ca.gov, San Joaquin

California Department of Water Resources
California Department of Water Resources

Source: Water Shortage Vulnerability Explorer Tool, [Water Shortage Vulnerability Explorer Tool](#), Accessed: 12/2024

Figure 3-6. Percent of Land as Irrigated Agriculture Indicator in San Joaquin County

3.4.2.3 Water Quality Aquifer Risk

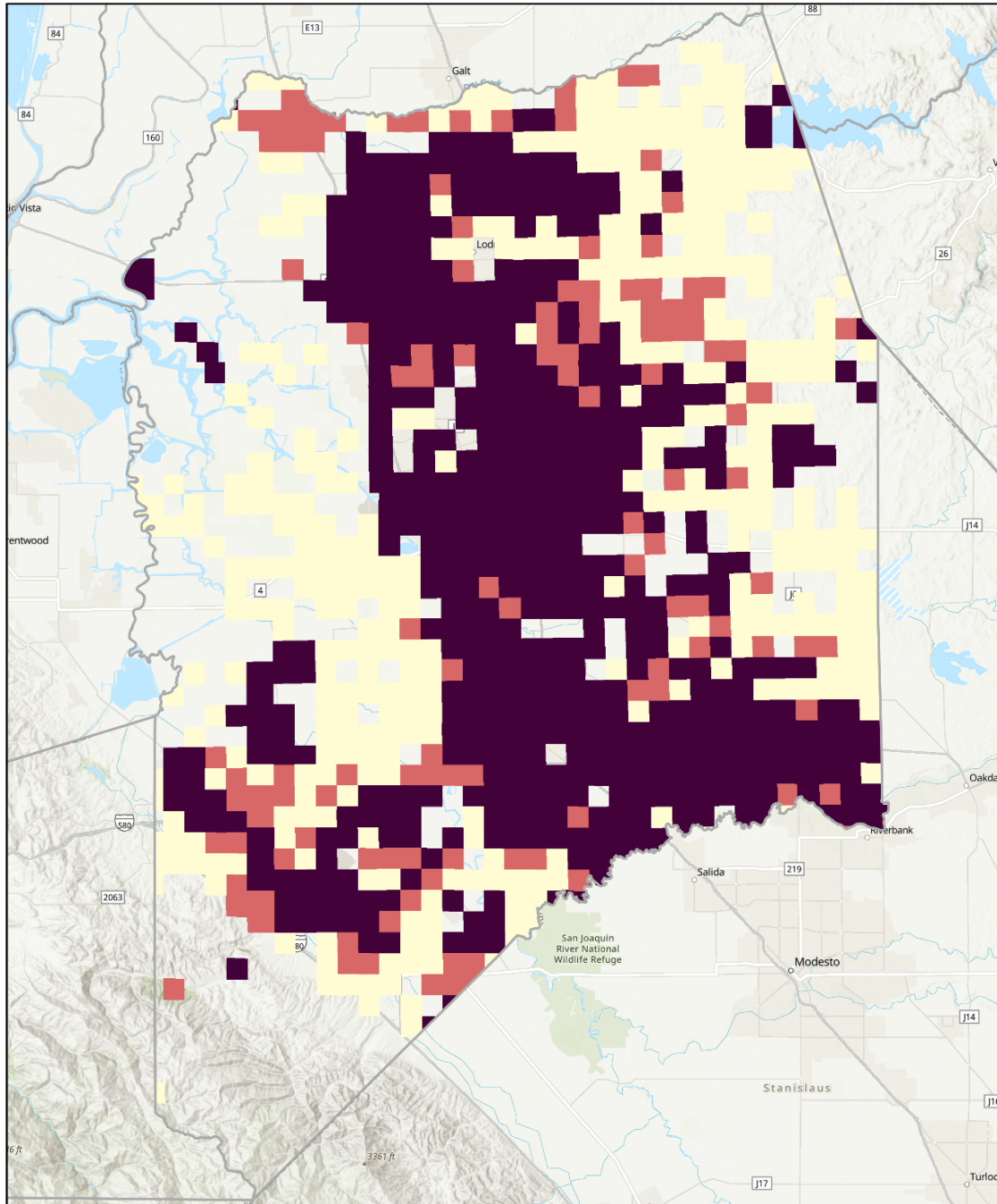
The potential groundwater quality risk is derived from the 2024 Safe and Affordable Funding for Equity and Resilience (SAFER) Needs Assessment,⁹ which evaluated the 20-year (long-term) average of groundwater quality data and the most recent reading (past 5 years) from publicly available databases to assess concentrations of potential contaminants. Areas were assigned a high water quality risk score if the long-term average or more recent reading for any potential contaminants exceeded the comparison concentration. Medium risk was assigned when concentrations were between 80 and 100 percent of the threshold. Areas below 80 percent for the long-term average *and* recent reading were classified as low risk.

Much of the County is designated medium to high water quality risk, with the most extensive high-risk areas concentrated in the central and southern valley floor within and around the cities of Stockton, Manteca, Ripon, Escalon, and Tracy. Additional clusters of high-risk areas also appear north and south of the unincorporated community of Victor (Figure 3-7). These locations overlap with regions of high irrigated agriculture, where fertilizer use may contribute to nitrate loading, and with urban centers, where legacy contamination and septic systems may add further water quality pressures. If water quality continues to degrade in these high-risk subregions, it may serve as an early warning of broader aquifer vulnerability across the County, signaling the potential for similar impacts to emerge in nearby groundwater-dependent communities.

The presence of regulated constituents at elevated levels increases the physical vulnerability of domestic wells and SSWSs by threatening the safety and potability of the water. Contaminants of concern in the County, as detailed in Section 3.3, include nitrates, arsenic, and VOCs, among others. Elevated levels not only compromise water for human consumption and domestic use but can also degrade aquatic ecosystems, soils, and agricultural productivity. For households and small systems, this can mean costly treatment, repairs, or reliance on bottled or hauled water during shortages.

⁹ Additional publicly available tools provide information about groundwater conditions and domestic well infrastructure within California. DWR maintains the Groundwater Live database, which provides dashboards and data related to groundwater levels, well infrastructure, and land subsidence. The State Water Resources Control Board also maintains the SAFER Program dashboards, which provide publicly accessible information on drinking water system risk and domestic well vulnerability that may assist residents and stakeholders in understanding groundwater conditions and water supply risks within San Joaquin County.

3.0 Drought and Water Shortage Risk Assessment



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- California Counties
- RC2i - SWRCB 2024 Water Quality Risk
 - Low
 - Medium
 - High

1:350,000

0 3.25 6.5 13 mi
0 5 10 20 km

Esri, CGIAR, USGS, U.S. Bureau of Reclamation, California Department of Conservation, California Department of Fish and Game, California Department of Forestry and Fire Protection, National Oceanic and Atmospheric Administration. Contact: gis@water.ca.gov, San Joaquin

California Department of Water Resources
California Department of Water Resources

Source: Water Shortage Vulnerability Explorer Tool, [Water Shortage Vulnerability Explorer Tool](#), Accessed: 12/2024
Figure 3-7. Safe and Affordable Funding for Equity and Resilience Water Quality Risk Assessed in 2024 Indicator in San Joaquin County

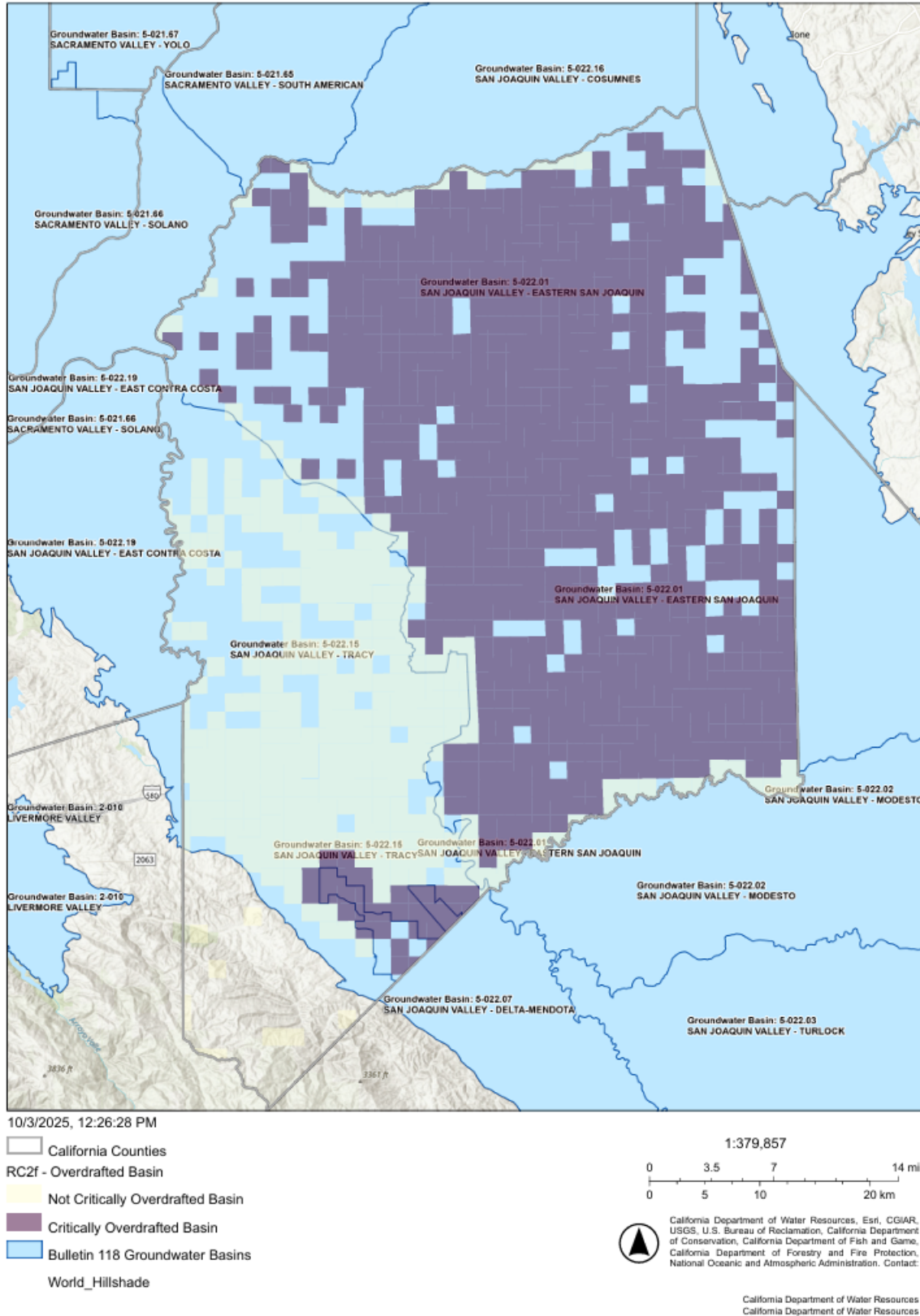
3.4.2.4 Critically Overdrafted Groundwater Basins

As defined by SGMA, “A basin is subject to critical overdraft when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts.” Overdraft occurs when the average annual amount of groundwater extraction exceeds the long-term average annual supply of water to the basin. Effects of overdraft can include seawater intrusion, land subsidence, groundwater depletion, and/or chronic lowering of groundwater levels.

The largest groundwater subbasin in the County is the Eastern San Joaquin Subbasin (DWR Basin Number 5-022.01) (Figure 3-8). This subbasin is in critical overdraft and encompasses much of the central and eastern regions of the County, including communities such as Stockton, Lodi, Manteca, Ripon, Escalon, and surrounding rural areas. The County additionally overlies a small portion of the critically overdrafted Delta-Mendota Subbasin (DWR Basin Number 5122.07) near Tracy.

For domestic wells and SWSs, reliance on these overdrafted basins increases the risk of outages, water quality degradation, and higher costs to access safe and reliable supplies.

Table 3-3 summarizes each of the physical vulnerability indicators from the WSVE Tool and how they impact the County.



Source: Water Shortage Vulnerability Explorer Tool, [Water Shortage Vulnerability Explorer Tool](#), Accessed: 10/2025

Figure 3-8. Critically Overdrafted Groundwater Basins Indicator in San Joaquin County

Table 3–3. Summary of Observed Conditions for Physical Vulnerability Indicators in San Joaquin County

Physical Vulnerability Indicator	Observed Conditions ¹
Climate Change	
Temperature Shift (RC1a)	An increase in the average annual maximum temperature of 1.6to 3.2°F is projected throughout the County. Much of the County is projected to warm by 2.7 to 3.0°F, with localized areas in the northeast, near the Camanche Reservoir, experiencing the highest increases (3.0–3.2°F). In contrast, localized areas in the southwest, near Tracy, are projected to see smaller increases closer to 1.6–3.0°F. These projections fall within the broader <i>San Joaquin Valley Region Report</i> , which estimates an overall warming of 4–5°F under stabilized greenhouse gas concentrations and up to 8°F under high emissions scenarios by 2100, as mentioned in Section 3.3.2. Rising temperatures could increase water supply demands from users, evapotranspiration, and other sources, thereby increasing vulnerability to drought and/or water shortage impacts.
Saline Intrusion Projected (RC1b)	The County is not expected to experience saltwater intrusion as a result of climate change or sea level rise.
Wildfire Risk Projection (RC1c)	Projections indicate that wildfire risk is primarily concentrated in the wildland–urban interface. Areas of elevated risks are most evident along the eastern foothills, where development meets natural vegetation, and along the southwestern edge of the valley floor near Tracy. The Central Valley floor is projected to remain among the least affected areas due, in part, to extensive agricultural operations in the region. The projected increase in risk of wildfire introduces additional vulnerability to water sources.
Current Environmental Conditions and Events	
2024 Precipitation (RC2a)	The County receives an average of about 14 to 17 inches of precipitation annually, with totals varying depending on location and elevation (NOAA 2026). For water year 2024, precipitation was below normal, with totals falling short of the long-term mean. While conditions did not trigger a formal “dry year” designation, the County still experienced drier-than-average conditions. These below-normal totals contribute to water supply stress, particularly for domestic wells, state small water systems, and groundwater-dependent communities, even if not classified as an official dry year. The stress is further compounded by consecutive dry years observed over the past 5-year period (RC2aa; Figure 3-1), which limit aquifer recharge and prolong drought impacts.
Multiple Dry Years (RC2aa)	Data indicate that most of the County has experienced 2 dry years over the last 5-year period (2020–2024), with localized areas in the southwest experiencing 3 or more dry years. The occurrence of multiple dry years in close succession may increase the physical vulnerability of water supplies by reducing opportunities for aquifer recharge and extending periods of water shortage.

Physical Vulnerability Indicator	Observed Conditions ¹
Wildfire Risk (RC2b)	Wildfire risk in the County is predominantly located in the grassland and woody chaparral of the Coastal Range and the grassland steps of the Sierra Nevada foothills to the east. The extensive agricultural operations in the valley floor limit wildfire risk in that area. U.S. Forest Service (RC2b) identifies mostly high hazard along the eastern boundary with localized very-high-risk pockets in the southwest.
Geology (RC2c)	Fractured rock is present in localized areas in the southwestern region of the County. Water availability in fractured rock areas is more difficult to monitor and, therefore, more uncertain for those relying on it as a source of water. Areas with fractured rock are considered due to high susceptibility to drought impacts.
Water Quality Aquifer Risk (RC2i)	This indicator shows that domestic wells in the County may be at elevated risk of accessing groundwater with concentrations of regulated constituents above State standards. This index reflects an assessment of overall water quality risk, rather than direct sampling results from each individual well. High-risk areas are widespread, with notable concentrations around Stockton, Lodi, Manteca, Tracy, Ripon, and Escalon. These findings suggest that domestic wells may face heightened vulnerability, as poor water quality could compound existing drought and water supply challenges.
Subsidence (RC2d)	No subsidence has been reported in the County. Higher subsidence creates more vulnerable conditions.
Basin Salt (RC2e)	The County is not anticipated to experience impacts on potable water supplies due to rising sea levels; however, the County, city of Stockton, and ESJ GWA have documented localized saline intrusion related to natural conditions and land use activities. These occurrences do not alter the overall risk assessment outcome.
Overdrafted Basin (RC2f)	Two groundwater basins in the County are considered critically overdrafted: San Joaquin Valley – Eastern San Joaquin Subbasin (DWR Basin Number 5-022.01) and Delta-Mendota Subbasin (DWR Basin Number 5-022.07). Overdrafted basins have increased physical vulnerability to water shortage and drought.
Chronic Declining Water Levels (RC2g)	Declining groundwater levels are most evident in the eastern portion of the County in the Eastern San Joaquin Subbasin (DWR Basin Number 5-022.01), as well as in the southwestern portion of the County in Tracy Subbasin (DWR Basin Number 5-022.15). Persistent declines in groundwater levels create multiple interconnected challenges that heighten the vulnerability of the groundwater system. These include reduced water supply reliability and water quality degradation from altered hydraulic pressures.
Surrounding Land Use (RC2j)	The County contains significant irrigated farmland, concentrated within the San Joaquin Valley Basin. The extent of irrigated agriculture creates competing demand for groundwater supplies and raises potential water quality concerns. These pressures increase vulnerability of domestic wells and state small water systems, especially during a drought or water shortage event when reliance on groundwater intensifies.

