County of San Luis Obispo
Risk Assessment

Final - November 6, 2025

Acknowledgment
This County of San Luis Obispo Baseline Risk Assessment was developed with direct technical assistance from the California Department of Water Resources (DWR) and its consultant, Stantec Consulting Services Inc. (Stantec)).

Guided by Senate Bill (SB) 552 of 2021 and benefited by funding made available by the Budget Act of 2021, DWR launched the County Drought Resilience Planning Assistance Program to help counties facilitate drought and water shortage preparedness for state small water systems and domestic wells within their jurisdiction per requirements of SB 552. The County of San Luis Obispo was approved on February 10, 2025, to receive direct technical assistance to support the county in preparation of documents desired by the County in response to SB 552.

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Abbreviations and Acronyms

ACS	American Community Survey
ATSDR	Agency for Toxic Substances and Disease Registry
BLM	U.S. Department of the Interior, Bureau of Land Management
Bulletin 118	California's Groundwater Bulletin 118
CBG	Census Block Group
CBGSA	Cuyama Basin Groundwater Sustainability Agency
CDAG	County Drought Advisory Group
CDEC	California Data Exchange Center
County	County of San Luis Obispo
CWC	California Water Code
CWS	Community Water Systems
DWR	California Department of Water Resources
DWR	Department of Water Resources
FEMA	Federal Emergency Management Agency
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HSC	California Health and Safety Code
HUC	Hydrologic Unit Code
IRWMP	Integrated Regional Water Management Plan
IWG	Internal Working Group
MJHMP	Multi-Jurisdictional Hazard Mitigation Plan
PLSS	Public Land Survey Section
Risk Assessment	The County of San Luis Obispo County Risk Assessment
SAFER	Safe and Affordable Funding for Equity and Resilience Program
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act
SSWS	State Small Water System
State	State of California
State Water Board	State Water Resources Control Board
UCSB	United States Census Bureau

USFS	United States Forest Service
WRAC	Water Resources Advisory Committee
WSVE	Water Shortage Vulnerability Explorer

1.0 Introduction and County of San Luis Obispo Overview

The County of San Luis Obispo Risk Assessment (Risk Assessment) documents how County of San Luis Obispo (County), 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 116275(n) and Section 10609.51(d); state small water systems (SSWS), as defined in HSC Section 116275(n) and Section 10609.51(m). The County Risk Assessment was prepared pursuant to Senate Bill (SB) 552: Drought Planning for Small Water Suppliers, State Small Water Systems, and Domestic Well Communities (Hertzberg). This County Risk Assessment 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 Legislative Requirements

Signed into law September 2021 by Governor Gavin Newsom, SB 552 (Hertzberg)[1] obligated the State of California (State) and local governments to share the responsibility in 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.

SB552 also implements legislation on Water Conservation and Drought Planning (SB 606 [Hertzberg] and AB 1668 [Friedman], as amended; collectively referred to as "2018 Legislation") passed by the State Legislature (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.

California Water Code (CWC) Section 10609.70 enacted by SB 552 provides the following directives relative to drought and water shortage risk assessment:

> *(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*

[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: https://water.ca.gov/drip.

> *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.*

A risk assessment is an overall process to explore potential hazards and analyze what could happen and who may be impacted if the hazard occurs. This is a standard part of informing any disaster mitigation plan. A drought and water shortage risk assessment is central to understanding, planning for, and reducing, where possible, the vulnerabilities and potential impacts of drought conditions, water shortage events, and other related hazards to state small water systems and domestic wells. Identifying vulnerabilities provides counties with information that can, and should, be used to develop response plans to meet emergency and short-term needs and to develop long-term mitigation strategies and actions that reduce the need for future short-term emergency response actions (DWR, 2023).

Water users protected under SB 552 include the following:

- **Small Water Supplier:** A community water system serving 15 to 2,999 service connections, inclusive, and 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).
- **State Small Water System:** A system for the provision of piped water to the public for human consumption that serves at least five, 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 116275(n) and Section 10609.51(d).
- **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 over six months per year, as defined in HSC Section 116275(k) and Section 10609.51(f).

For the water users protected under SB 552, this County Risk Assessment addresses water shortage vulnerabilities for domestic wells and SSWSs. Other water users protected under SB 552 not included in this County Risk Assessment have separate requirements to address water shortage vulnerabilities.

1.1.1 County Agency Requirements

This Risk Assessment fulfills county requirements for a plan that includes potential drought and water shortage risk (CWC Section 10609.80). While measures to protect small water suppliers and nontransient noncommunity water systems are not within the scope of this document, this plan considers integration opportunities consistent with the intent of SB 552. Applicable County requirements are:

- 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) 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

1.2 Purpose of County of San Luis Obispo Risk Assessment

The County Risk Assessment evaluates the potential risks and vulnerabilities related to drought, particularly focusing on small water systems and domestic wells as required under SB552. By identifying and understanding these risks, this assessment helps the County plan for and reduce the impacts of drought conditions and water shortages. The Risk Assessment will become an inclusion in the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP).

Implementation of the County Risk Assessment is led by the San Luis Obispo County Public Works Department in close coordination with other departments, including the County Departments of Agriculture, Groundwater Sustainability, Emergency Services, Planning and Building, Public Health, Parks and Recreation, County Counsel, and Fire.

The County Risk Assessment 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.

1.3 County of San Luis Obispo Overview

San Luis Obispo County is located on the central coast of California. The County geographic region is located on the Pacific coast, approximately halfway between the metropolitan areas of Los Angeles and San Francisco. The County is made up of seven cities and many unincorporated communities. The County seat is the City of San Luis Obispo (County of San Luis Obispo, 2025a).

1.3.1 Demographics

Selected demographics of the County are summarized in the MJHMP (County of San Luis Obispo, 2025b). Refer to Appendix A, Table A-1 for information on median household income (MHI) per Census place and location within California's Groundwater (Bulletin 118) Basins.

1.3.2 Geography

The County includes a coastal region along US Highway 101 with an interior of mosaic of fertile grasslands, oak woodlands and savannas, riparian corridors, wetlands, and vernal pools (The Nature Conservancy, 2025). The County includes the Coastal Range, Carrizo Plain National Monument and the Santa Lucia Range. The County's temperate coastal climate make the region uniquely positioned for several specialty crops including wine grapes, strawberries, vegetables, ornamental transplants, and

avocados. With farm gate values of more than $1.1 billion in 2023, the County is the 15th largest agricultural region of the state's $59 billion agricultural industry.

Hydrology

Within the County are six Hydrologic Unit Code (HUC) 6 basins, Salinas River Basin (HUC 180600), Nacimiento River Basin (HUC 180601), San Luis Obispo Creek Basin (HUC 180602), Estero Bay Basin (HUC 180603), Santa Maria River Basin (HUC 180604), and Pismo Creek Basin (HUC 180605). Within the County there are six HUC 8 hydrologic subregions, as shown in **Figure 1-1**. Water within these subbasins primarily originates in the County from tributaries and streams. Major lakes and reservoirs include Santa Margarita Lake, Whale Rock Reservoir, Nacimiento Reservoir, and Lopez Reservoir.

Figure 1-1. Hydrologic Subregions within the County of San Luis Obispo

Precipitation

The MJHMP states that precipitation within the County is highly seasonal with the majority of precipitation produced in the winter months (November through March) (County of San Luis Obispo, 2025b). Nearly all precipitation occurs as rainfall as snow or hail within the County is rare. California Polytechnic State University, located in the western portion of the County, reports an annual average precipitation of approximately 24.935 inches between 2019 to 2024. However, this precipitation can be highly variable year-to-year. The annual precipitation at this location was 47.06 inches in 2023, 17.09 inches in 2022, 11.27 inches in 2021, 15.97 inches in 2020, and 29.38 inches in 2019 (CDEC, 2024). The mountain ranges transecting the county create successive rain shadows to the east. The crest of the northerly Santa Lucia Range receives an average annual rainfall of 30 to 50 inches while the Carrizo Plain averages only six to eight inches (County of San Luis Obispo, 2010). The western slopes have a coastal climate, with a marine layer common. Refer to Figure 5-14, San Luis Obispo County 30-Year (2035-2064) Maximum Annual Average Precipitation under RCP 8.5, of the MJHMP for more information on annual average precipitation.

Topography

Topography within the County is shown in **Figure 1-2** . The County encompasses 3,316 square miles or 2,114,750 acres, with 80 miles of coastline. The highest point is Caliente Mountain (5,104 feet). The lowest point is sea level. Terrain within the County is primarily ancient volcanic peaks located between Morro Bay and San Luis Obispo, the Coastal Range, Santa Lucia Range, and the Carrizo Plain National Monument.