Physical Vulnerability Indicator	Observed Conditions ¹
Infrastructure Susceptibility	
Dry Domestic Well Susceptibility in basins (RC3a) – Alluvial Basin	This indicator identifies locations where wells are more likely to go dry if the current groundwater trends in the County continue. The analysis shows particularly high susceptibility in the southwestern portion of the County between the city of Tracy and Interstate 5, in some rural areas in the eastern region, and in north-central areas of the County where domestic well density overlaps with declining groundwater levels.
Domestic Well Density in Fractured Rock Areas (RC3c)	Higher density of domestic wells in a single square mile within a fractured rock area tends to create a higher susceptibility for outages and increase competing demands, especially in dry periods. In the County, most fractured rock areas contain relatively few domestic wells, but localized clusters of higher density appear in the southwest portion of Tracy, the southeast portion of Escalon, in north-central areas north of Stockton, and in areas north and northeast of Lodi. These pockets represent areas where domestic wells are more vulnerable compared to the broader County.
Record of Shortage	
Reported Household Outage on Domestic Well (RC5a)	Areas that have already experienced outages are more likely to experience similar conditions during future dry years, due to combinations of aquifer sensitivity/fluctuations and shallow wells. Household outages have been reported in scattered pockets of the County, predominantly east of the Highway 99 corridor. Evaluating the dry well data would provide further insight into the nature of the reported well outages. The reported well outages occurred primarily during the spring and summer of 2014 and 2015, which were drought periods. This indicates that the areas could be vulnerable to water supply shortages during future droughts.

Notes:

¹ Abbreviations are included next to indicator name (e.g., “RC1a”) for clarity.

Key:

°F = degrees Fahrenheit

County = San Joaquin County

DWR = California Department of Water Resources

ESJ GWA = Eastern San Joaquin Groundwater Authority

3.5 Risk Assessment Findings

The risk assessment evaluated physical and social vulnerability across the County to identify areas where domestic wells and SWSs may be most at risk during drought or extended water shortages. Using the DWR WSVE Tool and cluster-density analysis, eight primary domestic well clusters, referred to as indicator communities, were identified (Figure 3-9). These subregions serve as bellwether communities, providing early indications of water conditions that could emerge elsewhere in the County. That said, domestic wells and SWSs outside of the indicator communities still remain vulnerable to water shortages. Many parts of the County, particularly the central and southern valley floor, also face significant concerns even if they are not highlighted through this analysis. Only the Delta, Coastal Range, and far eastern edge of the County consistently exhibit lower vulnerability.

Table 3-4 summarizes the findings from the cluster-density analysis including each indicator community's total area, domestic well count, average depth, well spacing, and average physical and social vulnerability indices for each indicator community.

Table 3-5 presents the WSVE Tool physical hazards driving vulnerability within each indicator community.

Table 3–4. Characteristics of Indicator Communities in San Joaquin County

Indicator Community	Area (acres)	Domestic Well Count	Average Total Completed Depth of Domestic Wells	Agricultural and Industrial Well Count	Average Distance between Domestic Wells (feet) ¹	WSVE Tool Social Vulnerability Index (avg)	WSVE Tool Physical Vulnerability Index (avg)
Collierville	2,790	251	220	23	600	51	56
Dogtown	6,388	389	283	39	1,265	39	40
East County	1,893	153	283	7	337	30	75
Escalon East	5,062	359	224	48	879	69	68
French Camp	1,755	146	167	20	982	41	37
Mokelumne Aqueduct	2,059	134	261	13	1,031	74	54
Stockton East	14,256	867	248	154	946	59	59
Tracy South	2,028	200	209	11	823	48	60
Countywide						38	61

Notes:

¹ Distance is calculated using the latitude and longitude coordinates of domestic wells. Wells without sufficient geographic information (i.e. latitude and longitude coordinates) were not included in the analysis. Approximately 18 percent of domestic wells in the county were used in the cluster-density analysis.

Values are approximations due to the predominance of Public Land Survey Section locations of wells.

Key:

WSVE = Water Shortage Vulnerability Explorer

Table 3–5. Summary of Water Shortage Vulnerability Explorer Tool Findings in San Joaquin County

Area with Water Shortage Vulnerability and Domestic Wells/State Small Water Systems	Physical Vulnerability Indicators	Social Vulnerability Score
Collierville	<ul style="list-style-type: none"> • Overdrafted basin (RC2f) • Declining groundwater levels (RC2g) • Irrigated agriculture (RC2j) • Reported dry well outages (RC5a) 	Medium-Low to Medium
Dogtown	<ul style="list-style-type: none"> • Overdrafted basin (RC2f) • Declining groundwater levels (RC2g) • Wildfire hazard (RC2b) – moderate along eastern boundary • Irrigated agriculture (RC2j) • Reported dry well outages (RC5a) 	Medium
Mokelumne Aqueduct	<ul style="list-style-type: none"> • Overdrafted basin (RC2f) • Declining groundwater levels (RC2g) • Irrigated agriculture (RC2j) • Domestic well susceptibility (RC3a) 	Medium-High
Stockton East	<ul style="list-style-type: none"> • Overdrafted basin (RC2f) • Declining groundwater levels (RC2g) • Water quality risk (RC2i) • Irrigated agriculture (RC2j) • Reported dry well outages (RC5a) 	High
East County	<ul style="list-style-type: none"> • Overdrafted basin (RC2f) • Declining groundwater levels (RC2g) • Wildfire hazard (RC2b) – moderate along foothills • Irrigated agriculture (RC2j) • Water quality risk (RC2i) • Reported dry well outages (RC5a) • Domestic well susceptibility (RC3a) 	Medium-Low to Medium
French Camp	<ul style="list-style-type: none"> • Overdrafted basin (RC2f) • Irrigated agriculture (RC2j) • Water quality risk (RC2i) 	High
Escalon East	<ul style="list-style-type: none"> • Overdrafted basin (RC2f) • Declining groundwater levels (RC2g) • Irrigated agriculture (RC2j) • Water quality risk (RC2i) • Reported dry well outages (RC5a) 	Medium-Low to Medium
Tracy South	<ul style="list-style-type: none"> • Declining groundwater levels (RC2g) • Irrigated agriculture (RC2j) • Water quality risk (RC2i) • Wildfire hazard (RC2b) – proximity to southwest foothills • Domestic well susceptibility (RC3a) • Reported dry well outages (RC5a) 	Medium to Medium-High

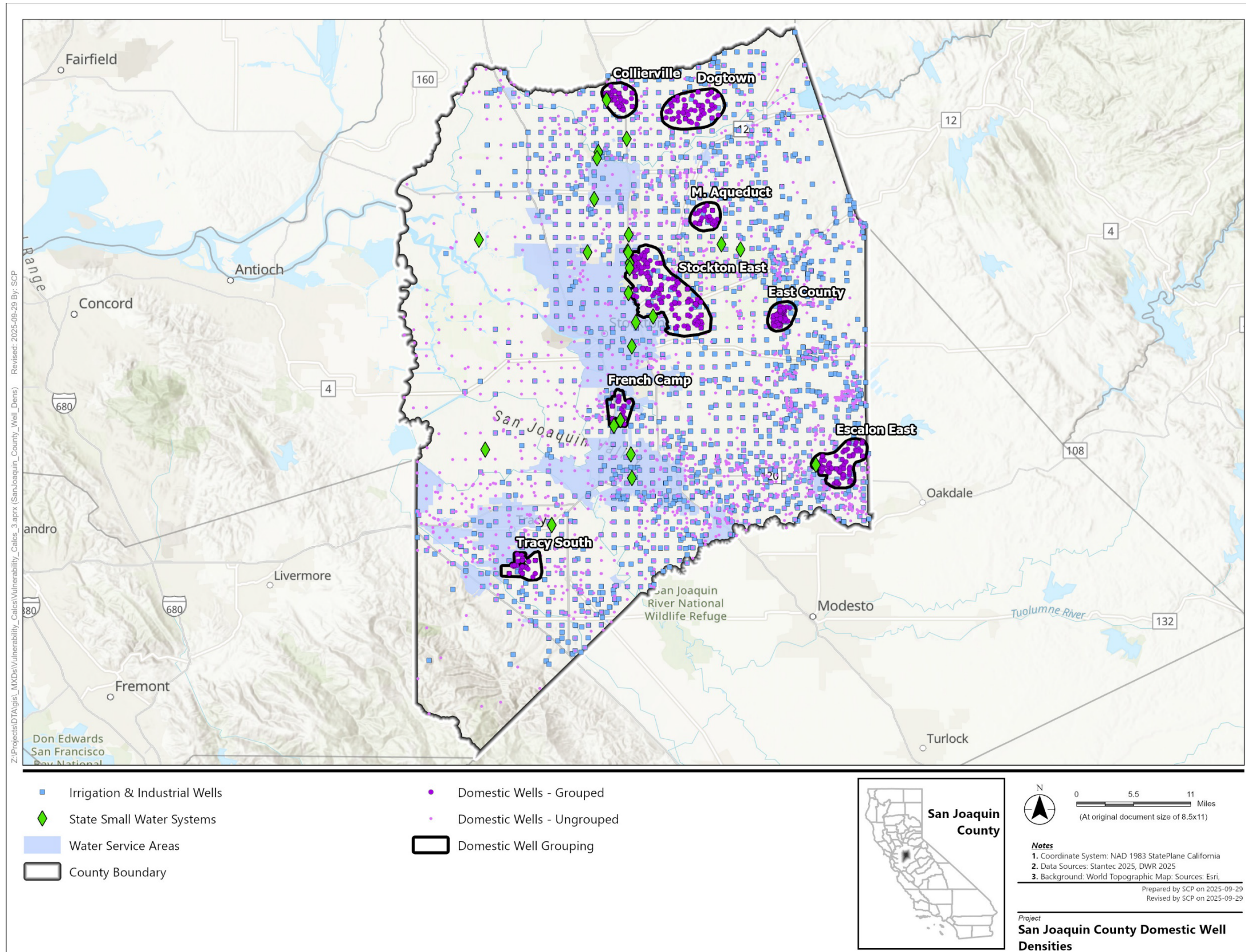


Figure 3-9. Indicator Communities in San Joaquin County Showing Areas of Elevated Water Shortage Vulnerability and Concentrations of Domestic Wells and State Small Water Systems

3.6 Risk Assessment Gaps

Understanding gaps in the risk assessment (1) helps identify physical and social vulnerabilities that may exist but are not effectively captured using the methodology applied and data available, (2) focuses future efforts to improve future risk assessments, and (3) allows communities to develop long-term continuous monitoring and improvement plans. This proactive approach helps build resilience over time. The risk assessment gaps described below were identified by the County, the DAWG, and other stakeholders during the development of the County DRP.

- **Domestic Well and SSWS Data:** The total number of SSWSs in the County varies slightly depending on the data source and timing of reporting. County staff noted that the most recent locally maintained records reflect a total of 29 SSWSs. County staff clarified that the Environmental Health Department regulates all SSWSs and provides updated SSWS counts to the State Water Board on an annual basis. County staff also noted that online domestic well records are incomplete and that additional accuracy could be achieved through digitization of existing County forms and incorporation of local knowledge.
- **Domestic Well Locations:** Approximately 80 percent of domestic wells in the County do not have sufficient geographic information. This limits the ability to determine exact well positions, depths, and spatial relationships. As a result, the identified indicator communities reflect generalized clusters of domestic wells, rather than detailed maps of where individual wells are located or whether specific wells may be impacted. This uncertainty may obscure localized variations in risk, where areas with higher or lower well concentrations could experience differing levels of vulnerability. Improving the accuracy of well point locations and associated attributes (e.g., depth, construction date) would enhance the County's ability to identify wells with elevated risks related to groundwater decline, water quality degradation, and spatial proximity to other wells.
- **Domestic Well Density Variability:** Well density is not uniform across the County. Based on the cluster-density analysis, some clusters contain many wells located in close proximity, while others are more dispersed. As a result, using a single countywide density value would obscure meaningful local differences. For example, areas such as Collierville exhibit a higher ratio of wells to land area compared to Dogtown, resulting in different average spacing between wells. To more accurately represent these conditions, per-cluster density estimates are provided in Table 3-5 rather than a single County average. This approach captures the diversity of hydrogeologic and land-use conditions across the County and supports prioritization of areas where the greatest number of domestic well and SSWS users could be affected simultaneously.

4.0 Short-Term Response Actions

The risk assessment presented in Section 3 showed that domestic wells and SWSs in bellwether communities, most notably areas around Stockton, Lodi, French Camp, and Tracy, may be susceptible to water shortages and therefore provide early indications of water conditions that could emerge elsewhere in the County.

Based on the outcomes of that assessment, OES, Department of Public Works, and the Environmental Health Department, identified STRAs to include in the County DRP to help address the effects of water shortage emergencies that could occur in the vulnerable regions of the County. In the context of this County DRP, STRAs are defined as actions that may be implemented in advance of, and during, water shortage emergencies caused by drought and water shortage events, often addressing immediate and basic public safety needs. The identified STRAs are not exhaustive and may be modified in the future. The implementation of these STRAs is contingent on situational conditions and may occur individually or not at all.

This section describes the STRAs included in the County DRP and the Drought and Water Shortage Emergency Response Process developed as part of the County DRP to assist with implementing STRAs.

4.1 Legislative Direction

SB 552 requires that each county develop a drought and water shortage plan that includes proposed interim solutions for SWSs and domestic wells, per CWC Section 10609.70 (**boldface** added for emphasis as related to STRAs and this section of the County DRP):

*(b) A county shall develop a plan that includes potential drought and water shortage risk and proposed interim and long-term solutions for state small water systems and domestic wells within the county's jurisdiction. The plan may be a stand-alone document or may be included as an element in an existing county plan, such as a local hazard mitigation plan, emergency operations plan, climate action plan, or general plan. A county shall consult with its drought task force or alternative coordinating process as established by this section in developing its plan. A county shall consider, **at a minimum**, all of the following in its plan:*

(1) Consolidations for existing water systems and domestic wells.

(2) Domestic well drinking water mitigation programs.

(3) Provision of emergency and interim drinking water solutions.

(4) An analysis of the steps necessary to implement the plan.

(5) An analysis of local, state, and federal funding sources available to implement the plan

4.2 Short-Term Response Actions Included in the San Joaquin County Drought Resilience Plan

STRAs included in the County DRP are summarized in Table 4-1 and described in this section. Most of these STRAs provide emergency and interim drinking water supplies via bulk water delivery or with

packaged or bottled water. Other STRAs address the mutual aid agreements required to (1) provide these emergency and interim drinking water supplies efficiently, and (2) expedite the well permitting approval process. A process for STRA implementation is presented in Section 4.3, while future efforts to address STRA implementation challenges and develop new STRAs are described in Section 6.2.

Table 4-1. List of Short-Term Response Actions Included in San Joaquin County Drought Resilience Plan

ID	Short-Term Response Action Type	Short-Term Response Action Name	Short-Term Response Action Description	Responsible Entity	Supporting Entities
STRA 01	Emergency And Interim Drinking Water Supplies	Dedicated Water Filling Stations	County staff may coordinate with public water systems, water purveyors, cities, special districts, and partner agencies to identify and facilitate a network of emergency potable water filling stations or suppliers during a drought or water shortage event.	OES (Lead) PW (Support)	Public water systems Special districts DWR Cities SSWSs NGOs
STRA 02	Emergency And Interim Drinking Water Supplies	Water Hauling, Bulk Water for Existing Tanks	County staff may coordinate with public water systems, water haulers, and partner agencies to support bulk water delivery and use of existing private storage tanks for domestic well and SSWS users during a water shortage emergency, prioritizing vulnerable and accessible locations.	OES (Lead) PW (Support)	Public water systems SSWSs Water haulers NGOs (e.g., Self-Help Enterprises) DWR State Water Board
STRA 03	Emergency And Interim Drinking Water Supplies	Water Hauling, Bulk Water for Temporary Tanks	County staff may coordinate with public water systems, water haulers, and partner agencies to support bulk water delivery and the placement, filling, and use of temporary or portable storage tanks for domestic well and SSWS users during a water shortage emergency, prioritizing vulnerable and accessible locations.	OES (Lead) PW (Support)	Public water systems SSWSs Water haulers NGOs (e.g., Self-Help Enterprises) DWR State Water Board
STRA 04	Emergency And Interim Drinking Water Supplies	Packaged and Bottled Water Supplies	County staff may support coordination of packaged or bottled water distribution for domestic well and SSWS users during a water shortage emergency by working with vendors, NGOs, and State programs, prioritizing vulnerable areas.	OES (Lead)	NGOs State-administered emergency water programs Public water systems Cities Private vendors
STRA 05	Emergency And Interim Drinking Water Supplies	Voluntary Water Conservation	County staff may coordinate voluntary water conservation communications for domestic well and SSWS users during a water shortage event through consistent, multilingual outreach in partnership with groundwater sustainability agencies, water purveyors, NGOs, and County PIOs, without enforcement.	OES (Lead)	County PIOs Cities NGOs Public water systems Community-based organizations
STRA 06	Interties	SSWS Intertie, Emergency	County staff may facilitate coordination among SSWSs, public water systems, and regulatory agencies to support the identification and installation of emergency or temporary interties during a water shortage emergency, without County ownership or operation.	PW (Lead) EHD (Support)	SSWSs State Water Board Cities Public water systems DWR
STRA 07	Interties	SSWS Intertie, Permanent	County staff may support coordination and planning among SSWSs and public water systems for permanent interties in advance of a water shortage, without County ownership, construction, or funding responsibilities.	PW (Lead) EHD (Support)	SSWSs State Water Board Local jurisdictions Public water systems DWR Regional water agencies
STRA 08	Permit Streamlining and Coordination	Expedited Well Permitting	County staff may implement and administer expedited emergency permitting procedures for domestic well and public water system repairs, deepening, or replacement during a water shortage emergency.	EHD (Lead)	State Water Board Well owners DWR Contractors

Key:
 County = San Joaquin County
 DWR = California Department of Water Resources
 EHD = Environmental Health Department
 NGO = non-governmental organization
 OES = Office of Emergency Services
 PIO = public information officer
 PW = Department of Public Works
 STRA = short-term response action
 SSWS = state small water system
 State Water Board = State Water Resources Control Board

4.2.1 Emergency and Interim Drinking Water Supplies

Emergency and interim drinking water supplies involve providing temporary water supplies until longer term water supplies are secured or the water shortage emergency ends. Emergency and interim drinking water supplies are used during water shortage emergencies to meet basic health and safety needs.

4.2.1.1 Dedicated Water Filling Stations (STRA 01)

During a water shortage emergency, the County may coordinate with local water suppliers and partner agencies to identify and make available water filling stations to support domestic well and SSWS users who lack access to potable water. Dedicated water filling stations are established locations where potable water can be made available for emergency use, typically operated by public water systems or other large water purveyors. Dedicated water filling stations are included as STRA 01 in the County DRP.

The County may support this STRA by coordinating with public water systems, cities, special districts, and other partner agencies to identify, prioritize, and facilitate access to feasible water filling station locations. County staff may focus on identifying locations that can serve areas experiencing water shortages, with particular attention to vulnerable communities identified through the risk assessment and analysis detailed in Section 3. Locations may include existing public water system facilities or temporary or mobile filling stations identified during an emergency. County staff may consider accessibility, transportation constraints, and community needs when identifying potential filling station locations.

County staff may support information sharing and situational awareness related to the availability, locations, and operational status of water filling stations. This may include compiling and disseminating information on hours of operation, general access requirements, and geographic coverage to support outreach and coordination under the Emergency and Interim Drinking Water Distribution (EIDWD) Plan described in Section 4.3.2.

The County will not own or operate water filling stations or directly supply potable water; however, County staff may facilitate coordination among participating entities and support the development of temporary agreements or memoranda of understanding, as needed, during activation. The County does not anticipate maintaining standing agreements or infrastructure related to water filling stations outside of emergency conditions.

County OES and the Department of Public Works are the lead entities responsible for coordinating this STRA, with support from public water systems, cities, special districts, SSWSs, DWR, and non-governmental organizations (NGO). Mutual aid agreements supporting this STRA are described in Section 4.2.4, and activation would occur through the Water Shortage Emergency Response Process and the EIDWD Plan outlined in Section 4.3.2.

4.2.1.2 Water Hauling or Bulk Water Delivery (STRA 02 and STRA 03)

Water hauling or bulk water delivery involves using licensed water haulers or tankers to deliver emergency water supplies to those in need at either (1) a central distribution point for residents to bring a container to be filled, or (2) a hospital or other critical infrastructure where the water hauler or tanker can be connected. Water hauling or bulk water delivery is included in the County DRP, with delivery to existing tanks being STRA 02 and temporary (mobile) tanks being STRA 03.

The County may support this STRA by coordinating with licensed water haulers, public water systems, SSWs, NGOs, and other partner agencies to facilitate bulk water delivery and, where needed, the placement and use of temporary or portable storage tanks. County staff may focus on identifying and prioritizing service areas based on vulnerability, accessibility, and operational feasibility and on supporting coordination between implementing partners.

County staff may support situational awareness and information sharing related to bulk water delivery needs, tank placement locations, delivery schedules, and general access information through the emergency and interim drinking water distribution process described in Section 4.3.2. Distribution approaches may include centralized filling locations, delivery to existing tanks, or filling of temporary tanks at community or public facilities, depending on site conditions and partner capacity.

During past drought events, bulk water delivery and temporary tank programs were implemented in the County through State-administered efforts and partnerships with NGOs, with the County providing coordination and situational support. Implementation of bulk water delivery during future emergencies would be subject to available funding, program authorization, and partner capacity.

County OES and the Department of Public Works are the lead entities responsible for coordinating this STRA, with support from public water systems, SSWs, licensed water haulers, NGOs (e.g., Self-Help Enterprises), DWR, and the State Water Board. Activation of this STRA would occur through the Water Shortage Emergency Response Process and the EIDWD Plan described in Section 4.3.2.

4.2.1.3 *Packaged or Bottled Water (STRA 04)*

In areas where other emergency and interim drinking water supplies are unavailable, the County could provide packaged or bottled water (i.e., 1- to 5-gallon jugs and individual bottled waters) to affected domestic well and SWS users. Packaged or bottled water delivery is included in the County DRP as STRA 04.

The County may support this STRA by coordinating with NGOs, public water systems, cities, private vendors, and State-administered emergency programs to facilitate access to packaged or bottled water for affected communities. County staff could assist in identifying appropriate distribution locations based on vulnerability, accessibility, and operational considerations and will support coordination among implementing partners.

County staff may support situational awareness and information sharing related to the availability, locations, and timing of packaged or bottled water distribution through the emergency and interim drinking water distribution process described in Section 4.3.2. Distribution locations, operating hours, and general access information would be communicated to affected communities using established County notification and outreach processes.

The County does not maintain standing stockpiles of bottled water for drought response and does not directly distribute bottled water; however, County staff may facilitate coordination, information sharing, and connections to State or partner-led programs during activation, subject to available funding, program eligibility, and partner capacity.

County OES serves as the lead County entity responsible for coordinating this STRA, with support from NGOs, State-administered emergency water programs, public water systems, cities, and private vendors. Activation of packaged and bottled water distribution would occur through the Water Shortage Emergency Response Process and the EIDWD Plan described in Section 4.3.2.

4.2.1.4 Voluntary Water Conservation Program (STRA 05)

During a drought or water shortage event, the County may coordinate voluntary water conservation communications to support domestic well and SSWS users in reducing water use and extending available supplies. Voluntary water conservation, included in the DRP as STRA 05, is intended as an early and ongoing response measure to help mitigate the impacts of drought and reduce the likelihood or severity of emergency water shortages.

The County may support this STRA by coordinating with GSAs, public water systems, water purveyors, NGOs, and County public information officers (PIO) to develop and disseminate consistent, timely, and accessible water conservation messaging. County staff could focus on outreach to domestic well and SSWS users, including communities identified as vulnerable through the risk assessment, and may support the use of multilingual and culturally appropriate communication methods where appropriate.

County staff may leverage existing emergency communication platforms, public outreach channels, and community-based networks to share information on voluntary conservation practices, drought conditions, and available resources. Conservation messaging may be scaled based on drought severity and aligned with conservation efforts implemented by water purveyors or state agencies to promote consistency across jurisdictions.

This STRA is education- and outreach-focused and does not include enforcement actions by the County. The County does not regulate water use for domestic wells or SSWS customers through this action but instead provides coordination and communication support to encourage voluntary participation.

County OES serves as the lead County entity for coordinating this STRA, with support from County PIOs, GSAs, public water systems, cities, community-based organizations, and NGOs. Voluntary water conservation communications would be implemented through the Water Shortage Emergency Response Process and the EIDWD Plan described in Section 4.3.2.

4.2.2 Interties (STRA 06 and STRA 07)

An emergency intertie is an above-ground or shallow subsurface pipeline that temporarily connects two or more willing water systems in the event of a water supply emergency that risks basic health and safety of residents. As the County is not a water purveyor, its role is to serve as facilitator and convenor to assist in successful execution of such agreements. The use of interties for emergency water supply is included in the County DRP as STRAs 06 and 07.

During a water shortage emergency, the County may assist water systems and partner agencies in identifying potential intertie opportunities based on known vulnerabilities, existing system configurations, and operational feasibility.

County staff could support this STRA by convening and facilitating coordination among SSWSs, public water systems, regulatory agencies, and other partner entities to explore feasible emergency intertie options. County staff may assist in identifying potential intertie locations based on known vulnerabilities, existing system configurations, and operational feasibility and may support coordination with State regulatory agencies and local jurisdictions to identify applicable emergency permitting pathways or administrative flexibilities.

In advance of future water shortages, the County may also support planning-level coordination related to permanent interties intended to improve long-term water system reliability and reduce vulnerability to drought or other water supply disruptions. County staff may facilitate discussions among water

systems, share relevant data and planning information, and help identify locations where permanent interties may be effective, including areas identified through the DRP.

The County’s role under this STRA is limited to coordination, facilitation, and planning support. The County does not design, construct, own, operate, or fund interties. Development and implementation of both emergency and permanent interties are led by participating water systems and are subject to technical feasibility, regulatory approval, funding availability, and governing board actions.

The Department of Public Works and Environmental Health Department serve as the lead entities for coordinating this STRA, with support from SSWs, public water systems, the State Water Board, DWR, cities, local jurisdictions, and regional water agencies. Implementing interties for emergency and/or permanent drinking water supplies would follow the process described in Section 4.3.

4.2.2.1 Partnership with Non-Governmental Organizations

NGOs can assist County staff in providing interim drinking water supplies to domestic well and SSWs communities. County staff could coordinate with these NGOs to determine the services needed. In some cases, NGOs may provide direct assistance to affected domestic well and SSWs communities without assistance from County staff. In these circumstances, County staff could coordinate with NGOs to track coverage and needs. The NGOs and services available within the County are listed below.

- The Community Water Center provides technical assistance, community outreach, and advocacy support to domestic well and SSWs communities. The organization works with partner organizations and local communities to help identify needs and support access to safe and reliable drinking water resources.
- Catholic Charities and other faith-based or community organizations may assist with community outreach and coordination during water shortage emergencies by helping connect affected residents with available assistance programs and resources.
- Self-Help Enterprises assists income-eligible domestic well users with emergency water supplies, including water storage tank and filling, well repair or replacement, and connection to larger water systems. This NGO collaborates with the Community Water Center and other organizations to connect with eligible domestic well users. The County has previously partnered with Self-Help Enterprises to support well drilling and related assistance efforts and remains open to continued coordination and partnership with them during future drought events.
- Regional volunteer and nonprofit coordination networks, such as Central Valley Voluntary Organizations Active in Disaster,¹⁰ may assist with connecting nonprofit, faith-based, and community organizations involved in disaster response and recovery. These networks can help facilitate coordination, volunteer support, and information-sharing among organizations providing outreach or emergency assistance.
- Citizen Emergency Response Teams operated by local jurisdictions and other trained volunteer networks may assist with community outreach, information distribution, and support activities during emergency response efforts.

¹⁰ County OES and community-based organizations are a part of the Central Valley Voluntary Organizations Active in Disaster.

- California Disaster Healthcare Volunteers are registered Disaster Service Workers who may assist with public health support and community outreach during emergency response events.

4.2.3 Permit Streamlining and Coordination (STRA 08)

As drought or water shortage conditions worsen and the production or quality of water at domestic wells or SWSs declines, well owners may be able to install a new well or rehabilitate an existing one to ensure continued water supply reliability. Within the County's authority, streamlining the permitting process for activities such as new well construction or existing well rehabilitation for domestic well or SWS users could provide relief during an ongoing water shortage. Permit streamlining and coordination are included in the County DRP as STRA 08. The County Environmental Health Department is the lead for this STRA.

The County may support this STRA by coordinating internally among County departments involved in well permitting and inspection, led by the Environmental Health Department, to implement emergency permitting procedures when a lack of water poses a risk to public health and safety. County staff may provide clear guidance on applicable emergency permitting requirements and timelines and will coordinate with the Department of Public Works and relevant State agencies, as needed, to support timely review and compliance.

Under existing County authority, emergency well work may proceed without a permit when an emergency is evidenced by a lack of water. Emergency work must be performed by a C-57 licensed contractor and may include construction of a new domestic well; repair, deepening, or replacement of an existing domestic well or pump; and, for public water systems, pump repairs or replacements. All work conducted under emergency conditions must comply with standards adopted pursuant to the County Development Title. In such cases, the well owner or contractor is required to file a statement documenting that the work constituted an emergency repair and the reason for the repair and to submit a permit application within 24 hours after work begins, excluding weekends and holidays.

The Environmental Health Department serves as the lead County entity for coordinating this STRA, with support from the Department of Public Works and coordination with the State Water Board, DWR, well owners, and licensed contractors, as appropriate. Activation of expedited permitting procedures would occur through the Water Shortage Emergency Response Process and be consistent with the emergency operations plan and the EIDWD Plan described in Section 4.3.2.

4.2.4 Pre-Negotiated Contracts and Mutual Aid Agreements

Efficient implementation of the STRAs identified in this County DRP requires coordination and cooperation with entities beyond the County government. These entities may include public water systems, cities, special districts, State agencies, NGOs, private vendors, and owners of public or quasi-public facilities. Coordination may occur through pre-negotiated contracts, mutual aid agreements, or activation-specific arrangements established in advance of or during a water shortage emergency.

The acquisition of materials or services needed to implement STRAs may be subject to local and State policies and regulations governing procurement. In the event of a declared emergency, the County may use existing emergency procurement authorities to acquire materials or services necessary to protect public health, welfare, or safety. Use of emergency procurement authority is time-limited, and the County is required to return to standard procurement practices as soon as practicable following the emergency.

The County may seek to establish pre-negotiated contracts or on-call arrangements to support implementation of certain STRAs, such as bulk water hauling, temporary water storage, bottled water supply, or related logistical services, that could be exercised during a recognized water shortage emergency. Establishing such agreements in advance may allow the County to act quickly and maintain consistent access to resources during emergency and interim water shortage events. The establishment, renewal, and management of any pre-negotiated contracts would comply with applicable local and State procurement requirements, except where emergency procurement authorities are temporarily invoked during a declared emergency.

A mutual aid agreement is an arrangement established in advance of an emergency through which another entity or entities may provide personnel, equipment, materials, and/or associated services during an emergency. Mutual aid agreements clarify how involved entities would engage with the County and with one another during a water shortage emergency, including roles, responsibilities, and coordination protocols. For purposes of this County DRP, mutual aid agreements are intended to support coordination, access, and implementation of emergency and interim drinking water supply actions, rather than capital investment or permanent infrastructure.

The County may also coordinate with large public water providers to explore use of existing mutual aid frameworks or cooperative arrangements that could assist with STRA activation during a water shortage emergency. While the County does not operate large water systems or directly supply water, County staff may facilitate communication, information sharing, and situational coordination to support actions identified in this County DRP. Any such coordination would be subject to provider capacity, regulatory considerations, and resource availability at the time of an event and would align with existing emergency management protocols.

Mutual aid agreements and pre-negotiated contract needs recommended to support efficient activation of STRAs are summarized in Table 4-2, including the type of agreement needed, lead County entity, and current status as of December 2025.

Table 4-2. Pre-Negotiated Contracts and Mutual Aid Agreements Recommended for Activation of Short-Term Response Actions Included in San Joaquin County Drought Resilience Plan (as of December 2025)

STRA	Contract or Mutual Aid Agreement Need	Lead County Entity	Status
STRA 01: Dedicated Water Filling Stations	Coordination-focused mutual aid agreements with public water systems and other water purveyors to identify and use existing facilities or temporary locations as emergency water filling stations during a water shortage emergency.	County OES / Public Works	Recommended
STRA 02 and STRA 03: Water Hauling and Bulk Water Delivery (Existing and Temporary Storage Tanks)	Pre-negotiated or on-call agreements with licensed water haulers and coordination agreements with NGOs or State-administered programs to support bulk water delivery and temporary storage tank placement during emergencies.	County OES / Public Works	Recommended

STRA	Contract or Mutual Aid Agreement Need	Lead County Entity	Status
STRA 04: Packaged and Bottled Water Supplies	Coordination agreements with NGOs, State-administered emergency water programs, and private vendors to facilitate access to packaged or bottled water during acute water shortage emergencies.	County OES	Recommended
STRA 06: Interties (Emergency and Permanent Coordination)	Coordination-focused mutual aid or cooperation agreements with SSWs, public water systems, and State regulatory agencies to support identification, emergency use, or planning-level coordination of interties.	Public Works / Environmental Health Department	Recommended
STRA 02, STRA 03, and STRA 04 (Site Access Support)	Activation-specific site access agreements with cities, school districts, special districts, fairgrounds, community facilities, or private property owners for placement of temporary water tanks or bottled water distribution sites.	County OES	Recommended

Key:

- County = San Joaquin County
- NGO = non-governmental organization
- OES = Office of Emergency Services
- Public Works = Department of Public Works
- State = State of California
- SSWS = small state water system
- STRA = short-term response action

4.3 Drought and Water Shortage Emergency Response Process

The Drought and Water Shortage Emergency Response Process describes (1) how County staff would evaluate drought and water shortage conditions in the County and declare a water shortage, and (2) its EIDWD Plan to activate emergency and interim drinking water supplies and communicate with affected domestic well and SSWs communities.

4.3.1 Drought or Water Shortage Triggers

Declaring a drought or water shortage is important as it communicates a potential or ongoing emergency, activates mutual aid agreements, and is the first step in accessing State and federal resources that may be available to assist the County in implementing STRAs.

This DRP outlines a process for classifying water shortage stages, as detailed in Table 4-3. This process uses indicators of water supply with defined criteria that categorize the County into one of four water shortage stages—Green (information), Yellow (Standby), Orange (alert) and Red (response)—as described below.

- In the Green Stage, hydrologic and groundwater conditions within San Joaquin County are within normal seasonal ranges, and no significant drought or water shortage impacts are observed. County activities during this stage emphasize preparedness, routine monitoring, and interagency coordination rather than active deployment of response measures. County staff promote baseline voluntary water conservation messaging (e.g., public information related to water conservation, protection of drinking water sources, and general awareness of drought

preparedness resources available to residents), maintain inventories of available water tanks and hauling resources, and support coordination with GSAs and other agencies to track groundwater and surface water conditions. This stage is intended to ensure readiness and situational awareness should conditions begin to deteriorate.

- In the Yellow Stage, early drought indicators or localized water stress are present, but widespread water shortages have not yet occurred. During this stage, County staff may increase communication and outreach to domestic well and SSWS communities, continue voluntary conservation efforts, and strengthen coordination with GSAs, public water systems, and partner agencies. County actions would focus on proactive preparation, including maintaining readiness of water hauling and bulk water resources, identifying candidate locations for emergency water filling stations, and initiating coordination discussions related to potential emergency or temporary SSWS interties. These actions are intended to encourage early response, improve coordination, and position STRAs for rapid activation if conditions worsen.
- In the Orange Stage, drought conditions are ongoing and are beginning to affect groundwater availability or water supply reliability, particularly in vulnerable communities. Indicators may include increasing dry well reports, groundwater level declines approaching or exceeding GSP minimum thresholds, or State or County drought declarations. During this stage, County staff may continue voluntary conservation campaigns, communicate with water haulers and tank providers to ensure readiness, and advance coordination for potential deployment of emergency water filling stations. Coordination with public water systems, SSWSs, GSAs, and emergency management partners is intensified, and preparatory actions transition toward implementation readiness. Where needed, County staff may begin deploying physical response measures with support from mutual aid partners to address emerging water access challenges.