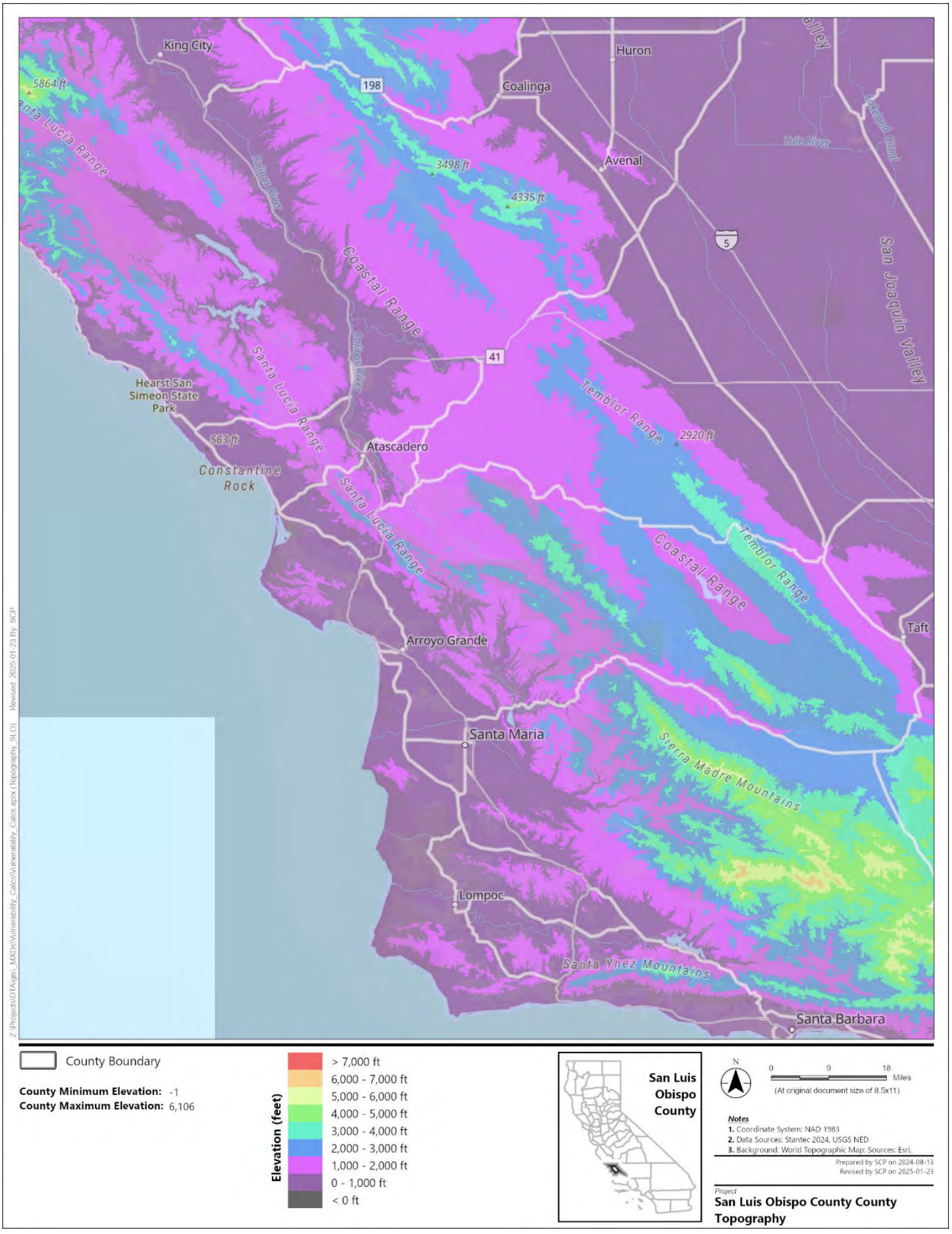


Figure 1-2. County of San Luis Obispo Topography

Land-Use

Land use agencies in the County of San Luis Obispo Region include the County, 7 incorporated cities and the US Forest Service (County of San Luis Obispo, 2019a). Agriculture occurs primarily in the following groundwater basins regions: Salinas Valley – Paso Robles, Salinas Valley – Atascadero Area, San Luis Obispo Valley, Santa Maria River Valley – Santa Maria, and Cuyama Valley Groundwater Basin regions. The majority of farmland is categorized as vineyard, deciduous fruits and nuts, pasture, grain and hay crop, and citrus and subtropical crops (DWR Land Use Viewer, 2022). Some county land is owned by the State of California, United States Forest Service (USFS) and U.S. Department of the Interior, Bureau of Land Management (BLM) as shown in **Figure 1-3** (BLM National Data, 2024). For more information, refer to Figure 5-24 San Luis Obispo – County Land Use within the MJHMP.

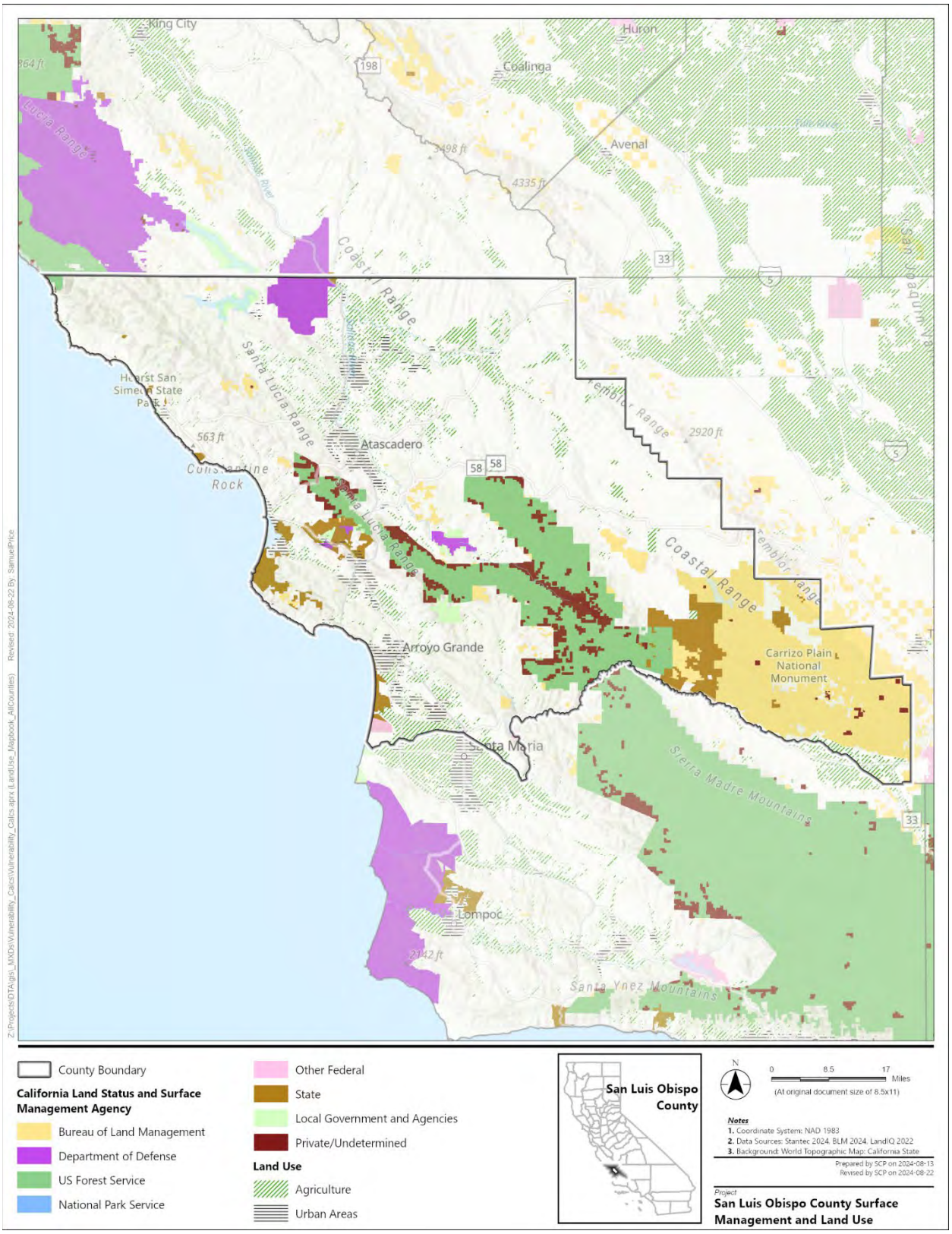


Figure 1-3. Land Use within County of San Luis Obispo County

Geology

The County is located in the Central Coast of California with several mountain ranges and valleys. The Central Coast of California is a seismically active region and there is high potential for earthquakes and associated risk to occur. The Santa Lucia Range, Coast Range, Monterey Formation and Morro Rock are key features within the County. Additionally, Morro Rock is a prominent landmark consisting of a volcanic plug that was formed from the solidified core of an ancient volcano.

1.3.3 Water Landscape: Supply, Use, and Management

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

Water Supplies:

- Groundwater: Groundwater represents the primary water supply resource for beneficial uses in the County. The region includes twenty-five alluvial groundwater basins. The remainder of the groundwater resources include fractured rock regions, whose supply is dependent on atmospheric conditions.
- Surface Water: Surface water is the other major source of water supply accounting for roughly 40 percent of the water supply for the county. There are four major rivers in the county: Salinas, Nacimiento, Cuyama and Santa Maria rivers. Lesser streams include Santa Rosa, Chorro, San Luis Obispo and Arroyo Grande creeks. There are also numerous wetlands located in various areas of the county including many reservoirs and rivers such as Salinas River, Whale Rock Reservoir, Nacimiento Reservoir, Lopez Reservoir, Santa Margarita Lake and Atascadero Creek (County of San Luis Obispo, 2010).