If water shortages are widespread or imminent due to drought or other emergencies (such as wildfire, contamination, or infrastructure failure), the County enters the Red Stage. During this stage, emergency coordination is required to protect public health and safety. County staff, in coordination with the DAWG and County Board of Supervisors, may declare a water shortage emergency and fully activate the emergency and interim drinking water distribution process. All applicable STRAs (STRAs 01–08) may be implemented, including operation of emergency water filling stations, water hauling and bulk water delivery, bottled water distribution, expedited well permitting, and emergency SSWS interties. Response actions are carried out in coordination with partner agencies and consistent with the County emergency operations plan and the Drought and Water Shortage Hazard Annex. If a State drought or water shortage emergency declaration includes areas within the County, the County would initiate the Water Shortage Emergency Response. Through this process, County staff will assess local conditions and determine the appropriate response stage. Depending on the severity and extent of impacts, this may include activation of the Red Stage and implementation of the EIDWD Plan described in Section 4.3.2. In the event of a federal disaster declaration, County staff would evaluate if the disaster could require emergency and interim drinking water supplies. If needed, it would activate the EIDWD Plan. State and/or federal disaster declarations may make additional resources available to provide emergency and interim drinking water supplies. County staff would evaluate how these declarations may influence the implementation of the STRAs identified in this County DRP and the activation of the EIDWD Plan.

Table 4–3. Emergency Response Process

Stage	Description	Drought Trigger	Disaster Triggers	STRAs to Activate	Notes
Green Stage No Major Drought or Water Shortage Issues	Hydrologic and groundwater conditions are within normal seasonal ranges, and no significant water supply impacts are observed. County activities focus on preparedness, monitoring, and coordination.	Precipitation, snowpack, and groundwater conditions within normal range for the season No U.S. Drought Monitor designation (no D0 or above) No reported dry wells GSP indicators within established thresholds	None	Promote voluntary conservation outreach (STRA 04) Maintain inventory of tanks and haulers (STRA 02 and STRA 03)	This stage emphasizes readiness, baseline communication, and interagency coordination rather than active deployment.
Yellow Stage Early Drought Indicators	Drought conditions are present, and localized water stress or early impacts may begin to appear. County actions focus on proactive coordination, increased outreach, and preparation for potential escalation.	Below-average snowpack or precipitation observed U.S. Drought Monitor classifications of Moderate to Severe Drought (D1–D2) Reports of dry wells GSPs show early downward trends in groundwater levels	Minor wildfire, flooding, or access issues affecting well communities or SSWSs	Continue voluntary conservation campaigns (STRA 04) Maintain inventory of tanks and haulers (STRA 02 and STRA 03) Identify candidate sites for water stations (STRA 01) Begin coordination and discussions related to potential emergency or temporary interties (STRA 06)	During this stage, the County focuses on encouraging early action, strengthening coordination mechanisms, and preparing STRAs for rapid activation if conditions worsen.
Orange Stage Active Drought Conditions	Drought is ongoing and affecting water supply or groundwater availability. Water insecurity risk is growing in vulnerable communities.	US Drought Monitor: Severe to Extreme Drought (D2–D3) GSP minimum threshold exceedances in 2+ wells 10+ dry well reports across basins State or County drought declaration issued	Wildfire, flooding, contamination event, or access issues affecting domestic well communities or SSWSs	Continue voluntary conservation campaigns (STRA 04) Communicate with tanks and haulers to be on standby (STRA 02 and STRA 03) Coordinate candidate sites for water stations (STRA 01) Continue coordination and discussions related to potential emergency or temporary interties (STRA 06)	Deploy physical response measures with support from mutual aid when necessary.
Red Stage Water Shortages are Occurring or Imminent	Water shortages are widespread or imminent, creating risks to public health and safety. Emergency coordination is required, and STRAs are actively implemented to maintain access to safe drinking water.	U.S. Drought Monitor classification of Extreme or Exceptional Drought (D3–D4) High numbers of reported dry wells, including in vulnerable or disadvantaged communities Significant groundwater declines or water system outages State or County drought emergency declarations Water shortages resulting from drought or other emergencies (e.g., wildfire, contamination, infrastructure failure)	Infrastructure failure or contamination disrupting water supplies	Fully activate Emergency and Interim Drinking Water Distribution Plan Operate all emergency water supply options (STRAs 01–08)	At this stage, the County would activate the emergency and interim drinking water distribution process, deploy mutual aid networks, and implement expedited permitting procedures consistent with the emergency operations plan and Drought and Water Shortage Hazard Annex.

Key:
 County = San Joaquin County
 GSP = groundwater sustainability plan
 SSWS = state small water system
 STRA = short-term response action

4.3.2 Emergency and Interim Drinking Water Distribution Plan

The EIDWD Plan outlines the process for County staff to follow when distributing emergency and interim drinking water supplies to affected domestic well and SSWS communities. Table 4-4 shows the process County staff could follow in the event distribution of emergency or interim drinking water supplies is required due to a drought or water shortage event. These activities are anticipated for events lasting up to 4 weeks. Unless otherwise noted, implementation of these activities is subject to declaration of an emergency consistent with the County DRP or by direction of the County Board of Supervisors.

The information in Table 4-4 can assist in selecting emergency and interim drinking water supplies to activate for distribution and in identifying organizations to coordinate with for distribution. This table aligns the emergency and interim drinking water supply STRAs described in Section 4.2 with the vulnerable domestic well and SSWS users identified in Section 3.5, as well as the mutual aid agreements described in Section 4.2.4. The information in this table is not exhaustive and should be periodically reviewed and updated by County staff. This table may also help identify the types and locations of emergency water supplies in the event of a water shortage emergency outside the currently identified vulnerable domestic well and SSWS communities.

Table 4-4. Emergency and Interim Drinking Water Distribution Plan Summary

EIDWD Plan Component	Description
Lead Agency	County OES leads implementation of the EIDWD Plan in coordination with EHD and Department of Public Works, as appropriate.
Activation	<p>Activation of the EIDWD Plan is informed by an assessment conducted by EHD, in coordination with OES and other departments as needed. The assessment may include:</p> <ul style="list-style-type: none"> • Trigger or cause of the water shortage emergency (e.g., drought, wildfire, infrastructure failure, contamination, power outage), consistent with Section 4.3.1 • Geographic extent of the affected area and demographics of the impacted population • Emergency and interim drinking water supply type(s) to be activated (see Table 4-4) • Estimated duration of need <p>Following review of the assessment, County OES may authorize activation administratively, through the County Board of Supervisors, or under other applicable emergency authorities.</p>
Notification	<p>County OES serves as the lead agency for coordinating notification to affected communities regarding the availability, location, and timing of emergency and interim drinking water supplies. Notification methods may vary depending on the nature of the emergency and may include:</p> <ul style="list-style-type: none"> • County or partner agency websites • Email notifications • Mailings • Broadcast media (radio and television) • Door hangers, flyers, or information kiosks • Public outreach meetings or existing community meetings • Hotline or call center services (e.g., 211, if available) <p>Notification activities may be conducted in coordination with partner agencies and organizations, including neighborhood associations, non-governmental organizations, schools, faith-based organizations, and community-based groups. Based on the demographics of the affected community, information may be provided in multiple languages or accessible formats. County OES will determine the need for bilingual or other accessibility services in support of EIDWD Plan implementation.</p>

EIDWD Plan Component	Description
Information Collection	<p>County OES may collect non-personally identifiable information to support situational awareness, cost recovery, and evaluation of emergency and interim drinking water distribution efforts. Information collected may include:</p> <ul style="list-style-type: none"> • Approximate number of people served by the emergency water supply • General geographic location of households served • Occupancy status (e.g., homeowner or tenant) • Estimated duration for which emergency supplies meet water needs • Distance traveled and general mode of transportation used to access supplies • Known condition of wells or prior experiences with water supply shortages • Other information as identified as necessary to support response or future planning

Key:

County = San Joaquin County

EHD = Environmental Health Department

EIDWD Plan = Emergency and Interim Drinking Water Distribution Plan

OES = Office of Emergency Services

Table 4–15. Summary of Short-Term Response Action Activation for Physically Vulnerable Domestic Wells and State Small Water Systems

Areas with Water Shortage Vulnerabilities	Emergency and Interim Drinking Water Supply Information	Cooperating Organizations
Collierville	Bulk water delivery and/or packaged water distribution at centralized locations serving the Collierville area. Water source to be identified based on operational feasibility during activation.	County OES; Environmental Health Department; nearby public water systems; NGOs
Dogtown	Bulk water delivery, temporary water storage tanks, and/or packaged water distribution. Distribution locations and water sources to be identified during activation based on accessibility and need.	County OES; Environmental Health Department; public water systems; NGOs
Mokelumne Aqueduct	Dedicated water filling stations and/or bulk water delivery. Water source anticipated from Mokelumne Aqueduct, subject to availability.	County OES; Environmental Health Department; Mokelumne Aqueduct–related public water systems; DWR
Stockton East	Dedicated water filling stations, bulk water delivery, and/or packaged water distribution. Water source anticipated from CalWater or other nearby public water systems.	County OES; Environmental Health Department; Stockton East Water District; Cities; NGOs
East County	Bulk water delivery and/or packaged water distribution at centralized or decentralized locations depending on affected areas. Water source to be identified during activation.	County OES; Environmental Health Department; public water systems; Cities; NGOs
French Camp	Dedicated water filling stations and/or bulk water delivery. Water source anticipated from City of Stockton.	County OES; Environmental Health Department; public water systems; San Joaquin General Hospital (if applicable); NGOs

4.0 Short-Term Response Actions

Areas with Water Shortage Vulnerabilities	Emergency and Interim Drinking Water Supply Information	Cooperating Organizations
Escalon East	Bulk water delivery, temporary water storage tanks, and/or packaged water distribution. Water source anticipated from City of Escalon or nearby public water systems.	County OES; Environmental Health Department; City of Escalon; public water systems; NGOs
Tracy South	Dedicated water filling stations, bulk water delivery, and/or packaged water distribution. Water source anticipated from City of Tracy or other nearby public water systems.	County OES; Environmental Health Department; City of Tracy; public water systems; NGOs

Key:

County = San Joaquin County

DWR = California Department of Water Resources

NGO = non-governmental organizations

OES = Office of Emergency Services

5.0 Long-Term Mitigation Strategies and Actions

Findings revealed through the risk assessment presented in Section 3 show localized and regional water supply concerns, including dry well susceptibility, amount of irrigated agriculture, groundwater quality risk (water quality aquifer risk), and critically overdrafted groundwater basins. While risks that impact the basic public health and safety of residents can be addressed through STRAs, LTMSAs mitigate and potentially prevent the conditions that lead to water shortage emergencies. This County DRP identified 19 LTMSAs, organized into four categories: drinking water well mitigation programs (DWWMP), system consolidation, regional water infrastructure investment, and data gaps. These LTMSAs are not exhaustive and may be modified in the future.

In the context of this County DRP, LTMSAs serve to reduce drought and water shortage vulnerabilities for domestic well and SSWS communities. When implemented, LTMSAs can reduce the extent and cost of emergency response actions but cannot eliminate the need for emergency response actions.

5.1 Legislative Direction

SB 552 requires that each county develop a drought and water shortage plan that covers long-term solutions for SSWSs and domestic wells, per CWC Section 10609.70 (**boldface** added for emphasis as related to LTMSAs and this section of the County DRP):

(b) A county shall develop a plan that includes potential drought and water shortage risk and proposed interim and long-term solutions for state small water systems and domestic wells within the county's jurisdiction. The plan may be a stand-alone document or may be included as an element in an existing county plan, such as a local hazard mitigation plan, emergency operations plan, climate action plan, or general plan. A county shall consult with its drought task force or alternative coordinating process as established by this section in developing its plan. A county shall consider, at a minimum, all of the following in its plan:

(1) Consolidations for existing water systems and domestic wells.

(2) Domestic well drinking water mitigation programs.

(3) Provision of emergency and interim drinking water solutions.

(4) An analysis of the steps necessary to implement the plan.

(5) An analysis of local, state, and federal funding sources available to implement the plan

5.2 Long-Term Mitigation Strategies and Actions Included in the San Joaquin County Drought Resilience Plan

LTMSAs included in the County DRP are summarized in Table 5-1. In Table 5-1, the lead entity identifies the County department responsible for coordinating implementation of the action. References to "County staff" throughout this chapter generally refer to staff from these departments working collaboratively with partner agencies. LTMSAs related to domestic well DWWMPs are described in Section 5.3. The system consolidation opportunities within the County are described in Section 5.4. The

5.0 Long-Term Mitigation Strategies and Actions

ability of regional water infrastructure investments to help address domestic well and SSWS vulnerabilities is detailed in Section 5.5. LTMSAs that address data gaps are discussed in Section 5.6. Future efforts related to LTMSA implementation and challenges are described in Section 6.2. The LTMSAs shown in this table may be updated or replaced as part of future County DRP updates.

Table 5–1. List of Long-Term Mitigation Strategies and Actions Included in San Joaquin County Drought Resilience Plan

ID	Long-Term Mitigation Strategy or Action Category and Type	Long-Term Mitigation Strategy and Action Name	Long-Term Mitigation Strategy or Action Description	Responsible Entity	Supporting Entities
LTMSA 01	Drinking Water Well Mitigation Programs: Drought and Water Shortage Risk Assessment	Drought and Water Shortage Risk Assessment; Non-Drought Hazard Assessment	County staff may update the risk assessment completed for this DRP to incorporate updated information, revisions to the Water Shortage Vulnerability Explorer Tool, and evaluation of non-drought hazards (e.g., wildfire, flooding, seismic hazards) that could interrupt domestic well or SSWS supplies, in coordination with relevant planning efforts such as the multi-jurisdictional hazard mitigation plan.	OES	EHD PW DWR Other Agencies
LTMSA 02	Drinking Water Well Mitigation Programs: Well Rehabilitation	Well Rehabilitation and Replacement for Domestic Wells and SSWS	County may support assessment, rehabilitation, and replacement of aging or shallow domestic wells and SSWS infrastructure that has experienced or may experience failure, including technical and/or financial assistance where feasible, and consideration of potential impacts to other groundwater users during permitting.	EHD	SHE
LTMSA 03	Drinking Water Well Mitigation Programs: Well Rehabilitation	Centralized Resource Hub and Vendor Information	County may maintain a centralized resource hub that provides domestic well and SSWS users with access to County information, permits, forms, and a vetted list of well drillers, laboratories, and related service providers, recognizing the need for regular updates and accessible design.	EHD	OES (GIS Personnel)
LTMSA 04	Drinking Water Well Mitigation Programs: Other Management Actions	Domestic Well and SSWS Resource Website	County Staff to create, review, and maintain a website with relevant information (County DRP, contacts, permitting processes, data, etc.) for domestic well and SSWS communities. The County DRP website will be understandable, accessible, and easy to navigate to remove avoidable associated barriers.	OES	EHD
LTMSA 05	Drinking Water Well Mitigation Programs: Other Management Actions	Grant Application Assistance to Domestic Wells and SSWS	County may provide assistance to domestic well and SSWS operators in identifying available federal, State, local, and other funding sources that assist in replacement or remediation of existing wells.	OES	SHE

5.0 Long-Term Mitigation Strategies and Actions

ID	Long-Term Mitigation Strategy or Action Category and Type	Long-Term Mitigation Strategy and Action Name	Long-Term Mitigation Strategy or Action Description	Responsible Entity	Supporting Entities
LTMSA 06	Drinking Water Well Mitigation Programs: Other Management Actions	Supply Interruption Notification for Public Safety Power Shutoffs	County, in coordination with power utilities, may support notification and messaging related to power interruptions that affect groundwater well operations, with emphasis on water use considerations following outages.	OES	EHD PW
LTMSA 07	Drinking Water Well Mitigation Programs: Other Management Actions	Point-of-Use Water Treatment Installation Outreach	County may provide outreach and information on point-of-use water treatment options for domestic well and SSWS users to address water quality concerns.	EHD	SHE
LTMSA 08	Drinking Water Well Mitigation Programs: Water Shortage Prevention	Assistance with Domestic and Regional Groundwater Monitoring	County may assist domestic well owners with depth-to-water monitoring by connecting them to GSA programs or other technical assistance resources and will continue coordination with GSAs and State agencies to monitor and publicly report regional groundwater levels using established monitoring programs.	EHD	DWR GSAs
LTMSA 09	Drinking Water Well Mitigation Programs: Water Shortage Prevention	Water Quality Outreach for Domestic Wells and SSWS	Domestic Wells: County may share available domestic well water quality data with well owners upon request or where data exist, including data maintained by the State pursuant to Health and Safety Code Section 116772. SSWSs: County may support water quality communication consistent with existing regulatory requirements, including providing information when SSWS owners do not meet notification requirements or when users request information.	EHD	OES SWRCB
LTMSA 10	Drinking Water Well Mitigation Programs: Water Shortage Prevention	Bulk Water Tank Installation Assistance	County may coordinate with DWR and other entities to provide technical assistance related to sizing and installing bulk water storage tanks for domestic wells and SSWSs, with potential financial assistance subject to funding availability.	OES	SHE

5.0 Long-Term Mitigation Strategies and Actions

ID	Long-Term Mitigation Strategy or Action Category and Type	Long-Term Mitigation Strategy and Action Name	Long-Term Mitigation Strategy or Action Description	Responsible Entity	Supporting Entities
LTMSA 11	Drinking Water Well Mitigation Programs: Water Shortage Prevention	Private Managed Aquifer Recharge Incentives	County may support coordination between GSAs and interested landowners regarding managed aquifer recharge opportunities; the County would not serve as the lead entity for design or construction of recharge projects.	OES	GSAs
LTMSA 12	Drinking Water Well Mitigation Program: Water Shortage Prevention	Well Permitting Considering Impacts to Other Groundwater Users and Future Growth	Groundwater Users: County may evaluate whether and how potential impacts to nearby groundwater users could be considered during review of new or replacement groundwater well permits. This evaluation could include clarifying applicability, responsible parties, available tools or data sources, and coordination needs with GSAs or other entities and would not establish new permitting requirements. Future Growth: County may consider groundwater demand associated with long-term growth and development during applicable planning and permitting processes, recognizing that not all residentially zoned lands are groundwater dependent and that the County general plan encourages connection to existing water systems as a first option where feasible.	EHD	Community Development
LTMSA 13	System Consolidation	Potential System Consolidation Opportunities	County may support identification and facilitation of managerial or physical consolidation opportunities between SSWSs and willing community water systems, including annexation or service expansion for domestic well or SSWS communities located within existing public water system service boundaries, recognizing that implementation occurs between systems.	OES	DWR EHD
LTMSA 14	Regional Water Infrastructure Investment	Flood Management Project Identification	County, in coordination with flood management agencies, Integrated Regional Water Management programs, and GSAs, may identify opportunities to advance Flood-Managed Aquifer Recharge projects that may support groundwater recharge and long-term water supply resilience.	PW (Flood Management)	OES

5.0 Long-Term Mitigation Strategies and Actions

ID	Long-Term Mitigation Strategy or Action Category and Type	Long-Term Mitigation Strategy and Action Name	Long-Term Mitigation Strategy or Action Description	Responsible Entity	Supporting Entities
LTMSA 15	Regional Water Infrastructure Investment	Regional Planning Integration	County may update its multi-jurisdictional hazard mitigation plan, emergency operations plan, and/or related documents to confirm interagency roles, responsibilities, and actions associated with implementation of the DRP.	OES	PW EHD DAWG
LTMSA 16	Data Gaps	Dry Well Reporting and Abandonment	<p>Reporting: County may coordinate with DWR and other entities to improve the accuracy of dry well reporting. Includes evaluation of County well completion reports to identify wells installed to supplement low-performing wells.</p> <p>Abandonment: County may review well completion reports to identify replacement wells and ensure dry wells are properly destroyed or placed out-of-service, with periodic evaluation of out-of-service wells and updates to County and State records as appropriate.</p>	EHD	OES PW
LTMSA 17	Data Gaps	Evaluate and Update Well Completion Report Administrative Record	County may review well completion reports maintained by DWR and reconcile these with County records to improve accuracy of geographic location, operational status, and other attributes and to support updates to the State registry.	EHD	OES (GIS Personnel)
LTMSA 18	Data Gaps	High-Risk Groundwater Contamination Regional Identification	In coordination with DWR and GSAs, the County could support identification of areas with elevated groundwater contamination risk at the subbasin or countywide scale to inform planning and mitigation efforts.	EHD	DWR GSAs CVRWQCB

ID	Long-Term Mitigation Strategy or Action Category and Type	Long-Term Mitigation Strategy and Action Name	Long-Term Mitigation Strategy or Action Description	Responsible Entity	Supporting Entities
LTMSA 19	Data Gaps	Create Local Small System Classification for Communities with 2–4 Connections	County may evaluate well permits and well completion reports for domestic wells serving 2–4 connections and explore options for monitoring water quality consistent with Assembly Bill 664, subject to funding availability and authority.	EHD	PW

Note: GSAs may serve as supporting partners for mitigation strategies related to groundwater monitoring, groundwater sustainability planning, and regional water resource coordination.

Key:

- County = San Joaquin County
- CVRWQCB = Central Valley Regional Water Quality Control Board
- DAWG = Drought Advisory Working Group
- DRP = Drought Resilience Plan
- DWR = California Department of Water Resources
- EHD = Environmental Health Department
- GIS = geographic information system
- GSA = Groundwater Sustainability Agency
- LTMSA = long-term mitigation strategy and action
- OES = County Office of Emergency Services
- PW = Department of Public Works
- SHE = Self Help Enterprises
- SSWS = state small water system
- SWRCB = State Water Resources Control Board

5.3 Drinking Water Well Mitigation Programs

This County DRP considered the utility of a domestic well DWWMP within the County DRP as directed under CWC Section 10609.70 (b)(2). A DWWMP describes actions that provide assistance to domestic well and SSWS communities whose groundwater supplies are vulnerable to drought and water shortage conditions. These vulnerabilities may result from relatively shallow wells, reliance on critically overdrafted groundwater basins, localized hydrogeologic conditions, infrastructure limitations, water quality issues, or non-drought hazards that interrupt water supply operations.

The County does not currently have a single, County-led DWWMP. Instead, drinking water well mitigation within the County is considered through a combination of GSP provisions, basin-specific mitigation approaches, and the LTMSAs identified in this County DRP.

This section first identifies drinking water well mitigation approaches within the County organized by Bulletin 118 groundwater subbasins and fractured rock areas (Table 5-2). It then describes the LTMSA components that could collectively function as the County’s drinking water well mitigation framework. DWWMP and LTMSA components described herein are not exhaustive and may be modified in the future.

When identifying and defining DWWMP components, the County DRP considered the factors listed below:

- Domestic wells and SSWSs vulnerable to water supply shortages (see Section 3)
- Whether a DWWMP or well mitigation policy had already been defined within applicable GSPs
- SGMA priority and overdraft conditions for Bulletin 118 groundwater subbasins
- Occurrence of potentially shallow wells that could be at enhanced risk of drying up
- Available information on dry well reports, replacement well permits, or deepened wells

summarizes the DWWMPs and approaches applicable within the County.

Table 5–2 summarizes the DWWMPs and approaches applicable within the County.

Table 5–2. Drinking Water Well Mitigation Programs within San Joaquin County

Location	Vulnerable Domestic Wells and State Small Water Systems Included	Drinking Water Well Mitigation Program Description
Eastern San Joaquin Subbasin (DWR Basin No. 5-022.01)	Domestic wells and SSWSs relying on groundwater within the critically overdrafted Eastern San Joaquin Subbasin, including rural areas and communities such as Stockton, Lodi, Manteca, Ripon, and Escalon	The Eastern San Joaquin Subbasin GSP includes a domestic well mitigation program adopted as part of the 2024 GSP update, which establishes a framework for addressing potential impacts to drinking water wells associated with groundwater level declines. The County DRP does not establish a separate subbasin-specific DWWMP for this area; instead, County LTMSAs focus on coordination with GSAs, domestic well monitoring assistance, data improvement, communication, and water shortage prevention measures that complement implementation of the GSP mitigation program.

Location	Vulnerable Domestic Wells and State Small Water Systems Included	Drinking Water Well Mitigation Program Description
Delta-Mendota Subbasin (DWR Basin No. 5-022.07) – San Joaquin County Portion near Tracy	Domestic wells and SWSs located within the portion of the Delta-Mendota Subbasin that overlaps the County	The Delta-Mendota Subbasin GSP includes a basin-wide well mitigation policy intended to address impacts to individual drinking water wells that may occur as a result of declining groundwater conditions. For the limited area of overlap within the County, the County DRP does not replace or duplicate this basin-wide approach. County LTMSAs emphasize coordination with the overlying GSA, communication and outreach, and assistance to domestic well and SWS users to support implementation of the GSP’s mitigation framework.
Localized Rural Domestic Well Areas Outside Primary Basin Settings	Domestic wells located in rural areas outside primary basin-fill aquifer settings or within localized clusters of domestic wells where groundwater monitoring data may be limited.	While these areas do not fall within subbasins with adopted SGMA mitigation programs, the County DRP identifies them as locations where domestic well users may be more vulnerable to water supply interruptions due to well depth variability, limited monitoring data, and reliance on individual groundwater supplies. County LTMSAs for these areas focus on domestic well monitoring assistance, water quality outreach, bulk water storage planning, and coordination with GSAs and regional partners to improve preparedness and situational awareness.

Key:

- County = San Joaquin County
- DRP = Drought Resilience Plan
- DWR = California Department of Water Resources
- DWWMP = drinking water well mitigation program
- GSA = groundwater sustainability agency
- GSP = groundwater sustainability plan
- LTMSA = long-term mitigation strategy and action
- SSWS = state small water system

5.3.1 Drought and Water Shortage Risk Assessment (LTMSA 01)

The drought and water shortage risk assessment documented in Section 3 is a key component of a DWWMP. It helps define the areas and populations with domestic wells and SWSs with higher vulnerabilities to water shortage. It also characterizes what conditions may be driving water shortage vulnerabilities. Both can help inform the components of a DWWMP.

The risk assessment was used to help select the components of the DWWMP documented in this County DRP. However, this risk assessment could be enhanced by including a more detailed assessment within currently identified vulnerable areas, customizing the analytical process used to determine physical and social vulnerability, and/or completing a more detailed risk assessment on non-drought hazards.

5.3.2 Well Rehabilitation and Other Management Actions (LTMSAs 02, 03, 04, 05, 06, and 07)

Well rehabilitation and other management actions address drinking water vulnerabilities that have occurred in the past or are likely to occur under continued drought and groundwater stress conditions.

In the County, these vulnerabilities may include declining groundwater levels in overdrafted basins, aging or shallow wells, water quality challenges, and operational disruptions caused by extended power outages.

5.3.2.1 Well Rehabilitation and Replacement for Domestic Wells and SSWSs (LTMSA 02)

During past drought periods, County staff have observed increased well permitting activity in certain areas, including permit applications for replacement or deepened wells. While some well owners are able to replace failed wells without submitting dry well reports, other domestic wells and SSWSs in the same areas may remain vulnerable due to limited financial capacity or hydrogeologic constraints.

This LTMSA supports well rehabilitation and replacement through the following potential actions:

- Outreach to domestic well and SSWS communities in indicator communities and other areas identified as vulnerable through the DRP risk assessment, including information on signs of well failure, who to contact if a well failure occurs, and available technical resources
- Assistance with identifying and pursuing potential grant or funding opportunities to support well rehabilitation or replacement
- With additional resources, provision of direct financial assistance to support rehabilitation or replacement of domestic wells or SSWS infrastructure

Under the current County DRP, the County's role is primarily focused on outreach, coordination, and assistance with identifying resources. Implementation of financial assistance components is dependent on future funding availability.

5.3.2.2 Centralized Resource Hub and Vendor Information (LTMSA 03)

County staff maintain information on well drillers, laboratories, and other service providers that support domestic well and SSWS evaluation, rehabilitation, and replacement. Under this LTMSA, the County may:

- Maintain and periodically update vendor and service provider information
- Make this information accessible through a centralized online resource on the County's website and DRP webpage under LTMSA 04
- Provide the information upon request through County OES or Environmental Health via phone or email
- Reference these resources during drought events or other conditions that may affect water supply reliability

The resource may be publicly available on the County's DRP webpage and may also be distributed directly to affected well owners during drought response activities.

5.3.2.3 Domestic Well and SSWS Resource Website (LTMSA 04)

As part of this County DRP, the County may establish a website focused on domestic well and SSWS communities. County Staff plan to update and maintain this website, enhancing its content as part of other LTMSAs. This website could house a variety of relevant resources, such as the County DRP, contact information, links to monitoring and water quality data, and characterization of water supply. County

OES plans to maintain the website with input from County Environmental Health Department (EHD). Technical content, such as sampling guidance, disinfection information, and well-safety information, would be reviewed by County EHD before being included on the website. During drought or water shortage events, this website may also be used to communicate current drought stage conditions and available response resources to domestic well and SSWS communities.

5.3.2.4 Grant Application Assistance to Domestic Wells and SSWSs (LTMSA 05)

This LTMSA focuses on assisting domestic well and SSWS operators in identifying available federal, State, local, or other funding sources that may support well rehabilitation, replacement, or remediation. Assistance is coordination- and information-based and may include helping communities understand eligibility requirements, application timelines, and available technical assistance providers.

5.3.2.5 Supply Interruption Notification for Public Safety Power Shutoffs (LTMSA 06)

Public safety power shutoffs implemented for wildfire mitigation can disrupt groundwater pumping for domestic wells and SSWSs. Under this LTMSA, County staff may coordinate with power utilities and relevant County departments to support notification and messaging related to power interruptions that affect groundwater well operations. Outreach may include use of County communication channels, such as SJReady, to inform domestic well and SSWS communities about anticipated outages and water use considerations following outages.

5.3.2.6 Point-of-Use Water Treatment Installation Outreach (LTMSA 07)

Water quality issues may also result in interruptions to safe drinking water access. Under this LTMSA, the County may provide outreach and information to domestic well and SSWS users regarding point-of-use water treatment options and available resources. With additional funding, the County could assist communities in identifying financial assistance opportunities to support installation of treatment systems.

5.3.3 Water Shortage Prevention (LTMSAs 08, 09, 10, and 11)

Water shortage prevention LTMSAs are intended to improve understanding of groundwater conditions, enhance preparedness, and reduce the likelihood of acute drinking water shortages during drought.

5.3.3.1 Assistance with Domestic and Regional Groundwater Monitoring (LTMSA 08)

Under this LTMSA, the County may assist domestic well owners and SSWS operators by improving access to groundwater monitoring programs or technical assistance resources. The County may coordinate with local GSAs, DWR, and the State Water Board to identify and reference existing groundwater level monitoring programs and publicly available data platforms.

The County could compile and maintain links to relevant groundwater monitoring resources, including GSA monitoring dashboards, DWR’s SGMA Portal, California Statewide Groundwater Elevation Monitoring data, and other publicly available datasets, on the County’s DRP webpage (see LTMSA 04). During drought conditions or when declining groundwater levels are observed in vulnerable areas, County staff may communicate available monitoring information and technical assistance resources directly to affected domestic well communities, as appropriate.

With additional resources, the County could expand this effort to support voluntary domestic well monitoring in targeted vulnerable areas. This may include outreach to well owners, coordination with GSAs to identify monitoring gaps, and facilitation of participation in regional monitoring programs to improve understanding of localized groundwater conditions.

5.3.3.2 Water Quality Outreach for Domestic Wells and SWSs (LTMSA 09)

The County could share available water quality data with domestic well owners upon request or where data exist and will support water quality communication for SWS users consistent with existing regulatory requirements. This outreach improves awareness of water quality conditions and potential risks.

5.3.3.3 Bulk Water Tank Installation (LTMSA 10)

Bulk water storage can improve short-term water supply reliability during outages or drought-related interruptions. In the near term, the County may provide outreach and technical assistance related to bulk water tank sizing and installation. With additional resources, the County could assist communities in identifying funding sources or provide direct financial assistance.

5.3.3.4 Private Managed Aquifer Recharge Incentives (LTMSA 11)

This LTMSA supports coordination between GSAs and interested landowners regarding managed aquifer recharge opportunities. The County's role is limited to coordination and facilitation; it does not include design, construction, or operation of recharge projects.

5.3.4 Water Shortage Prevention when Permitting New or Replacement Wells (LTMSA 12)

Adding new wells or replacing existing wells in areas with existing groundwater vulnerabilities can exacerbate water supply risks. This LTMSA would develop a framework for evaluating whether and how potential impacts to nearby groundwater users could be considered during review of new or replacement groundwater well permits. This evaluation may include clarifying applicability, responsible parties, available tools or data sources, and coordination needs and does not establish new permitting requirements.

This LTMSA also supports consideration of groundwater demand associated with long-term growth and development during applicable planning and permitting processes. Consistent with the County general plan, this evaluation recognizes that not all residentially zoned lands are groundwater dependent and that connection to existing water systems is encouraged as a first option where feasible.

5.4 System Consolidation

System consolidation is the physical or managerial joining of two or more water systems. Consolidation may occur through physical infrastructure connections (such as pipelines or interties), shared treatment or storage facilities, or managerial arrangements such as shared operations, governance, or administrative services. In the context of domestic wells and SWSs, these systems can be consolidated with each other and/or a larger water system. System consolidation can improve water supply reliability by broadening water supply sources and/or the numbers of users. With more users in a singular system, operating and maintaining that system can be cost effective compared to smaller or individual systems. This section identifies potential consolidation opportunities for domestic wells and SWSs.

5.4.1 Potential System Consolidation Opportunities (LTMSA 13)

There are system consolidation opportunities for domestic wells and SWSs that are within the existing service area boundaries of a community water system.¹¹ While a community water system is not

¹¹ As defined in HSC Section 116275(i) a community water system means a public water system that serves at least 15 service connections used by yearlong residents or regularly serves at least 25 yearlong residents of the area served by the system.

required to provide water service to domestic well and SSWS communities, their proximity may increase the feasibility of system consolidation. There may be nearby water supply infrastructure from a community water system that could connect to domestic wells and SSWSs. Policy or institutional hurdles may be less onerous if domestic wells and SSWSs are in an existing service area.

Domestic Wells and SSWSs in Community Water System Service Areas. Table 5–3 presents community water systems that likely have domestic wells and/or SSWSs in their service areas. Due to the uncertainty of the domestic well location data, this table may not reflect all community water systems with domestic wells or SSWSs in their service areas. The information in this table highlights where outreach and additional analysis by County staff with these community water systems may be most effective.

Table 5–3. Community Water Systems with Domestic Wells and/or State Small Water Systems Likely within their Service Area

Community Water Systems with Domestic Wells Likely in Their Service Areas^{1,2}	Number of State Small Water Systems Likely in Their Service Areas²
Bel Air Mobile Estate	0
California Water Service - Stockton	4
CDCR California Health Care Facility	0
City of Mountain House	0
City of Stockton	5
Country Manor MHP	0
Country Squire Mobile Estates & Water Sy	0
Defense Distrib. Depot, Sharpe Site	0
Deuel Vocational Institution	0
Double L Mobile Estates	0
El Rio Mobile Home Park	0
Elkhorn Estates Water System	0
Escalon, City of	1
Fairoaks PWS #44	0
Fairway Estates PWS CSA-18	1
Galt, City of	0
Il Vineto	0
Linden County Water District	0
Little Potato Slough Mutual	0
Lockeford Community Serv. Dist.	0
Lodi, City of	1
Manteca, City of	2
Morada Acres Water System	0
Morada Estates N PWS #46	2
Oakwood Lake Water District-Subdivision	0
Par Country Estates CSA-16	0

Community Water Systems with Domestic Wells Likely in Their Service Areas ^{1,2}	Number of State Small Water Systems Likely in Their Service Areas ²
Park Heights Mutual Water Co	0
Ripon, City of	0
Riverbank, City of	0
Sahara Mobile Court	0
San Joaquin County - Colonial Heights	0
San Joaquin County - Lincoln Village	0
San Joaquin County - Thornton	0
San Joaquin County-Mokelumne Acres	1
San Joaquin County-Raymus Village	0
San Joaquin River Club Inc	0
Stockton Verde Mobile Home Park	0
Tracy, City of	0

Notes:

¹ Number of domestic wells within a community water system’s service area are not shown as they may be inaccurate due to the locations of some domestic wells not being known.