Water Uses:

- Agriculture: Agriculture in the County includes wine grapes, strawberries, cattle and calves, broccoli, avocados, vegetables and ornamental transplant, brussels sprouts, cauliflower, cut flowers, and celery (County of San Luis Obispo 2024).
- Municipal and Domestic: There are 186 public water systems in the County, with 73 serving community populations, 42 serving Transient Non-Communities, and 52 serving Non-Transient Non-Communities (State Water Board 2020).
- Industrial: Key industries in the County with substantive water demands include colleges, universities and professional schools, aerospace product manufacturing, basic and agricultural chemical manufacturing, pharmaceutical manufacturing, golf courses, food processing, and health care.

Water Management Actions:

- Groundwater Sustainability Plan (GSP): Three GSP's have been completed with the County of San Luis Obispo for the Salinas Valley – Paso Robles Area Basin, San Luis Obispo Valley Basin, and the Cuyama Valley Basin. These are described below. The adjudication of the Santa Maria Subbasin of the Santa Maria Valley Groundwater Basin resulted in the three management areas listed below:
    - Northern Cities Management Area
    - Nipomo Mesa Management Area
    - Santa Maria Valley Management Area
- Recycled Water Initiatives (Plants that do not currently produce Recycled Water but have plans to begin within the coming years).
    - Avila Beach CSD Wastewater Treatment Facility
    - Oak Shores Wastewater Treatment Facility
    - Heritage Ranch CSD Water Resource Recovery Facility
    - San Miguel CSD Wastewater Treatment Facility
    - City of Pismo Beach Wastewater Treatment Plant
    - South San Luis Obispo County Sanitary District Wastewater Treatment Plant
- Recycled Water Producers (Plants that currently produce Recycled Water for reuse through landscape/agricultural irrigation, surface water augmentation, groundwater recharge, construction water).
    - San Simeon CSD Wastewater Treatment Plant
    - City of Morro Bay Water Reclamation Facility
    - City of San Luis Obispo Water Resource Recovery Facility
    - Los Osos Water Recycling Facility
    - San Luis Obispo County Club Wastewater Treatment Plant
    - California Men's Colony Wastewater Treatment Plant
    - Templeton CSD Meadowbrook Wastewater Treatment Plant
    - City of El Paso de Robles Wastewater Treatment Plant
    - Cambria CSD Wastewater Treatment Plant
    - City of Atascadero Water Reclamation Facility
    - Cayucos Sanitary District Waster Resource Recovery Facility
    - Nipomo CSD Southland Wastewater Treatment Facility
    - Nipomo CSD Blacklake Wastewater Reclamation Facility

Groundwater Detail

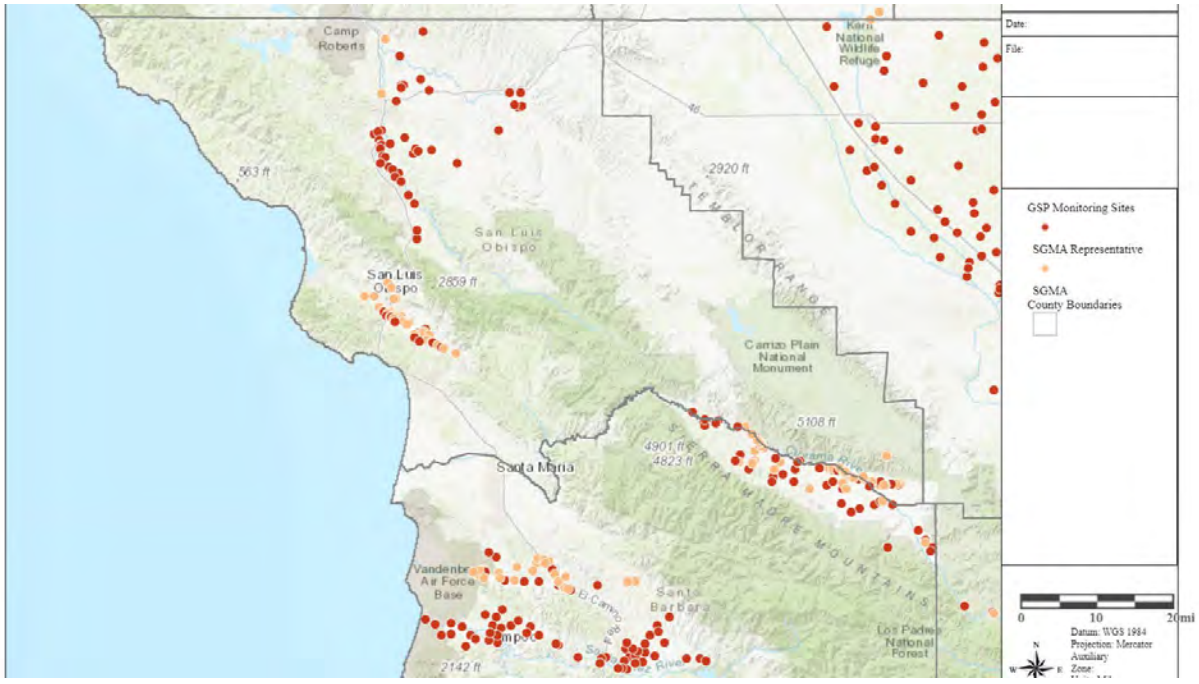
California's Groundwater Bulletin 118 is the State's official publication on the occurrence and nature of groundwater in California. The County contains twenty-five Bulletin 118 Subbasins listed in Table 1-1.

Passed in 2014, Sustainable Groundwater Management Act (SGMA) represents a statewide framework to protect groundwater resources over the long-term. SGMA led local public agencies, pursuant to CWC Section 10721(n), to form groundwater sustainability agencies (GSAs) in high and medium priority basins and develop GSPs to avoid undesirable results and mitigate overdraft within 20 years.

Analysis completed by DWR to support implementation of SGMA classified the Salinas Valley – Paso Robles Area Basin, San Luis Obispo Valley Basin, and the Cuyama Valley Basin as a high priority subbasin, and the other basins as very low priority basins. The remainder of county groundwater supplies are in fractured rock regions (DWR 2024b).

The Salinas Valley – Paso Robles Area Basin is currently cooperatively managed by six GSAs and its Groundwater Sustainability Plan (Paso Robles Subbasin GSP) was adopted in 2019. There are 1,831 GSP monitoring wells in the Salinas Valley – Paso Robles Area Basin, all of which are in the County, as shown in Figure 1-4. (County of San Luis Obispo, 2019b). The San Luis Obispo Valley Basin is cooperatively managed by two GSAs and its Groundwater Sustainability Plan (San Luis Obispo GSP) was adopted in 2021 (County of San Luis Obispo, 2021). There are 382 GSP monitoring wells in the San Luis Obispo Basin, all of which are in the County, as shown in Figure 1-4.

The Cuyama Basin Groundwater Sustainability Agency (CBGSA) manages the Cuyama Valley Basin and prepared its Groundwater Sustainability Plan (Cuyama Valley GSP), which was adopted in 2019 (CBGSA, 2019). There are 424 GSP monitoring wells in the Cuyama Valley Basin, 88 of which are in the County, as shown in Figure 1-4.



Source: https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#gwlevels, Accessed: 1/2025

Figure 1-4. Groundwater Sustainability Agency Monitoring Wells in County of San Luis Obispo

1.3.4 Water Systems Within San Luis Obispo County's Jurisdiction

California Water Code Section 10609.70 requires the County Risk Assessment that includes domestic wells and SSWS. Figure 1-5 shows the location of domestic wells and SSWSs within the County, and Table 1-1 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. For more information on the SSWS located within the County, number of connections and population served, refer to the MJHMP (County of San Luis Obispo, 2025b).

Table 1-1. Summary of Groundwater Basins, Domestic Wells, and State Small Water Systems in the County of San Luis Obispo

Bulletin 118 Basin ID	Groundwater Basin Name	Partial or Full	Priority	Domestic Wells Drilled After 1977[1]	Domestic Wells Drilled Before 1977[1]	Domestic Wells in Basin but Outside County	State Small Water Systems
3-004.06	Salinas Valley - Paso Robles Area (*Critical Overdraft*)	Full	High	4,499	411	0	1
3-004.11	Salinas Valley - Atascadero Area	Full	Very Low	710	188	0	0
3-005	Cholame Valley	Partial	Very Low	0	0	21	0
3-008.01	Los Osos Valley - Los Osos Area (*Critical Overdraft, Adjudicated*)	Full	Very Low	169[2]	97[2]	0	0
3-008.02	Los Osos Valley - Warden Creek	Full	Very Low	11	8	0	0
3-009	San Luis Obispo Valley	Full	High	352	49	0	2
3-012.01	Santa Maria River Valley - Santa Maria (*Adjudicated*)	Partial	Very Low	1,104	204	346	10
3-012.02	Santa Maria River Valley - Arroyo Grande	Full	Very Low	101	22	0	1
3-013	Cuyama Valley (*Critical Overdraft*)	Partial	High	14	1	103	0
3-019	Carrizo Plain	Partial	Very Low	338	8	0	0
3-033	San Carpoforo Valley	Full	Very Low	2	0	0	0
3-034	Arroyo De La Cruz Valley	Full	Very Low	0	0	0	0
3-035	San Simeon Valley	Full	Very Low	9	0	0	0
3-036	Santa Rosa Valley	Full	Very Low	34	4	0	0
3-037	Villa Valley	Full	Very Low	10	0	0	0
3-038	Cayucos Valley	Full	Very Low	1	0	0	0
3-039	Old Valley	Full	Very Low	13	1	0	0
3-040	Toro Valley	Full	Very Low	7	1	0	0
3-041	Morro Valley	Full	Very Low	15	0	0	0
3-042	Chorro Valley (*Adjudicated*)	Full	Very Low	16	0	0	0
3-043	Rinconada Valley	Full	Very Low	5	1	0	0

3-044	Pozo Valley	Full	Very Low	32	3	0	0
3-045	Huasna Valley	Full	Very Low	31	3	0	0
3-046	Rafael Valley	Full	Very Low	1	0	0	0
3-047	Big Spring Area	Full	Very Low	1	0	0	0
N/A	Fractured Rock Aquifer Wells		N/A	6,099	1141	N/A	13

[1]Information presented in this table and figure are based on well-completion reports data. Geographic information on well completion reports may be inaccurate and/or place the well not at the actual well location. As a result, the number of domestic wells may be overestimated, and the placement of wells may not reflect actual location. This data is displayed in Figure 1-5. Groundwater totals included in this table is a composite of data maintained by the State of California via its Groundwater Live database and data maintained by provided by the County of San Luis Obispo.