² Domestic wells and SSWs within a community water system’s service area are based on the established service area boundary and do not reflect proximity to existing water delivery infrastructure. Additional analysis would be needed to determine the proximity of domestic wells and SSWs to existing water delivery infrastructure.

Key:

CDCR = California Department of Corrections and Rehabilitation
MHP = Mobile Home Park

CSA = County Service Area
PWS = public water system

Groupings of Domestic Wells and SSWs near Community Water Systems. The proximity of domestic wells and SSWs to service areas of community water systems was also evaluated to identify system consolidation opportunities. Concentrations of SSWs and domestic wells and their proximity to a community water system are presented in Figure 5-1. This proximity analysis is based on methods developed by State Water Board with Santa Cruz County. Areas with a higher concentration of domestic wells are highlighted in this figure to show areas of system consolidation opportunity. Identification and facilitation of potential managerial or physical consolidation opportunities between SSWs and willing community water systems, as well as annexation or service expansion opportunities for domestic well or SSW communities located within existing public water system service boundaries.

County involvement under this LTMSA is intended to be coordination- and facilitation-focused, rather than implementation-focused. With available funding and partner support, the County may assist domestic well and SSW communities and community water systems in evaluating whether consolidation or service expansion may be a feasible long-term solution to address drinking water reliability, water quality concerns, or recurring drought-related vulnerabilities.

Evaluation of consolidation opportunities may include:

- Outreach to domestic well and SSW communities and nearby community water systems to assess interest in and willingness to pursue consolidation or service expansion
- Preliminary assessment of water supply availability, water quality considerations, and system capacity constraints

- High-level review of existing water delivery infrastructure, including distance, connectivity, and capacity considerations
- Identification of potential funding and financing pathways for consolidation planning or infrastructure improvements
- Clarification of roles, points of contact, and regulatory considerations associated with consolidation or annexation processes

Implementation of any managerial or physical consolidation, annexation, or service expansion would occur between the participating water systems and communities, subject to regulatory requirements, funding availability, and mutual agreement. Inclusion of this LTMSA does not commit the County to construct, own, or operate water system infrastructure.

Table 5–4 summarizes those areas of consolidation opportunity, including the number of domestic wells and SSWSs in each area and the nearby community water systems. Note that some of the areas of system consolidation opportunity highlighted in Figure 5-1 may also overlap with domestic wells and SSWSs within a community water system’s boundary as described above.

There may also be system consolidation opportunities outside the areas shown and described below. County staff would stay apprised of all potential opportunities as they arise.

Evaluating Consolidation Opportunities in the County. Under this LTMSA, County staff may support identification and facilitation of potential managerial or physical consolidation opportunities between SSWSs and willing community water systems, as well as annexation or service expansion opportunities for domestic well or SSWS communities located within existing public water system service boundaries.

County involvement under this LTMSA is intended to be coordination- and facilitation-focused, rather than implementation-focused. With available funding and partner support, the County may assist domestic well and SSWS communities and community water systems in evaluating whether consolidation or service expansion may be a feasible long-term solution to address drinking water reliability, water quality concerns, or recurring drought-related vulnerabilities.

Evaluation of consolidation opportunities may include:

- Outreach to domestic well and SSWS communities and nearby community water systems to assess interest in and willingness to pursue consolidation or service expansion
- Preliminary assessment of water supply availability, water quality considerations, and system capacity constraints
- High-level review of existing water delivery infrastructure, including distance, connectivity, and capacity considerations
- Identification of potential funding and financing pathways for consolidation planning or infrastructure improvements
- Clarification of roles, points of contact, and regulatory considerations associated with consolidation or annexation processes

Implementation of any managerial or physical consolidation, annexation, or service expansion would occur between the participating water systems and communities, subject to regulatory requirements,

funding availability, and mutual agreement. Inclusion of this LTMSA does not commit the County to construct, own, or operate water system infrastructure.

Table 5–4. Areas with Opportunity for Domestic Wells and State Small Water Systems Consolidation

Area of System Consolidation Opportunity	Approximate Number of Domestic Wells	Number of State Small Water Systems	Community Water Systems that Could be Involved in Consolidation with Domestic Wells or State Small Water Systems
A. Area northeast of Stockton near Morada	514	5	California Water Service – Stockton City of Stockton Morada Estates N PWS #46 San Joaquin County Wilkinson Manor
B. Area south of French Camp, west of Manteca Junction	213	2	City of Lathrop City of Stockton Defense Distribution Depot, Sharpe Site
C. Areas in east Tracy off Highway 205	281	0	City of Tracy City of Mountain House Santos Ranch PWS #5-CSA #35 Currier Estates Water Corp
D. Areas in south Tracy near the Army Depot	253	0	City of Tracy Fairoaks PWS #44 Maurland Manor Water System Defense Distribution Depot - Tracy Site Jefferson ESD-Jefferson School
E. Areas in Escalon off HWY 120 and Main Street	206	1	City of Escalon

Key: CSA = County Service Area ESD = Elementary School District HWY = Highway
PWS = public water system SSWS = state small water system

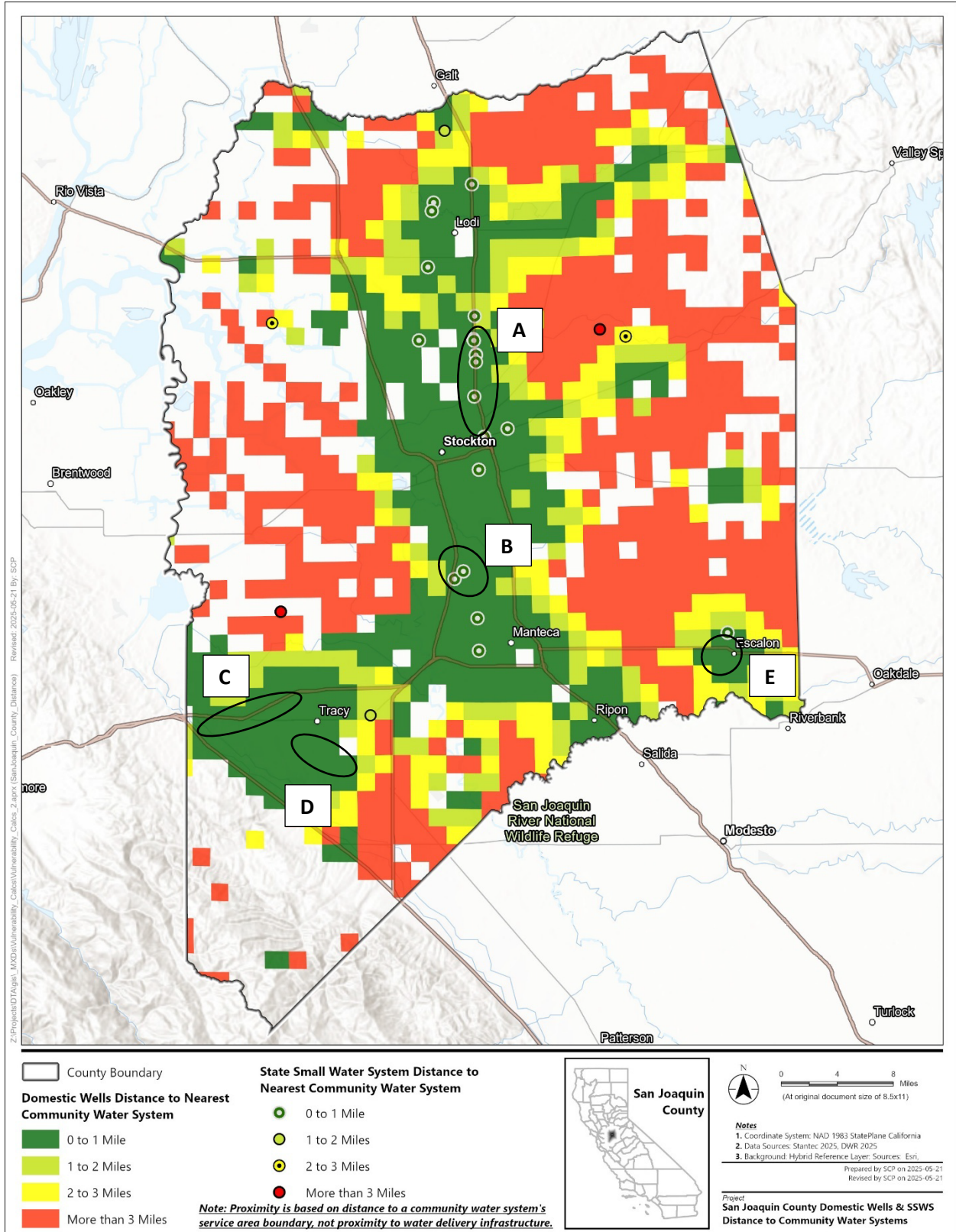


Figure 5-1. Areas with Opportunity for Domestic Wells and State Small Water Systems Consolidation

5.5 Regional Water Infrastructure Investment

Regional water infrastructure projects can enhance the water supply reliability of many communities, including domestic wells and SSWSs. The LTMSAs in this section describe how County staff could integrate into flood management projects and regional planning to help enhance the water supply reliability of domestic well and SSWS communities. Some planning efforts are referenced under LTMSAs 13 and 14, reflecting their relevance to both project-level opportunity identification and broader regional planning coordination.

5.5.1 Flood Management Project Identification (LTMSA 14)

Flood management planning in the County occurs through multiple County-led and partner-led planning efforts that address flood hazards, floodplain management, watershed conditions, and infrastructure vulnerabilities. Key planning and coordination avenues include the County's multi-jurisdictional hazard mitigation plan, floodplain management and National Flood Insurance Program administration, regional Integrated Regional Water Management planning efforts, and groundwater sustainability planning under the SGMA (Table 5-5).

Under LTMSA 14, County staff may coordinate with these entities to identify where flood management projects, such as floodplain restoration, stormwater and flood attenuation, or managed inundation, may also provide opportunities to advance flood-managed aquifer recharge and support long-term groundwater recharge and water supply resilience. Coordination activities may include participating in planning processes, sharing information on drinking-water vulnerabilities identified in Section 3, and screening whether multi-benefit project concepts could help improve resilience for domestic wells and SSWSs. LTMSA 14 focuses on coordination and opportunity identification and does not obligate the County to sponsor, implement, or fund flood management or flood-managed aquifer recharge projects.

Table 5–5. Summary of Relevant Regional Flood Management Efforts

Planning Effort	County Lead	Supporting Entities	Current Status	Intersection with Domestic Wells and SWSs	How County Staff Would Coordinate
San Joaquin County LHMP (San Joaquin County 2023a)	County OES	Local jurisdictions, State and federal partners	Adopted; periodic updates	Identifies flood as a hazard that can affect drinking water reliability through impacts to infrastructure, access, and power; provides a framework for mitigation actions.	Participate in LHMP updates and action tracking; identify where flood mitigation actions could align with Flood-MAR or groundwater recharge objectives that benefit groundwater-dependent communities.
County Floodplain Management/NFIP (SJFCWCD 2022)	Department of Public Works	Federal Emergency Management Agency	Ongoing regulatory program	Floodplain permitting and compliance influence where flood infrastructure and land uses occur; may intersect with areas suitable for multi-benefit flood and recharge projects.	Coordinate during planning and permitting discussions to flag locations where flood management activities could support recharge or drought resilience objectives.
Eastern San Joaquin IRWMP (GSJCRWCC 2020)	Department of Public Works	GSJCRWCC, GSAs, water agencies	Adopted 2021	Evaluates regional water supply reliability, surface water and groundwater strategies, and multi-benefit water management that may intersect with domestic wells and SWSs.	Participate, as appropriate, in IRWM discussions; screen regional project concepts for alignment with domestic well and SWS resilience needs; coordinate on grant opportunities.
Westside-San Joaquin IRWMP (SLDMWA 2019)	Department of Public Works	SLDMWA, GSAs, water agencies	Adopted 2019; implementation ongoing	Emphasizes multi-benefit water management, including flood management, recharge, and infrastructure investments that may intersect with domestic wells and SWSs in western parts of the County.	Participate, as feasible, in IRWM discussions; screen regional project concepts for alignment with domestic well and SWS resilience needs; coordinate on planning and grant opportunities.
Eastern San Joaquin Subbasin GSP (ESJ GWA 2024)	Environmental Health Department	GSA, DWR	Approved; implementation ongoing	Includes recharge and groundwater sustainability actions that may align with Flood-MAR concepts during high-flow conditions.	Coordinate with GSAs to identify where Flood-MAR opportunities may support GSP implementation and groundwater recharge objectives.
Delta-Mendota Subbasin GSP (DMSGSA 2024)	Environmental Health Department	GSA, DWR	Approved; implementation ongoing	Covers a portion of the County near Tracy; includes basin-wide mitigation approaches that may intersect with flood and recharge opportunities.	Coordinate with the overlying GSA to identify potential Flood-MAR opportunities within the County's area of overlap.

Notes:

Planning efforts are not exhaustive and are expected to evolve.

LTMSA 13 focuses on coordination and opportunity identification and does not obligate the County to implement flood or Flood-MAR projects.

Key:

County = San Joaquin County

DWR = California Department of Water Resources

Flood-MAR = Flood-Managed Aquifer Recharge

GSA = groundwater sustainability agency

GSP = groundwater sustainability plan

GSJCRWCC = Greater San Joaquin County Regional Water Coordinating Committee

IRWMP = Integrated Regional Water Management Plan

LHMP = local hazard mitigation plan

LTMSA = long-term mitigation strategy and action

NFIP = National Flood Insurance Program

OES = County Office of Emergency Services

SLDMWA = San Luis & Delta-Mendota Water Authority

SSWS = state small water system

5.5.2 Regional Planning Integration (LTMSA 15)

Many regional and County planning efforts intersect with the County DRP. Coordination by County staff on these other regional and County planning efforts will help ensure these plans consider domestic wells and SSWs. Table 5–66 For LTMSA 15, County staff may participate in applicable planning efforts and provide the perspective of domestic well and SSWs communities, including coordination with GSAs. Additional information on the timing of these efforts and County roles and responsibilities related to implementation of the County DRP is provided in Section 6.2. County OES is the lead for this LTMSA, with support from the Department of Public Works, Environmental Health Department, and DAWG.

Table 5–66. Summary of Relevant Regional Planning Efforts

Planning Effort	Current Status	Intersection with Domestic Wells and State Small Water Systems
Eastern San Joaquin IRWMP (GSJCRWCC 2014)	Adopted 2014; implementation ongoing	Evaluates regional water supply reliability, surface water and groundwater interactions, and multi-benefit water management strategies within areas that include domestic wells and SSWs in the County.
Westside-San Joaquin IRWMP (SLDMWA 2019)	Adopted 2019; implementation ongoing	Addresses water supply reliability, flood management, and groundwater recharge strategies in regions that include domestic wells and SSWs within the western portion of the County near Tracy.
South San Joaquin Irrigation District UWMP (SSJID 2021)	Adopted 2021	Provides information on water supply reliability, demand projections, and water management strategies in service areas that overlap parts of the County; supports regional water supply context relevant to domestic wells and SSWs.
South San Joaquin Irrigation District Water Master Plan (SSJID 2022)	Adopted 2022	Documents system infrastructure and long-term water supply planning that may inform regional water supply resilience and coordination with County drought planning.
Eastern San Joaquin Subbasin GSP (ESJ GWA 2024)	Approved 2024	Covers areas within the County that include domestic wells and SSWs; evaluates groundwater conditions, domestic well vulnerability, and actions intended to avoid undesirable results under the SGMA.
Delta-Mendota Subbasin GSP (DMSGSA 2024)	Approved 2024	Covers the portion of the County near Tracy; includes a basin-wide well mitigation policy that addresses impacts to individual drinking water wells, including domestic wells and SSWs.
City of San Joaquin General Plan (San Joaquin County 2016)	Adopted 2014	Establishes policies related to water supply, land use, and growth; provides planning context for areas that include domestic wells, County small systems, and SSWs communities.
San Joaquin County LHMP (San Joaquin County 2023a)	Adopted 2023	Evaluates hazards such as drought, flood, wildfire, and seismic events that may affect water supply reliability for domestic wells, County small systems, and SSWs.
San Joaquin County EOP (San Joaquin County 2020)	Adopted 2022	Defines interagency roles and response actions during emergencies, including water supply disruptions affecting domestic wells and SSWs.

Planning Effort	Current Status	Intersection with Domestic Wells and State Small Water Systems
Southern San Joaquin Municipal Utility District Water Management Plan (SSJMUD 2021)	Adopted 2021	Outlines alternative water management strategies (including conjunctive use concepts) that provide regional context for surface water and groundwater management in areas adjacent to San Joaquin County.

Key:

- County = San Joaquin County
- EOP = emergency operations plan
- GSP = Groundwater Sustainability Plan
- IRWMP = Integrated Regional Water Management Plan
- LHMP = local hazard mitigation plan
- SGMA = Sustainable Groundwater Management Act
- SSWS = state small water system
- UWMP = urban water management plan

5.6 Data Gaps

This County DRP used available data to support (1) evaluation of the vulnerability of domestic wells and SSWSs to water shortages, and (2) development and alignment of effective STRAs and LTMSAs. Access to new or more accurate/complete data would help improve this planning process in the future. This section details the LTMSAs identified by the County DRP that would provide new or improved data for use in future planning efforts.