[2]Data represents all wells within the Los Osos Area adjudicated region. Total wells within the groundwater basin: 165 domestic wells after 1977 and 95 domestic wells before 1977.

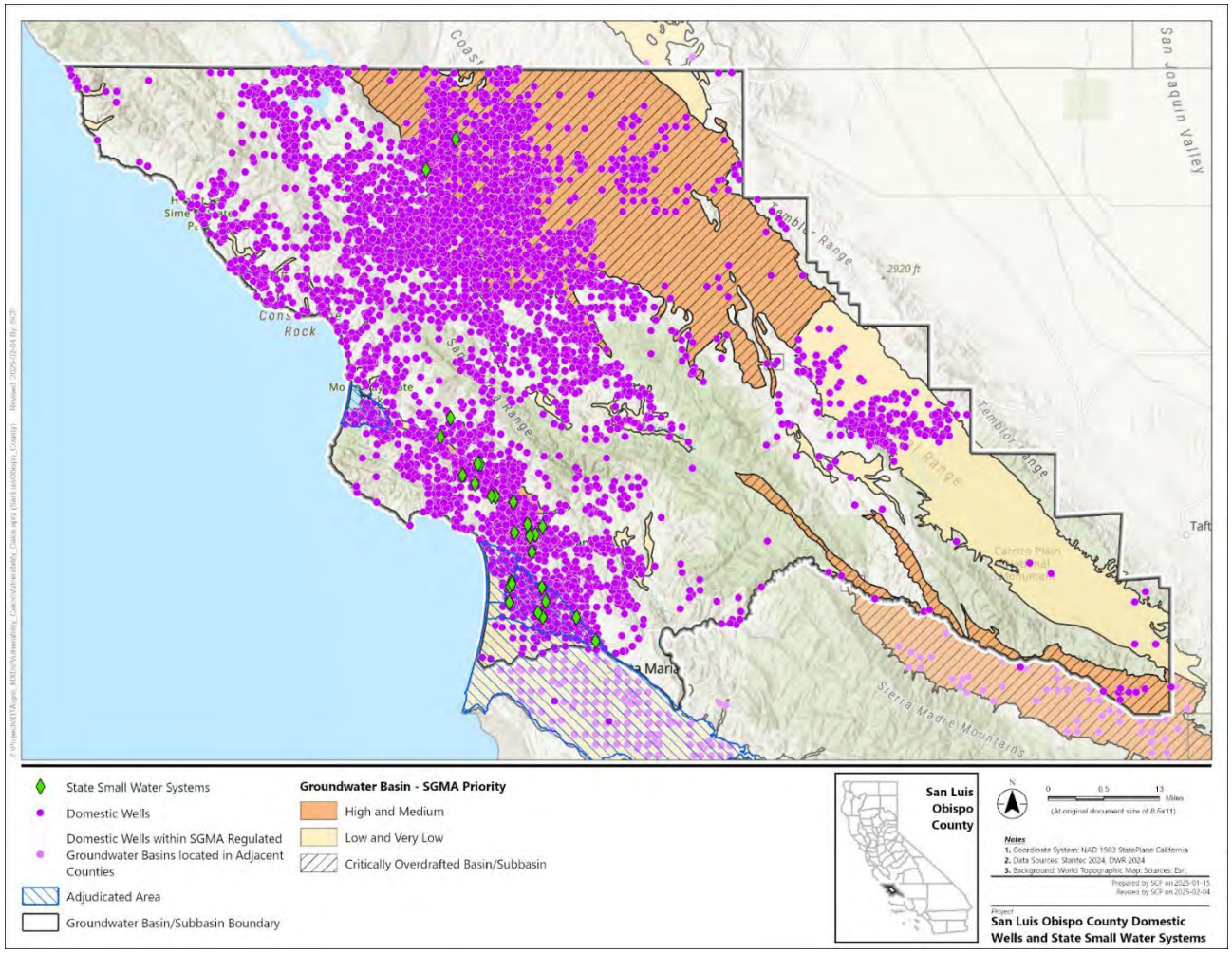


Figure 1-5. Locations of Domestic Wells and State Small Water Systems in San Luis Obispo County

Map for Reference Purposes Only:
The County of San Luis Obispo does not assume liability for any damages caused by any errors or omissions in the data. The County of San Luis Obispo makes no warranty of any kind, express or implied, that these data are accurate and reliable, nor does the fact of distribution constitute such a warranty. Independent verification of all data contained on this map should be obtained by any user thereof. Users assume responsibility to determine the appropriate use of these data.

2.0 Drought and Water Shortage Risk Assessment

A drought and water shortage risk assessment (referred to as a risk assessment) was prepared in development for the County as directed in CWC Section 10609.70(b). This risk assessment evaluated how potential hazards intersect with the County's domestic well and SSWS assets and other community assets and to characterize the vulnerability of domestic wells and SSWSs to water supply shortage. The outcomes from the risk assessment helped inform response plans with STRA to employ when a water supply shortage occurs and LTMS/A that reduce the vulnerability to water shortages. This document presents the risk assessment results for the County of San Luis Obispo.

The risk assessment does not replace the regulatory requirements of the Federal Emergency Management Agency (FEMA). The MJHMP Plan meets the requirements of major grant programs including FEMA's Hazard Mitigation Grant Program, Pre-Disaster Mitigation program, Flood Mitigation Assistance Program, and flood control projects authorized by the U.S. Army Corps of Engineers.

2.1 Terminology

The County Risk Assessment adapted the following definitions from the FEMA *Local Mitigation Planning Handbook* (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 plan include domestic wells, SSWSs, and populations relying on those water supplies.
- **Hazard:** A source of harm or difficulty created by a meteorological, environmental, geological, hydrological, or other event conditions. 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.

2.2 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, regulatory frameworks, and other conditions. Communities lacking access to reliable water sources are most vulnerable to water shortage caused by such hazards. To address this, a thorough risk assessment was completed that considered many physical and social hazard indicators.

The risk assessment was completed following the four steps outlined below.

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 DWR Water Shortage Vulnerability Explorer (WSVE) was used to (a) identify areas within the County where domestic wells and SSWSs are vulnerable to water supply shortages, and (b) characterize the hazards driving vulnerability. This information was included in a draft risk assessment. The County, Water Resources Advisory Committee (WRAC), and Internal Working Group (IWG) reviewed the draft risk assessment, provided feedback, and identified data gaps. Additional detail on the WSVE and how it was applied in the risk assessment is included below.
3. **Revise the Draft Risk Assessment:** County, WRAC and IWG, feedback on the draft risk assessment was used to develop a revised risk assessment.
4. **Incorporate Results of Revised Risk Assessment into County MJHMP:** Information from the revised risk assessment was included in the County MJHMP.

Developed by DWR in collaboration with the CDAG, the WSVE is an online geospatial tool that quantifies hazards using spatially visualized indicators. There are both indicators of physical vulnerability (Table 2-1) and social vulnerability (Table 2-2). These indicators were selected by DWR and the CDAG to reflect the hazards that could make a domestic well or SSWS vulnerable to water supply shortage.

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

- The total physical vulnerability score was calculated at the Public Land Survey Section[2] (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 total social vulnerability score was calculated at the Census Block Group[3] (CBG) scale by normalizing the indicator value between 0 and 1 and summing the values together without additional weighting.

DWR periodically revises the WSVE to incorporate improved data and/or updated methodology. The October 2024 version was used to complete the risk assessment. The detailed methodology that describes the WSVE indicators and corresponding values, data sources, and weighting factors is available on the WSVE website (https://arcg.is/1LCKGO).

Table 2-1. Water Shortage Vulnerability Explorer Indicators Used in the Development of Physical Vulnerability Score

[2] A Public Land Survey Section is a geographic delineation of an area equivalent to one square mile.
[3] A Census Block Group is a geographic unit with a population between 600 and 3,000 people that are a smallest geographical unit that the U.S. Census Bureau publishes data collected from a fraction of households.

Indicator Name[1]	Indicator Description
Climate Change	
Temperature Shift (RC1a)	Projected change in max temperatures by end of 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.
Consecutive Dry Years (RC2aa)	Count of dry years within the last five years (2020-2024).
Wildfire Risk (RC2b)	CalFire Hazard Score.
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 2004 to 2024).
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	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 Program

SGMA = Sustainable Groundwater Management Act

Table 2-2. 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.
Race and Ethnicity	
Persons of Color	Percent of persons that identify with a race other than White or identify ethnically as Hispanic or Latino.