5.6.1 Dry Well Reporting and Abandonment (LTMSA 16)

DWR maintains an online dry well reporting system that allows domestic well owners to report well outages or other issues affecting water supply. Information submitted through this system can help identify areas experiencing current or past water shortages and provide early indicators of emerging groundwater stress.

County staff could coordinate with DWR and other relevant entities to improve the accuracy and usefulness of dry well reporting data for the County. This includes monitoring publicly accessible dry well reports and evaluating trends over time to inform drought planning and mitigation efforts.

However, not all domestic well or SSWS owners experiencing well failure submit a dry well report. In some cases, well owners may drill a new or deeper well without formally reporting the previously impacted well. To improve identification of replacement wells, the County may utilize its well permitting process to capture whether a proposed well is intended to replace a dry, failed, or low-performing well. This may include adding or maintaining a designation within well permit application forms to indicate replacement of a dry well.

County staff may also review well completion reports to identify wells installed to replace dry or low-performing wells and to evaluate spatial patterns of replacement activity. Reviewing both well permit applications and well completion report data could help the County better characterize dry well occurrence, identify emerging hotspot areas, and inform drought response planning.

County staff will continue to ensure that dry or out-of-service wells are properly destroyed or placed out-of-service in accordance with County requirements. Coordination with DWR will support updates to the State’s well completion report database, improving the County’s understanding of dry well occurrence and water shortage conditions over time.

5.6.2 Well Completion Reports (LTMSA 17)

DWR maintains an online public database of well completion reports submitted by licensed well drillers. These reports include information such as well type, depth, year of installation, and general location, and they serve as a primary data source for identifying domestic wells within the County. This dataset was an important input to the WSVE Tool and the analyses conducted for this County DRP.

Despite its value, the well completion report dataset contains limitations and inaccuracies. Some well locations may be imprecise or incorrectly attributed to a jurisdiction, and wells that have been replaced, destroyed, or placed out-of-service may still appear as active in the database. These issues can affect the accuracy of vulnerability analyses and planning decisions.

Under this LTMSA, County staff may review well completion reports maintained by DWR and reconcile them with County administrative records to improve accuracy related to geographic location, operational status, and other key attributes. This effort may include coordination with DWR and use of County GIS resources to support data reconciliation and updates to the State registry. Improved well completion report data will enhance future drought vulnerability assessments and support more targeted mitigation planning.

5.6.3 High-Risk Groundwater Contamination Regional Identification (LTMSA 18)

Groundwater quality is a key factor influencing the reliability and safety of domestic well and SSWS supplies. While statewide and regional datasets, such as the SAFER Needs Assessment, provide important screening-level information, additional regional refinement can improve understanding of where water quality risks are most likely to affect drinking water users.

Under this LTMSA, the County may support identification of areas with elevated groundwater contamination risk at the subbasin or countywide scale, in coordination with DWR and GSA. This effort may include synthesis of existing water quality datasets, identification of spatial patterns or clusters of concern, and integration of groundwater quality considerations into future drought resilience planning.

Improved identification of high-risk groundwater contamination areas will help inform prioritization of outreach, monitoring, and mitigation actions for domestic wells and SSWSs and support alignment between County DRP efforts and ongoing groundwater management activities.

5.6.4 Create Local Small System Classification (LTMSA 19)

State law defines a domestic well as a water system serving no more than four connections. Within this category, systems serving two to four connections often support more users per system than single-connection domestic wells and may face heightened vulnerability due to shared infrastructure and reliance on a single groundwater source.

To improve understanding of water supply reliability for these systems, County staff may evaluate well permits and well completion report data to identify domestic well systems serving two to four connections (“Local Small Systems”). Subject to funding availability and authority, the County may explore options for monitoring water quality for these systems in a manner consistent with existing SSWS monitoring practices.

Development of a Local Small System classification would support improved tracking of these systems, targeted outreach, and future planning efforts. Systems with a single connection are not included in this effort due to the large number of such systems within the County and the resources that would be required to implement a monitoring program at that scale.

6.0 Implementation Considerations

The STRAs and LTMSAs identified and described in Sections 4 and 5 represent the range of in-progress and proposed activities. Implementation of these STRAs and LTMSAs often (1) falls under the authorities and jurisdictional responsibilities of separate County departments and other local and State public agencies, and (2) requires the involvement of other interested parties. To implement these STRAs and LTMSAs, and contribute to continued improvement of water supply reliability for domestic well and SWS communities, this section describes the implementation steps designed to assist the County with:

- Ongoing water supply monitoring and inter-agency collaboration in support of implementation
- Outlining STRA and LTMSA implementation responsibility, status, and resource needs
- Identifying opportunities to align the County DRP with other County policy and County and regional planning documents
- Adaptive management
- Identifying funding opportunities

6.1 Legislative Direction

SB 552 requires the County to develop a drought and water shortage plan that analyzes the steps to implement the plan and funding sources available to support implementation, per CWC Section 10609.70 (**boldface** added for emphasis as related to plan implementation and this section of the County DRP):

*(b) A county shall develop a plan that includes potential drought and water shortage risk and proposed interim and long-term solutions for state small water systems and domestic wells within the county's jurisdiction. The plan may be a stand-alone document or may be included as an element in an existing county plan, such as a local hazard mitigation plan, emergency operations plan, climate action plan, or general plan. A county shall consult with its drought task force or alternative coordinating process as established by this section in developing its plan. A county shall consider, **at a minimum**, all of the following in its plan:*

(1) Consolidations for existing water systems and domestic wells.

(2) Domestic well drinking water mitigation programs.

(3) Provision of emergency and interim drinking water solutions.

(4) An analysis of the steps necessary to implement the plan.

(5) An analysis of local, state, and federal funding sources available to implement the plan

6.2 Implementation Roadmap

The County DRP describes existing and proposed STRAs and LTMSAs that, when executed, help the County meet its objectives under CWC Section 10609.70 (b)(1), (b)(2), and (b)(3). Implementing these

STRAs and LTMSAs will require resources and clear roles and responsibilities. The identified STRAs and LTMSAs include existing or new activities to be implemented under existing authorities and funding of County departments and those activities that are dependent on appropriation of funds from local, State, or federal resources. This section presents the implementation roadmap for this County DRP; identification of ongoing monitoring and collaboration with County staff; and conduct of management oversight, prioritization, and resource identification needs.

6.2.1 Monitoring and Collaboration

Supply monitoring and inter-agency collaboration support County DRP implementation by evaluating water supply reliability and maintaining ongoing coordination and collaboration among County departments, related organizations, and the DAWG. County staff will conduct a range of activities as described in Table 6–1. These activities may be superseded by the activities described in Section 4.2 if a drought or water shortage emergency has occurred.

In addition to monitoring and coordination, public outreach and communication will be supported through the County DRP website and associated resource materials. The website will serve as an accessible location to share drought-related updates, water supply condition information, and practical resources for domestic well and SSWS owners/operators, including technical assistance and funding opportunities when available.

Table 6–1. San Joaquin County Drought Resilience Plan Monitoring and Collaboration Activities

Activity	Description	Activity Lead	Timing
Eastern San Joaquin Groundwater Authority, Tracy Subbasin GSAs, Delta-Mendota GSA Coordination	County staff to meet with GSA manager/staff prior to the GSA’s release of the basin/subbasin GSP Annual Report (California Water Code Section 10728). May include additional coordination based on water supply conditions.	County EHD	February/March
Internal Coordination	Biannual meeting to inform development of the water supply condition assessment. This meeting prepares draft final assessment for presentation at the annual DAWG meeting.	County OES, in coordination with County EHD and PW	March and October of each year
DAWG Meeting	County staff will schedule and facilitate a minimum of one DAWG meeting annually. The meeting will follow the County’s annual water supply condition assessment (see Section 4.3.1) and will support County staff and the DAWG in identifying whether conditions warrant activation of response measures described in this plan.	County OES	April of each year (or as aligned with the annual assessment schedule)
Drought Resilience Plan Website Update	County staff to update the website content and resource materials as described in the water supply condition assessment. This includes any contact information, list of resources (vendors, links to external websites, etc.), and other website content.	County OES, in coordination with County EHD and PW	April of each year prior to DAWG meeting, and as water supply conditions merit

Activity	Description	Activity Lead	Timing
Water Supply Monitoring and Coordination	County EHD to regularly engage with agencies/ organizations that monitor physical risk factors and water supply conditions as associated with domestic well and SSWS communities (See 4.3.1). Coordinating agencies include Eastern San Joaquin Groundwater Authority, Delta-Mendota GSA, and DWR.	County EHD County OES	As-needed April through November
Eastern San Joaquin Groundwater Authority, Tracy Subbasin GSAs, Delta-Mendota GSA Coordination	County staff to engage, where applicable, with GSA advisory or technical groups/committees where those activities assist to inform or implement actions that complement the County DRP.	County EHD	As identified

Key:

- County = San Joaquin County
- DAWG = Drought Advisory Working Group
- DRP = Drought Resilience Plan
- DWR = California Department of Water Resources
- EHD = Environmental Health Department
- GSA = groundwater sustainability agency
- GSP = groundwater sustainability plan
- OES = County Office of Emergency Services
- PW = Department of Public Works
- SSWS = state small water system

6.2.2 Oversight, Responsibilities, Priorities, and Resource Needs

Individual STRAs and LTMSAs identified in this County DRP have been assigned to individual County departments and agencies pursuant to each agency’s regulatory and policy authorities. County OES, as lead agency for the County DRP, shall provide administrative oversight/collaboration for all implementation actions that fall outside of its regulatory and policy authorities.

Table 6–2 details the type, status, and lead of County DRP STRAs and LTMSAs. Activities described in this table are subject to modification based on climate conditions, engagement with the DAWG, and other relevant factors. While activities have been assigned a near-, mid-, and long-term priority status, the pace of an activity’s implementation schedule can be changed depending on various drivers such as new regulations, climate conditions, and funding. “Priority” is classified as:

- Near (in the next 2 years)
- Mid (within 2 to 5 years)
- Long (5 or more years in the future)

“Status” is classified as:

- Available
- In progress (for those currently being implemented)
- Proposed (for those that require additional resources)

The “Resource Requirement” columns specify if the STRA/LTMSA would require additional staff time, additional County budget, and external funds beyond what the County currently has available. These external funds could include grants, financing, federal funding, and future State funding to support DRP implementation.

Beyond these implementation activities, County OES will coordinate with the entities listed in Table 6–2 on mid-term and long-term priorities. The status of these mid-term and long-term priorities, as well as the information in this table, will be reviewed at least annually in coordination with the DAWG meeting.

Table 6–2. San Joaquin County Drought Resilience Plan Short-Term Response Action and Long-Term Mitigation Strategy and Action Implementation Summary

Action/Strategy ID and Name	Lead Agency	Coordinating Agency	Priority	Status	Resource Requirement		
					Additional Staff Time	County Budget	External Funds
STRA 01: Dedicated Water Filling Stations	OES PW	Public Water Systems Cities Special Districts SSWSs DWR NGOs	Near	Available	No	No	No
STRA 02: Water Hauling, Bulk Water for Existing Tanks	OES PW	Public Water Systems SSWSs Water Haulers NGOs (e.g., Self-Help Enterprises) DWR State Water Board	Near	Available	No	Yes	Yes
STRA 03: Water Hauling, Bulk Water for Temporary Tanks	OES PW	Public Water Systems SSWSs Water Haulers NGOs (e.g., Self-Help Enterprises) DWR State Water Board	Near	Available	No	Yes	Yes

Action/Strategy ID and Name	Lead Agency	Coordinating Agency	Priority	Status	Resource Requirement		
					Additional Staff Time	County Budget	External Funds
STRA 04: Packaged and Bottled Water Supplies	OES	NGOs State-Administered Emergency Water Programs Public Water Systems Cities Private Vendors	Near	Available	No	Yes	Yes
STRA 05: Voluntary Water Conservation	OES	County PIOs Public Water Systems Cities Community-Based Organizations NGOs	Near	Available	No	No	No
STRA 06: SSWS Intertie, Emergency	PW EHD	SSWSs Public Water Systems State Water Board DWR Cities	Mid	Proposed	Yes	Yes	Yes
STRA 07: SSWS Intertie, Permanent	PW EHD	SSWSs Public Water Systems State Water Board DWR Local Jurisdictions Regional Water Agencies	Long	Proposed	Yes	Yes	Yes

6.0 Implementation Considerations

Action/Strategy ID and Name	Lead Agency	Coordinating Agency	Priority	Status	Resource Requirement		
					Additional Staff Time	County Budget	External Funds
STRA 08: Expedited Well Permitting	EHD	State Water Board DWR Well Owners Contractors	Near	Available	No	No	No
LTMSA 01: Drought and Water Shortage Risk Assessment; Non-Drought Hazard Assessment	OES	EHD PW DWR Other Agencies	Near	Available	Yes	Yes	Yes
LTMSA 02: Well Rehabilitation and Replacement for Domestic Wells and SSWS	EHD	SHE	Near	Available	Yes	Yes	Yes
LTMSA 03: Centralized Resource Hub and Vendor Information	EHD	OES (GIS Personnel)	Near	In progress	No	No	No
LTMSA 04: Domestic Well and SSWS Resource Website	OES	EHD	Near	Available	Yes	No	No
LTMSA 05: Grant Application Assistance to Domestic Wells and SSWS	OES	SHE	Near	Available	No	No	No
LTMSA 06: Supply Interruption Notification for Public Safety Power Shutoffs	OES	EHD PW	Mid	Proposed	No	Yes	Yes
LTMSA 07: Point-of-Use Water Treatment Installation Outreach	EHD	SHE	Mid	Proposed	No	Yes	Yes
LTMSA 08: Assistance with Domestic and Regional Groundwater Monitoring	EHD	DWR GSAs	Mid	In progress	No	Yes	Yes
LTMSA 09: Water Quality Outreach for Domestic Wells and SSWS	EHD	OES	Near	Available	Yes	No	No
LTMSA 10: Bulk Water Tank Installation Assistance	OES	SHE	Mid	Proposed	Yes	Yes	Yes

Action/Strategy ID and Name	Lead Agency	Coordinating Agency	Priority	Status	Resource Requirement		
					Additional Staff Time	County Budget	External Funds
LTMSA 11: Private Managed Aquifer Recharge Incentives	OES	GSA	Mid	In progress	No	No	No
LTMSA 12: Well Permitting Considering Impacts to Other Groundwater Users and Future Growth	EHD	Community Development	Long	Proposed	Yes	Yes	Yes
LTMSA 13: Potential System Consolidation Opportunities	OES	DWR EHD	Long	Proposed	Yes	Yes	Yes
LTMSA 14: Flood Management Project Identification	PW (Flood Management)	OES	Mid	In progress	Yes	No	No
LTMSA 15: Regional Planning Integration	OES	PW EHD DAWG	Long	Proposed	Yes	Yes	No
LTMSA 16: Dry Well Reporting and Abandonment	EHD	OES PW	Mid	Proposed	Yes	Yes	Yes
LTMSA 17: Evaluate and Update Well Completion Report Administrative Record	EHD	OES (GIS Personnel)	Long	Proposed	Yes	Yes	Yes
LTMSA 18: High-Risk Groundwater Contamination Regional Identification	EHD	DWR GSA	Long	Proposed	Yes	Yes	Yes
LTMSA 19: Create Local Small System Classification for Communities with 2–4 Connections	EHD	PW	Long	Proposed	Yes	Yes	Yes

Key:

County = San Joaquin County

DWR = California Department of Water Resources

GIS = geographic information system

LTMSA = long-term mitigation strategy and action

OES = County Office of Emergency Services

PW = Department of Public Works

SSWS = state small water system

STRA = short-term response action

DAWG = Drought and Water Advisory Group

EHD = Environmental Health Department

GSA = groundwater sustainability agency

NGO = non-governmental organization

PIO = public information officer

SHE = Self Help Enterprises

State Water Board = State Water Resources Control Board

6.3 Policy Alignment and Integration

While this County DRP is a stand-alone document, the information and actions it contains provide mutual benefits toward realizing goals and objectives of other County and regional planning efforts associated with domestic well and SSWS communities. Table 6-3 describes recommended policy alignment and/or integration actions that promote delivery of STRA and LTMSA actions identified in this County DRP through coordinated efforts with other related County and regional planning efforts.

Table 6-3. San Joaquin County Drought Resilience Plan Policy Alignment and Integration

Related Planning Effort	Release Date	County Lead	Integration Activity
San Joaquin County EOP (San Joaquin County 2020)	Adopted; updated as needed	County OES	Use DRP vulnerability findings (Chapter 3) to inform land use and siting considerations in groundwater-dependent areas; reinforce general plan direction to connect new development to existing water systems where feasible (supports LTMSA 11); integrate DRP considerations into review of discretionary projects in rural areas with domestic wells/SSWSs.
San Joaquin County LHMP (San Joaquin County 2023a)	Adopted 2023; periodic updates	County OES	Crosswalk DRP non-drought hazard findings into hazard mitigation updates and project lists; identify mitigation actions that reduce water supply disruption risk for domestic wells/SSWSs (power/access/flood impacts) (supports LTMSA 01 and LTMSA 14).
San Joaquin County EOP (San Joaquin County 2020)	Adopted 2022; periodic updates	County OES	Integrate DRP emergency/interim water supply actions into response procedures and annexes (water filling stations, hauling, bottled water, SSWS interties, expedited well permitting) (supports STRAs 01–08 and LTMSA 14).
Eastern San Joaquin Subbasin GSP (ESJ GWA 2024) Delta-Mendota Subbasin GSP (DMSGSA 2024) Tracy Subbasin GSP (GEI Consultants 2021)	Approved; annual reporting + periodic evaluation	EHD	Coordinate with GSAs on domestic well and SSWS considerations in GSP implementation (e.g., well mitigation frameworks, monitoring, outreach); use GSP monitoring/annual report information to inform the County’s annual water supply condition assessment and DRP updates (supports LTMSA 07, LTMSA 10, and implementation tracking for LTMSA 01).
Eastern San Joaquin IRWMP (GSJCRWCC 2014) Westside-San Joaquin IRWMP (SLDMWA 2019)	Adopted; implementation ongoing	Public Works	Use DRP vulnerability areas (high domestic well density/high aquifer risk areas) to help screen and prioritize multi-benefit project concepts that improve recharge/resilience; coordinate with IRWM partners on grant applications where projects could benefit groundwater-dependent communities (supports LTMSA 13 and, where relevant, LTMSA 12).