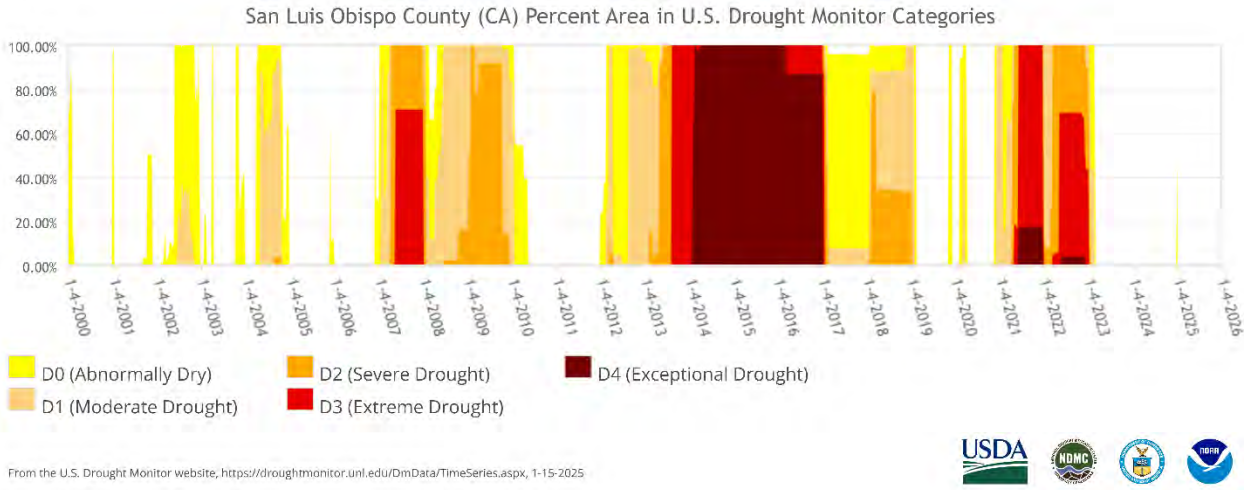
2.3 Hazards in the County of San Luis Obispo

This section summarizes the recent drought, projected climate change, current water quality, and groundwater hazards in the County. Section 2.4 provides more detail on the vulnerabilities related to these hazards.

2.3.1 Drought

Since 2000, the County has experienced various drought periods. Most notably in 2007 where the county experienced what the U.S. Drought Monitor categorizes as “Extreme Drought” and from 2014-2017, the county 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. This figure also shows that drought can onset rapidly, sometimes within a single year. This demonstrates that drought is an important hazard for the risk assessment to consider.

The County of San Luis Obispo has experiences significant drought conditions multiple times over the past two decades. Notable historic events include periods of extreme and exceptional drought around 2014-2017 and 2020-2022. Given the historical occurrence of severe drought impacts throughout the County of San Luis Obispo and across the state, the drought will continue to pose a high degree of risk to the County, potentially impacting crops, livestock, water resources, the natural environment at large, buildings and infrastructure (from cascading or compound hazards), and local economies



Source: https://droughtmonitor.unl.edu/DmData/TimeSeries.aspx, Accessed: 01/2025

Figure 2-1. Occurrence of Drought in the County of San Luis Obispo

2.3.2 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 1.8–3.6°F, local observed increases that affect neighborhoods and ecosystems are more variable and often of greater magnitude. The Central Coast Region Report subsection predicted changes over this century to include higher average temperatures with an approximate increase of 7–8°F across the five counties within the Central Coast Region (Barnard et al., 2018).

Droughts in California are triggered by a lack of large winter storms, and water shortages are further exacerbated by high temperatures, which increase the evaporative loss of water from soils, rivers, canals, and reservoirs. Drought conditions, particularly when persisting for several years, can cause mental and physical stress in people, reduce the number of workable farm-labor days, and lead to deteriorated air and water quality (Greene 2018; Barreau et al., 2017).

Historical data show that daily precipitation extremes have intensified in most areas of the country, including California. As the atmosphere continues to warm, extreme precipitation events could become more frequent as storms can hold about six to seven percent more water for each degree Celsius of warming. Climate model simulations that consider such effects suggest that this trend will continue. Simulations of future climate indicate only modest changes in annual precipitation accumulation with some shifts in the seasonality of precipitation that may be relevant for water management: less precipitation from November through January, and possibly more from February through May.

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 2.3.3.

Specifically, the climate of the County is influenced by the effects of the Santa Lucia Range, the Pacific Ocean, and routine climate patterns such as El Niño and La Niña. While the marine influence of the Pacific Ocean is expected to continue to provide a temperature climate for coastal communities such as Morro Bay and Los Osos, the elevated temperatures indicate a dryer future. Risks to human health and mortality, natural ecosystems, agriculture and other economic sectors along the Santa Lucia Range increase further inland under these temperature projections.

2.3.3 Water Quality

In 2019, the County of San Luis Obispo completed an Integrated Regional Water Management Plan (IRWMP) which presents a comprehensive water resources management approach to managing the region's water resources, focusing on strategies to improve the sustainability of current and future needs of the County of San Luis Obispo. Within this plan, a water quality analysis was completed investigating regional nitrate, arsenic, perchlorate, and hexavalent chromium contamination of active, groundwater-reliant Community Water Systems (CWS) from 2007 to 2017. Additionally, based on California's GeoTracker site, the County faces various water quality concerns regarding its surface and groundwater resources.

Existing and previous water contamination issues in water bodies throughout the County serve as indicators of how climate change effects will make water quality a growing concern. For instance, previous heavy rain events have resulted in increased water contaminant levels in reservoirs and surface water supplies forcing communities to change their water treatment methods. As storm severity increases in the future, this water quality concern will only worsen. Some of the threats to water quality that will be exacerbated by climate change include increased sedimentation and erosion, increased eutrophication, more concentrated instances of runoff, and decreased assimilative capacity. This threatens not only consumptive water uses but also the health of aquatic ecosystems and species and economies and recreation reliant on water bodies (County of San Luis Obispo, 2019a).

Refer to Appendix A, Table A-1 for information on groundwater quality risk per Census place and location within Bulletin 118 groundwater basins.

Surface Water:

Major surface water bodies in the County include Lake Nacimiento (Nacimiento Reservoir), Nacimiento River, Salinas River, Estrella River, Whale Rock Reservoir, Santa Margarita Lake (Salinas Reservoir), San Luis Obispo Creek, Lopez Lake, Lopez Reservoir, Arroyo Grande Creek, Huasna River, Twitchell Reservoir, Cuyama River, and Santa Maria River. Many surface water bodies within the County are included on the State's 303(d) list. Water bodies and pollutants that exceed protective water quality standards are placed on the State's 303(d) List. In California, this determination is governed by the Water Quality Control Policy for developing California's Clean Water Act Section 303(d) list (State Water Board, 2024a). All listed 303(d) surface water bodies and segments within the county are categorized as Category 5. Category 5 water bodies/segments are not meeting the standards, and a total max daily load is required, but not yet completed, for at least one of the pollutants being listed for the segment. Impaired water bodies on the 303(d) list are shown in Figure 2-2 and Table 2-5. Summary of Risk Assessment Findings in the County of San Luis ObispoTable 2-3.

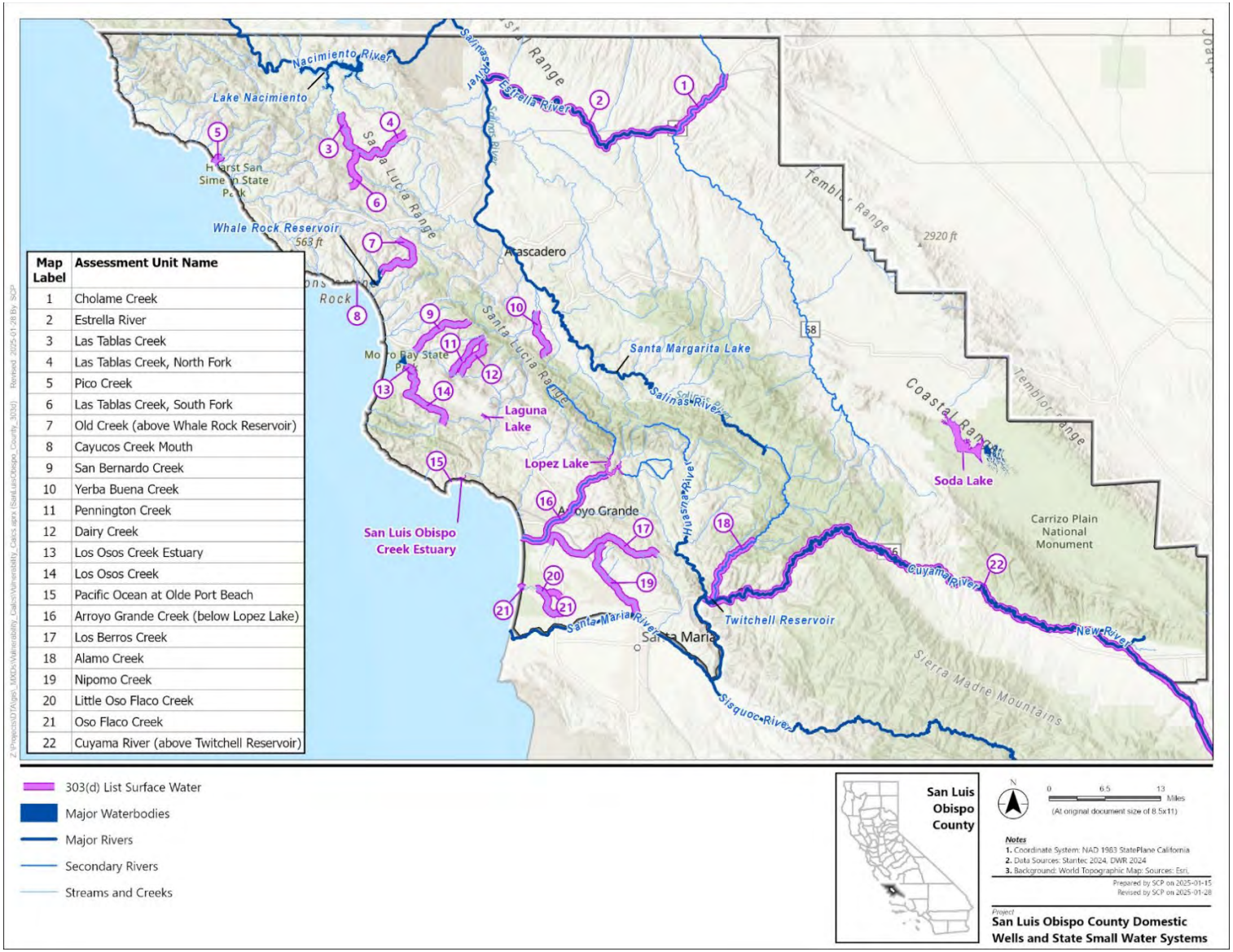
More information on contaminants, water monitoring locations, and waterbody conditions for each 303(d) listed water body, can be found on the USEPA "How's My Waterway" online database.

Additionally, the IRWMP Region's near-coastal drinking water intakes and estuarine habitats are both susceptible to saltwater intrusion. Fish in local rivers and streams are susceptible to higher temperatures. Rivers, reservoirs, lakes, and coastal areas are all susceptible to low dissolved oxygen that accompany higher temperatures. For more information on coastal storms, coastal erosion, and sea level rise, refer to the MJHMP (County of San Luis Obispo, 2025b).

Table 2-3. 303(d) Listed Water Bodies/Segments in the County of San Luis Obispo

Waterbody Name	303 (d) List Category	Impaired[1]	Threatened[2]
Soda Lake	5	Y	N
Lopez Lake	5	Y	N
Laguna Lake	5	Y	N
San Luis Obispo Creek Estuary	5	Y	N
Los Osos Creek	5	Y	N
Pennington Creek	5	Y	N
Little Oso Flaco Creek	5	Y	N
Alamo Creek	5	Y	N
Cholame Creek	5	Y	N
Las Tablas Creek	5	Y	N
Cayucos Creek Mouth	5	Y	N
Dairy Creek	5	Y	N
San Bernardo Creek	5	Y	N
Los Berros Creek	5	Y	N
Yerba Buena Creek	5	Y	N
Las Tablas Creek, North Fork	5	Y	N
Las Tablas Creek, South Fork	5	Y	N
Estrella River	5	Y	N
Old Creek (above Whale Rock Reservoir)	5	Y	N
Pacific Ocean at Olde Port Beach	5	Y	N
Nipomo Creek	5	Y	N
Pico Creek	5	Y	N
Oso Flaco Creek	5	Y	N
Los Osos Creek Estuary	5	Y	N
Arroyo Grande Creek (below Lopez Lake)	5	Y	N
Cuyama River (above Twitchell Reservoir)	5	Y	N

[1]: Impaired waters are waterbodies not fully supporting their designated uses under the Clean Water Act.
[2]: A Clean Water Act Section 303(d) listed impaired water is a waterbody that is impaired or threatened and needs a TMDL restoration plan.



Map Label	Assessment Unit Name
1	Cholame Creek
2	Estrella River
3	Las Tablas Creek
4	Las Tablas Creek, North Fork
5	Pico Creek
6	Las Tablas Creek, South Fork
7	Old Creek (above Whale Rock Reservoir)
8	Cayucos Creek Mouth
9	San Bernardo Creek
10	Yerba Buena Creek
11	Pennington Creek
12	Dairy Creek
13	Los Osos Creek Estuary
14	Los Osos Creek
15	Pacific Ocean at Olde Port Beach
16	Arroyo Grande Creek (below Lopez Lake)
17	Los Berros Creek
18	Alamo Creek
19	Nipomo Creek
20	Little Oso Flaco Creek
21	Oso Flaco Creek
22	Cuyama River (above Twitchell Reservoir)

Figure 2-2. California's Clean Water Act Section 303(d) Water Bodies in the County of San Luis Obispo

Groundwater:

Key groundwater quality constituents of interest identified in the 2019 Integrated Regional Water Management Plan include nitrate, arsenic, perchlorate, and hexavalent chromium contamination of active, groundwater-reliant CWSs from 2007 to 2017 (County of San Luis Obispo, 2019a). 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. The 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).
- *Arsenic:* This constituent is a metalloid that occurs naturally in the environment, including 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).
- *Perchlorate:* This constituent can occur naturally in the atmosphere, leading to trace amounts of perchlorate in precipitation. Perchlorates are soluble in water and generally have high mobility in soils. Acute exposure to high doses via ingestion has not been documented to contribute to death (ATSDR, 2008).
- *Hexavalent chromium:* 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 2012).

Additionally, groundwater quality data provided by DWR shows increased levels of total dissolved solids within the Los Osos Valley - Los Osos Area (DWR Basin Number 3-008.01) and Los Osos Valley - Warden Creek (DWR Basin Number 3-008.02), San Luis Obispo Valley (DWR Basin Number 3-009), Cuyama Valley (DWR Basin Number 3-013), Carrizo Plain (DWR Basin Number 3-019), Arroyo De La Cruz Valley (DWR Basin Number 3-034) and the San Simeon Valley (DWR Basin Number 3-035) (DWR 2004a, 2004b, 2004c, 2004d, 2004e).

More specifically, the Los Osos Valley - Los Osos Area Basin (DWR Basin Number 3-008.01) and Los Osos Valley - Warden Creek Basin (DWR Basin Number 3-008.02) have increased levels of chloride concentrations in groundwater along the coast between 1977 and 1986 which indicates that sea water has intruded the basin (DWR, 2004a).

The San Luis Obispo Valley Basin (DWR Basin Number 3-009) Basin's groundwater quality is generally adequate for use as potable water supply and irrigation. Two sampling locations within the San Luis Obispo Valley Basin have increased concentration of nitrates slightly in recent years, but most show no significant increases with time. Sampling locations with multiple data points displayed stable or decreasing concentrations of arsenic over the data period of record (County of San Luis Obispo, 2021).

The Cuyama Valley Basin (DWR Basin Number 3-013) has shown deteriorating water quality because of the constant cycling and evaporation of irrigation water in the basin Groundwater near the Caliente

Range has high salinity, which has been attributed to seepage out of the basement marine rocks (DWR, 2004b)

Within the Carrizo Plain basin (DWR Basin Number 3-019) a highly mineralized groundwater zone was found in the lower part of the alluvium and upper part of the Paso Robles Formation where they underlie Soda Lake. Water in a deeper zone in the Paso Robles Formation is of higher quality and confined in the vicinity of Soda Lake. Groundwater in the Morales Formation is likely to be brackish (DWR, 2004c).

The San Simeon Valley Basin (DWR Basin Number 3-035) has no evidence of seawater intrusion. There are increased concentrations of manganese downstream of the San Simeon Valley Basin (DWR, 2004e). Additional, site-specific data is available in various online mapping tools published by the State Water Resources Control Board's Groundwater Ambient Monitoring and Assessment Program[4].

2.4 Risk Assessment Results

This section summarizes the risk assessment results, including the County's total physical and social vulnerability scores, followed by discussions of the individual indicators driving physical vulnerability. This information was used to identify the regions of water supply shortage vulnerability described in Section 2.5.