Related Planning Effort	Release Date	County Lead	Integration Activity
South San Joaquin Irrigation District UWMP (SSJID 2021)	Adopted; Updated on a 5-year cycle	Public Works	Coordinate drought communications and response assumptions with nearby/overlapping water suppliers where their actions affect adjacent groundwater-dependent communities; use supplier planning context to inform DRP updates and outreach (supports STRA 05 and coordination elements of LTMSA 14).

Key:

- County = San Joaquin County
- DRP = Drought Resilience Plan
- EHD = Environmental Health Department
- EOP = emergency operations plan
- GSA = groundwater sustainability agency
- GSP = groundwater sustainability plan
- IRWMP = integrated regional water management plan
- LHMP = local hazard mitigation plan
- LTMSA = long-term mitigation strategy and action
- OES = County Office of Emergency Services
- Public Works = Department of Public Works
- SSWS = state small water system
- STRA = short-term response action
- UWMP = urban water management plan

6.4 Adaptive Management

The County DRP will be reviewed and updated periodically or in response to new information or changing conditions to ensure findings, STRAs, and LTMSAs are appropriate and relevant. At a minimum, this County DRP will be reviewed and updated by County staff every 5 years. The County DRP may also be revisited after major droughts, water shortage events, changes in GSA status, as well as when new data, strategies, policies, or requests from the DAWG arise. County OES is responsible for initiating and coordinating the County DRP update.

Updates to the County DRP will include: (1) reviewing the risk assessment findings in light of new and improved information that characterizes water supply vulnerability, (2) evaluating progress on STRA and LTMSA implementation, (3) updating any communications and outreach materials and information, (4) updating DAWG details, and (5) revising the County DRP content to incorporate any changes. During this update, County OES will present proposed updates to the DAWG and provide an opportunity for discussion and input to support transparent communication and coordination.

6.5 Funding Opportunities and Assistance Programs

As described in Table 6-2, this County DRP includes a variety of proposed activities that require appropriation of additional funds as approved by the County Board of Supervisors or through other State or federal sources. Receipt of these additional funds could involve a variety of activities, both for County staff and domestic well and SSWS owners/operators, including plan administration, management, and updates; submitting funding applications and administering agreements; outreach and communications; coordination with other agencies and entities; DAWG engagement; managing assistance programs; development and construction of infrastructure and associated operations, maintenance, repair, rehabilitation, and eventual replacement; and other efforts. Those activities

require funding, both short term for projects with a finite schedule (for example, design and construction of a new domestic well) and long term for ongoing activities (for example, use and upkeep of that new well). As SB 552 does not provide funding for implementation activities, this DRP analyzed local, State, and federal funding sources available to implement the plan.

A combination of funding sources could be used to support County DRP implementation, such as generated revenue (e.g., rates and assessments), grants, loans, agency staff time, and services provided by others (e.g., in-kind work, technical or training assistance through a State or federal agency), with various agencies and entities involved in securing and administering each source. The availability of these internal and external funding sources will impact the success and timeliness of DRP implementation.

Although access to reliable funding is a hurdle faced by agencies and entities when implementing any program or project, domestic well and SSWS owners/operators are the most acutely impacted due to limited staff, reserves, and requirements of the implementing agencies. Agencies and entities may find (1) it is cost- and resource-prohibitive to implement STRAs and LTMSAs by themselves; (2) solutions frequently require participation or involvement of other entities; and (3) it is challenging to prepare for, navigate, apply for, and administer the various local, State, and federal funding mechanisms that could be available at any given time. These system owners/operators will need assistance and support from the County and other agencies and entities.

Using the STRAs and LTMSAs developed for the County (listed in Section 4.2 and 5.2, respectively), this DRP investigated and analyzed potential funding sources for implementation, as shown in Table 6-4. This analysis presented in this table will be used as basis for developing future funding strategies. It is not a complete/exhaustive list. Note that available funding sources are constantly changing, and funding needs, timing, and potential opportunities should be periodically reassessed.

In analyzing potential funding sources, the DRP identified the following key implementation considerations for STRAs and LTMSAs:

- **Administration and Coordination:** Implementation of the County DRP will require coordinated effort across multiple County departments and external partners. County OES, as lead agency, is anticipated to provide administrative oversight and coordination for actions that extend beyond individual departmental authorities, in collaboration with the County Department of Environmental Health, and County Department of Public Works.
- **Capacity Constraints:** Limited staff capacity, technical expertise, and financial resources may constrain the County's and its partners' ability to track funding opportunities, prepare competitive applications, administer awarded funds, and meet reporting requirements. These challenges are particularly pronounced for domestic well and SSWS owners/operators, especially where funding requires local cost share, upfront expenditures, or reimbursement-based financing.
- **Funding Availability and Gaps:** Not all STRAs and LTMSAs have clearly identified funding sources. Some high-priority actions may rely on discretionary County funds, rates or assessments, or future State and federal programs that are competitive, limited, or uncertain.
- **Timing and Sufficiency of Funding:** The availability, scale, and timing of funding may not align with implementation needs. Delays in grant cycles or limited award amounts may require

phasing, prioritization, or deferral of certain actions based on funding constraints, climate conditions, or emerging risks.

- **Adaptation and Partnerships:** STRAs and LTMSAs may need to be refined to better align with grant program objectives and evaluation criteria. Partnerships with GSAs, tribal governments, neighboring counties, or regional entities may improve competitiveness, reduce administrative burden, and distribute implementation risk.
- **DRP-Wide Implementation and Updates:** Resources will be required not only for individual actions, but also for ongoing DRP coordination, outreach, tracking and monitoring, and periodic updates. These needs extend beyond the duration of individual funding awards and will require sustained resourcing.
- **Funding Strategy Development:** The funding analysis completed as part of this DRP provides a foundation for future funding strategy development but is not exhaustive. Funding sources, eligibility requirements, and priorities will evolve, necessitating periodic reassessment of implementation priorities and available resources.

Table 6-4. Funding Opportunities and Assistance Programs for Drought Resilience Plan Implementation

Resource	Funding Agency	Description
General Fund	County	The County General Fund includes revenues such as sales and property tax. Use of these funds is discretionary and subject to approval by the County Board of Supervisors.
Proposition 4: Safe Drinking Water, Wildfire Prevention, Drought Preparedness, and Clean Air Bond Act of 2024	Multiple State agencies	Major categories with potential support for domestic and SSWS communities include: <ul style="list-style-type: none"> • Safe Drinking Water, Drought, Flood, and Water Resilience • Wildfire and Forest Resilience • Coastal Resilience
Sustainable Groundwater Management Grant Program (DWR 2025)	DWR	Provides GSAs with assistance and engagement support for preparation and implementation of GSPs.
Countywide and Regional Funding Program (State Water Board 2025a)	State Water Board	Provides direct funding to support SSWSs and domestic wells serving disadvantaged communities and low-income households. Community outreach, domestic well testing, and interim and long-term solutions are eligible to receive funds (DWR 2020).
Drinking Water State Revolving Fund (State Water Board 2025b)	State Water Board	Provides low-cost loans for planning, design, and construction of drinking water improvements to water systems and can be used to support system consolidation.
Technical Assistance Funding Program (State Water Board 2025c)	State Water Board	Provides technical assistance for small, disadvantaged communities to develop, fund, and implement eligible drinking water needs, including system consolidation support.

6.0 Implementation Considerations

Resource	Funding Agency	Description
Water and Environmental Program (USDA 2025)	USDA	Through the Rural Utilities Service WEP, communities with populations of 10,000 or less can apply for funding support to construct water and wastewater facilities. Such programs could support annexation of SSWS and domestic well communities as part of a multi-benefit project led by a WEP-eligible public water system.

Key:
 County = San Joaquin County
 DWR = California Department of Water Resources
 GSA = groundwater sustainability agency
 GSP = groundwater sustainability plan
 SSWS = state small water system
 State Water Board = State Water Resources Control Board
 USDA = United State Department of Agriculture
 WEP = Water and Environmental Program

7.0 References

- ATSDR (Agency for Toxic Substances and Disease Registry). 2003. *Toxicological Profile for Selenium*. <https://www.atsdr.cdc.gov/ToxProfiles/tp92.pdf>
- ATSDR (Agency for Toxic Substances and Disease Registry). 2007. *Toxicological Profile for Arsenic*. <https://www.atsdr.cdc.gov/toxprofiles/tp2.pdf>
- ATSDR (Agency for Toxic Substances and Disease Registry). 2010. *Toxicological Profile for Boron*. <https://www.atsdr.cdc.gov/toxprofiles/tp26.pdf>
- ATSDR (Agency for Toxic Substances and Disease Registry). 2012a. *Toxicological Profile for Chromium*. <https://www.atsdr.cdc.gov/toxprofiles/tp7.pdf>
- ATSDR (Agency for Toxic Substances and Disease Registry). 2012b. *Toxicological Profile for Manganese*. <https://www.atsdr.cdc.gov/ToxProfiles/tp151.pdf>
- ATSDR (Agency for Toxic Substances and Disease Registry). 2017. *Toxicological Profile for Nitrate and Nitrite*. <https://www.atsdr.cdc.gov/toxprofiles/tp204.pdf>
- ATSDR (Agency for Toxic Substances and Disease Registry). 2021. *Toxicological Profile for 1,2,3-Trichloropropane*. <https://www.atsdr.cdc.gov/toxprofiles/tp57.pdf>
- ATSDR (Agency for Toxic Substances and Disease Registry). 2023. *Toxicological Profile for Methyl tert-Butyl Ether (MTBE)*. <https://www.atsdr.cdc.gov/ToxProfiles/tp91.pdf>
- Cozad, D., K. Miller, R. Meyerhoff, R., and T. Grovhoug. 2024. *Central Valley Region Salt Control Program: An Ongoing Approach to Prioritizing Salinity Management Measures in the Central Valley*. Northern California Water Association. <https://norcalwater.org/2024/01/03/central-valley-region-salt-control-program-an-ongoing-approach-to-prioritizing-salinity-management-measures-in-the-central-valley/>
- Delta Stewardship Council. 2023. *Harmful Algal Blooms in the Delta*. <https://deltacouncil.ca.gov/>
- DMSGSA (Delta-Mendota Subbasin Groundwater Sustainability Agency). 2024. *Delta-Mendota Subbasin Groundwater Sustainability Plan*. <https://deltamendota.org/final-gsp-documents/>
- DWR (California Department of Water Resources). 2013. *San Joaquin River Hydrologic Region*. <https://cawaterlibrary.net/wp-content/uploads/2017/05/CWP-Update-2013-San-Joaquin-River-Hydrologic-Region.pdf>
- DWR (California Department of Water Resources). 2020. *Disadvantaged Communities (DAC) Mapping Tool*. <https://gis.water.ca.gov/app/dacs/>
- DWR (California Department of Water Resources). 2022. *California Statewide Crop Mapping/Land Use Surveys*.
- DWR (California Department of Water Resources). 2023. *County Drought Resilience Plan Guidebook*.

- https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/SB-552/DWR_Final_Guidebook_20230313_ADA_508_v5.pdf
- DWR (California Department of Water Resources). 2025. *Assistance and Engagement Program*. <https://water.ca.gov/Programs/Groundwater-Management/Assistance-and-Engagement>
- ESJ GWA (Eastern San Joaquin Groundwater Authority). 2024. *Eastern San Joaquin Subbasin Groundwater Sustainability Plan*. <https://www.esjgroundwater.org/Documents/GSP>
- FEMA Federal Emergency Management Agency. 2013. *Local Mitigation Planning Handbook*. https://www.fema.gov/sites/default/files/2020-06/fema-local-mitigation-planning-handbook_03-2013.pdf
- Fernandez-Bou, A.S., J. Maestas, S. K. M. Ernest, E. H. Beaver, A. J. K. Calhoun, J. M. Fargione, J. H. Thorne, and D. D. Ackerly. 2021. *Regional Report for the San Joaquin Valley Region*. California's Fourth Climate Change Assessment. Publication No. SUM-CCCA4-2021-003.
- GEI Consultants. 2021. Banta-Carbona Irrigation District, Byron-Bethany Irrigation District, City of Lathrop, City of Tracy, County of San Joaquin, and Stewart Tract. 2021. Tracy Subbasin Groundwater Sustainability Plan. Prepared by GEI Consultants. November 2021. https://tracysubbasin.org/wp-content/uploads/2022/02/Tracy-Subbasin-GSP_Final.pdf
- Greene, Christina 2018. Broadening understandings of drought: the climate vulnerability of farmworkers and rural communities in California (USA) (Revised and Resubmitted, 2018). <https://cawaterlibrary.net/wp-content/uploads/2019/08/Pages-from-Greene.pdf>
- GSJCRWCC (Greater San Joaquin County Regional Water Coordinating Committee). 2020. *Eastern San Joaquin Integrated Regional Water Management Plan*. <https://www.esjirwm.org/IRWMP/2014-IRWMP>
- NOAA (National Oceanic and Atmospheric Administration). 2021a. *Climate Normals: ACAMPO 5NE, CA (1991–2020)*. <https://www.ncei.noaa.gov/access/us-climate-normals/>
- NOAA (National Oceanic and Atmospheric Administration). 2021b. *Climate Normals: Tracy Carbona, CA (1991–2020)*. <https://www.ncei.noaa.gov/access/us-climate-normals/>
- NOAA (National Oceanic and Atmospheric Administration). 2021c. *Climate Normals: Stockton Fire Station 4, CA (1991–2020)*. <https://www.ncei.noaa.gov/access/us-climate-normals/>
- NOAA (National Oceanic and Atmospheric Administration). 2026a. Climate Data Online: Annual Summaries, Stockton Fire Station 4, CA. National Centers for Environmental Information. <https://www.ncei.noaa.gov/cdo-web/>
- OEHHA (California Office of Environmental Health Hazard Assessment). 2024. *Precipitation Trends*. <https://oehha.ca.gov/climate-change/epic-2022/changes-climate/precipitation>
- San Joaquin Council of Governments. 2018. 2018 Regional Transportation Plan / Sustainable Communities Strategy Draft Program Environmental Impact Report: Geology and Soils.

- San Joaquin County. 2001. *Water Management Plan Phase 1 – Planning*.
<https://www.sjgov.org/docs/default-source/public-works-documents/water-resources/san-joaquin-water-management-plan-vol-1.pdf>
- San Joaquin County. 2016. *General Plan Policy Document*. <https://www.sjgov.org/commdev/cgi-bin/cdyn.exe/file/Planning/General%20Plan%202035/General%20Plan%202035.pdf>
- San Joaquin County. 2020. *Emergency Operations Plan*. <https://www.sjgov.org/docs/default-source/office-of-emergency-services-documents/emergency-plans/2022-sjc-emergency-operations-plan.pdf>
- San Joaquin County. 2023a. *Multi-Jurisdictional Hazard Mitigation Plan*.
<https://www.sjgov.org/docs/default-source/covid-19/2023-lhmp-final-.pdf>
- San Joaquin County. 2023b. *90th Annual Crop Report*. <https://www.sjgov.org/docs/default-source/county-administrator-documents/2023-crop-report-8-27-24-.pdf>
- SLDWA (San Luis & Delta-Mendota Water Authority). 2019. *Westside–San Joaquin Integrated Regional Water Management Plan*.
- SJCFCWCD (San Joaquin County Flood Control and Water Conservation District). 2022. *Floodplain Management and National Flood Insurance Program Administration*.
<https://www.sjwater.org/Flood-Management/Floodplain-Management>
- State Water Board (California State Water Resources Control Board. 2022. *California Integrated Report (Clean Water Act Sections 303(d) and 305(b))*.
- State Water Board (California State Water Resources Control Board. 2025a. *Countywide and Regional Funding Programs*. https://www.waterboards.ca.gov/safer/funding_solicitation.html
- State Water Board (California State Water Resources Control Board. 2025b. *Drinking Water State Revolving Fund*. https://www.waterboards.ca.gov/drinking_water/services/funding/SRF.html
- State Water Board (California State Water Resources Control Board. 2025c. *Technical Assistance and Funding Programs*.
https://www.waterboards.ca.gov/water_issues/programs/grants_loans/tech_asst_funding.html
- SSIID (South San Joaquin Irrigation District). 2021. *2020 Urban Water Management Plan*.
- SSJMUD (Southern San Joaquin Municipal Utility District). 2021. *Water Management Plan*.
- U.S. Census Bureau. 2020. *San Joaquin County, California*.
https://data.census.gov/profile/San_Joaquin_County,_California?g=050XX00US06077
- U.S. Census Bureau. 2024. *San Joaquin County, California*.
https://data.census.gov/profile/San_Joaquin_County,_California?g=050XX00US06077
- USDA (U.S. Department of Agriculture), Rural Development. 2025. *Water and Environmental Programs*.
<https://www.rd.usda.gov/programs-services/water-environmental-programs>
- USEPA (U.S. Environmental Protection Agency). 2023. *Septic Systems and Surface Water*.
<https://www.epa.gov/septic/septic-systems-and-surface-water>

USEPA (U.S. Environmental Protection Agency). 2024. *Potential Well Water Contaminants and Their Impacts*. <https://www.epa.gov/privatewells/potential-well-water-contaminants-and-their-impacts>

USEPA (U.S. Environmental Protection Agency). 2025. *PFAS Explained*. <https://www.epa.gov/pfas/pfas-explained>



San Joaquin County Drought Resilience Plan
Administrative Final

Prepared for:
San Joaquin County

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