2.4.1 Total Physical Vulnerability and Social Vulnerability Scores

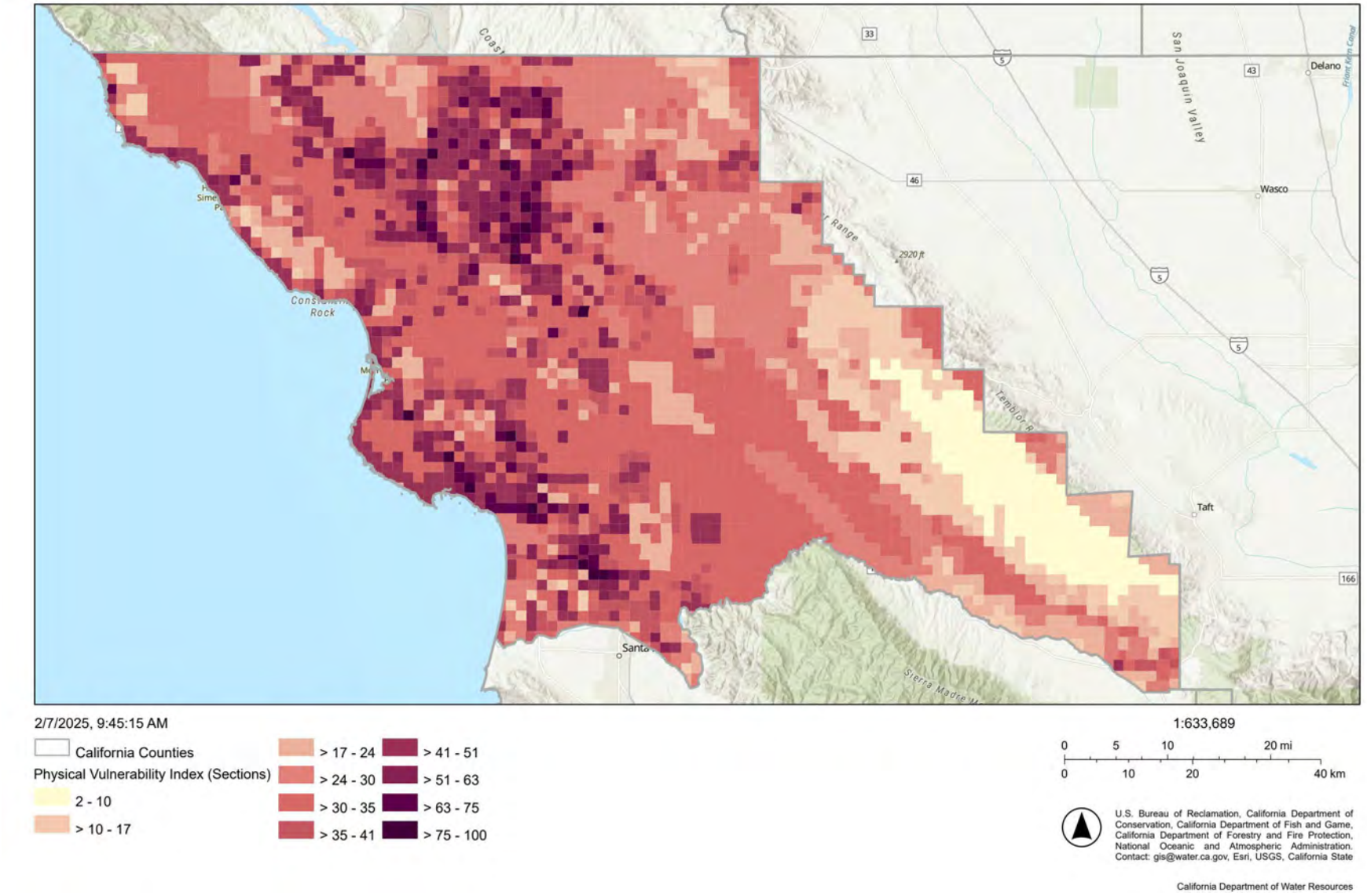
Total physical vulnerability scores within the County are shown in Figure 2-3, with darker shaded areas (or PLSSs) indicating higher physical vulnerability scores. If an area is not shaded, it means there are no domestic wells or SSWSs within the PLSS and physical vulnerability was not scored. Communities around Paso Robles, Atascadero, northern portion of the Santa Lucia Range, Los Osos, Irish Hills, near Grover Beach and the Nipomo Valley have high physical vulnerability to water supply shortages.

Figure 2-4 displays the intersection of physical vulnerability and location of domestic wells and SSWSs within the County. A darker shaded area indicates a higher presence of domestic wells or SSWSs within an area with high physical vulnerability. A blue area has a higher physical vulnerability but minimal domestic wells or SSWSs, and an orange area has a high presence of domestic wells or SSWSs but low physical vulnerability. This figure shows where short-term actions and long-term mitigation strategies are most likely to be needed because of the vulnerability to water supply shortages. The areas with high physical vulnerability and a higher density of domestic wells include areas west of Lake Nacimiento, Paso Robles, Linne, Creston, south of San Luis Obispo, and within the Nipomo Valley – including Oceano and Nipomo. There are many isolated domestic wells with high physical vulnerability as well. Areas within the central Santa Lucia Range have a higher density of domestic wells, but a lower physical vulnerability to water supply shortage compared to other parts of the County.

Social vulnerability is also an important factor in assessing the risk of water supply shortage and need for mitigation through short-term actions and long-term strategies. Total social vulnerability scores in Sierra County are depicted in Figure 2-5, with darker shaded areas indicating higher vulnerabilities. Comparing the social vulnerability scores in Figure 2-5 with the physical vulnerability scores in Figure 2-4 helps

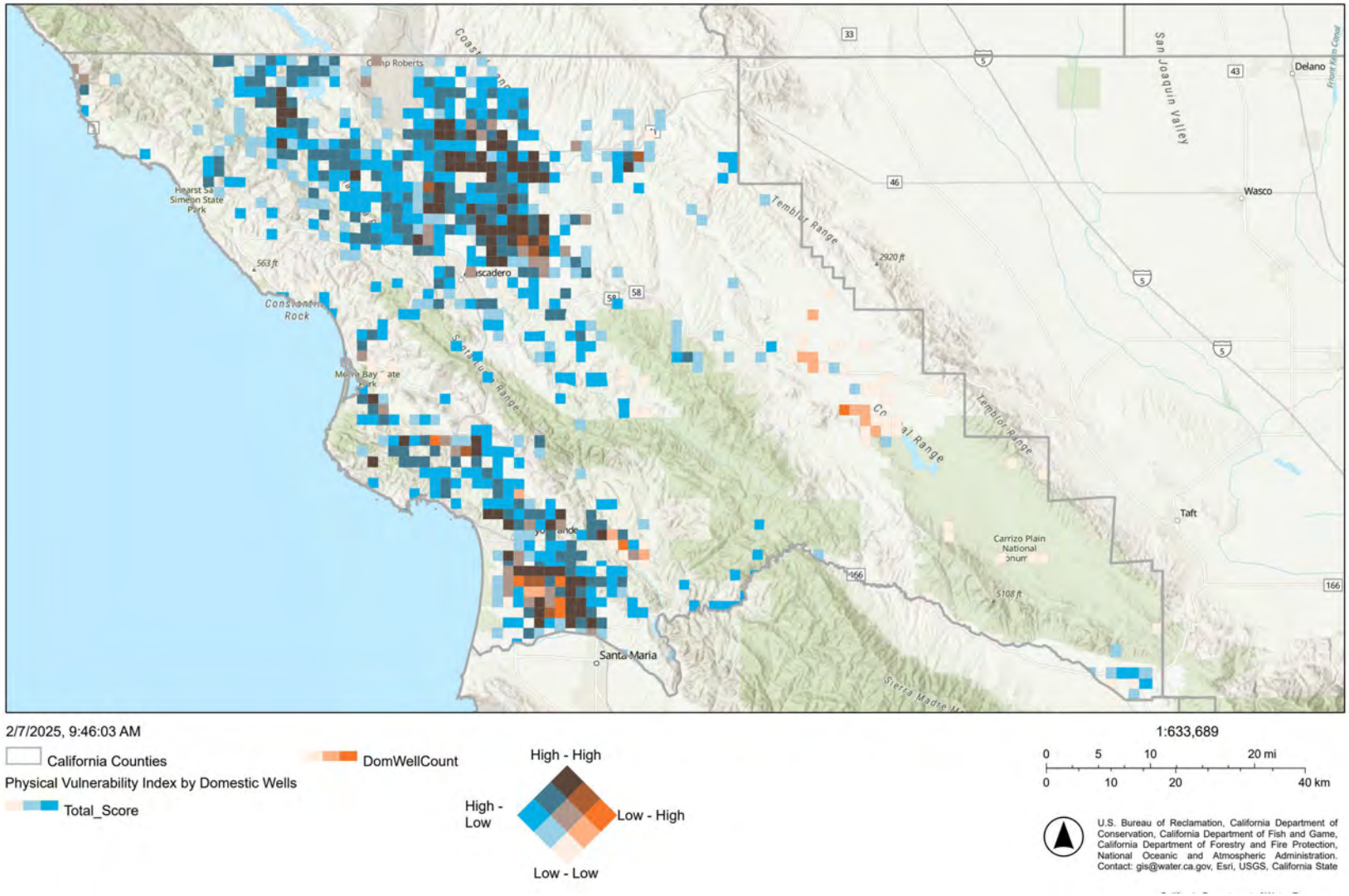
[4] https://www.waterboards.ca.gov/water_issues/programs/gama/online_tools.html

characterize how social vulnerability may overlap with the physical vulnerability of domestic wells and SSWSs. Most of the County has medium-low social vulnerability scores.



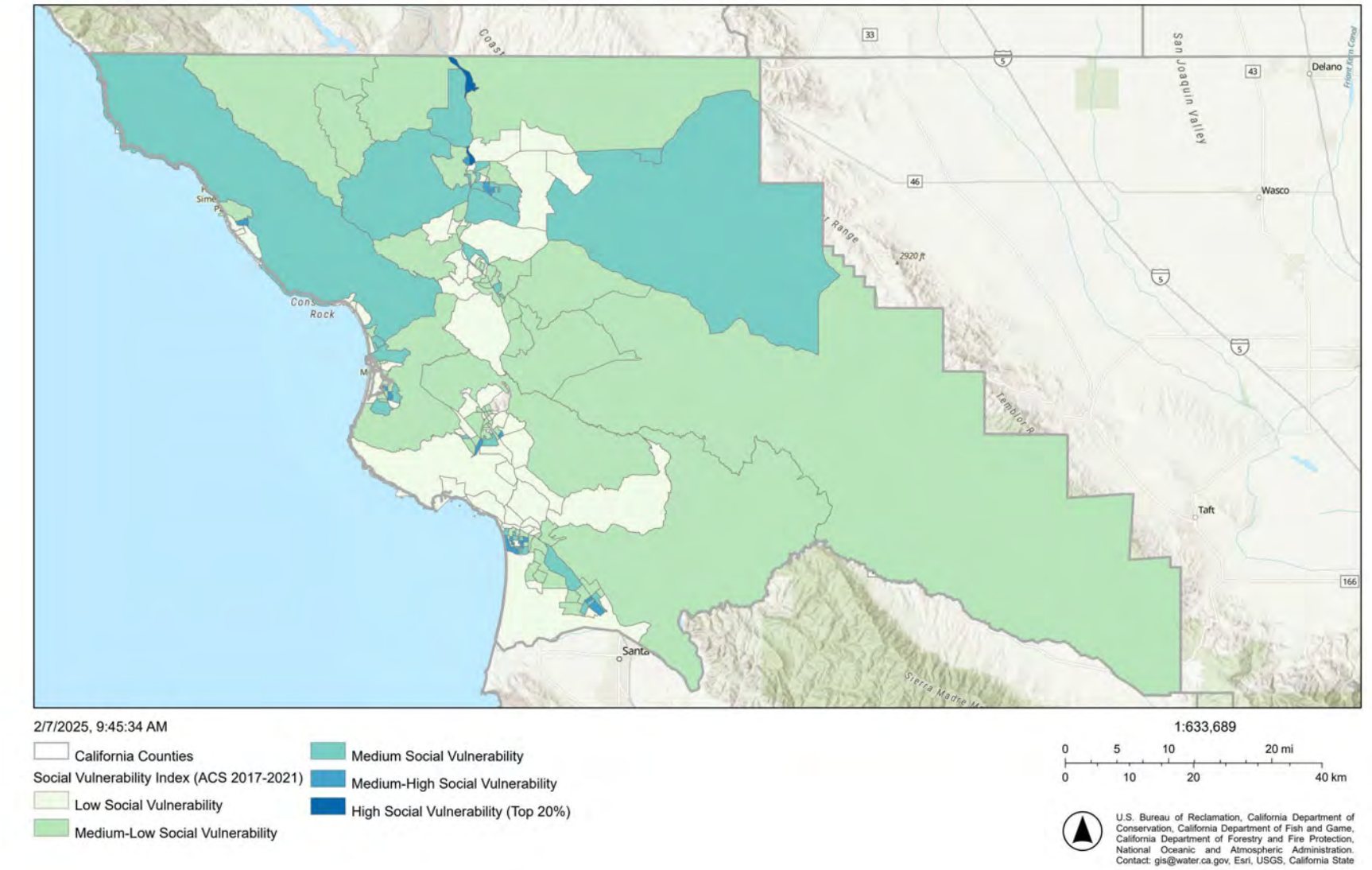
Source: Water Shortage Vulnerability Explorer Tool, https://arcg.is/1LCKGO, Accessed: 02/2025

Figure 2-3. Physical Vulnerability to Drought and Water Supply Shortage in the County of San Luis Obispo



Source: Water Shortage Vulnerability Explorer Tool, https://arcg.is/1LCKGO, Accessed: 02/2025

Figure 2-4. Intersection of Physical Vulnerability and Density of Domestic Wells and State Small Water Systems in the County of San Luis Obispo



Source: Water Shortage Vulnerability Explorer Tool, https://arcg.is/1LCKGO, Accessed: 02/2025

Figure 2-5. Social Vulnerability Scores by Census Block Group in the County of San Luis Obispo

2.4.2 Physical Vulnerability Indicators

The risk assessment summarizes where water shortages associated with domestic wells and SSWSs may be more likely to occur. This section describes factors that are driving water shortage risk in greater detail.

Within the County, the primary indicators driving physical vulnerability are fractured rock areas, dry well susceptibility in alluvial basins, wildlife hazard risk, water quality risk and overdrafted basins. Details on these three indicators are included below, and information on all physical vulnerability indicators is summarized in Table 2-4.

An underlying driver of water shortage vulnerability in the County is the large area within a fractured rock basin, with the geology indicator showing the fractured rock basin shown in (Figure 2-6). Water availability in fractured rock areas is more difficult to track and manage.

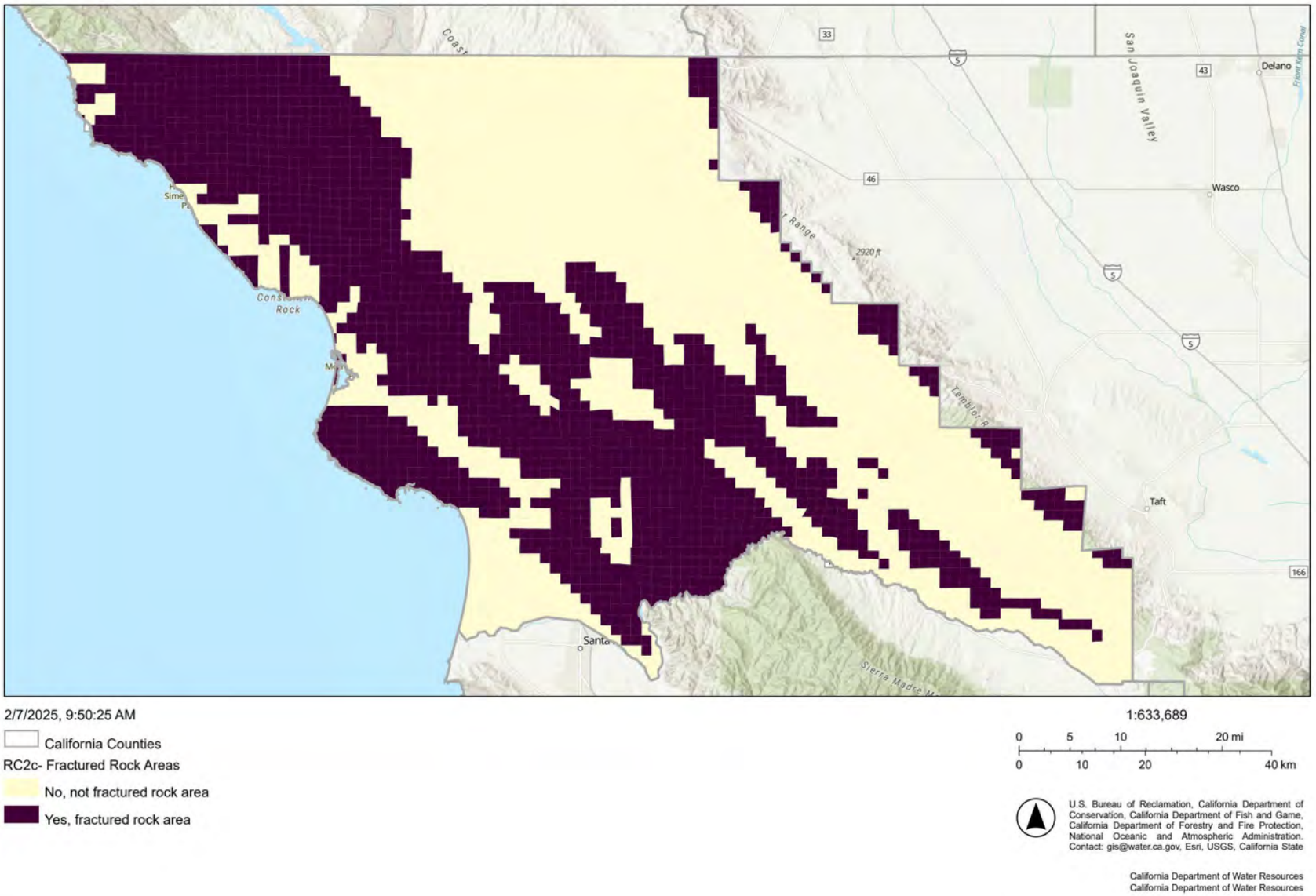
Additionally, there are several areas in the County with a high density of domestic wells in alluvial basins (Figure 2-7), including the Camp Roberts area, South of San Miguel, northeast of Paso Robles, north of Templeton, southwest of Linne, San Luis Obispo, Arroyo Grande, and Nipomo. The competing demand from the multiple domestic wells in the same area increases the potential for a water shortage during a drought or other conditions that stress the water supply.

In addition, another underlying driver of water shortage vulnerability in the County is the large area within a Very High and High Risk wildfire designation within Local and State Responsibility Areas (Figure 2-9). For more detailed mapping of Fire Hazard Severity Zones within Local Responsibility Areas, refer to Appendix B.

Another indicator contributing to water shortage vulnerability within the County is water quality risk. This indicator displays potential risk per square mile section based on raw source groundwater quality data. This indicator is not intended to predict or estimate the water quality at any given location. Areas of high potential water quality risk within the County are areas southeast of Shandon, Whitney Gardens area, Paso Robles, Templeton, Atascadero, Morro Bay, Los Osos, San Luis Obispo, Grover Beach, Oceano, Santa Maria Mesa, and California Valley (Figure 2-10).

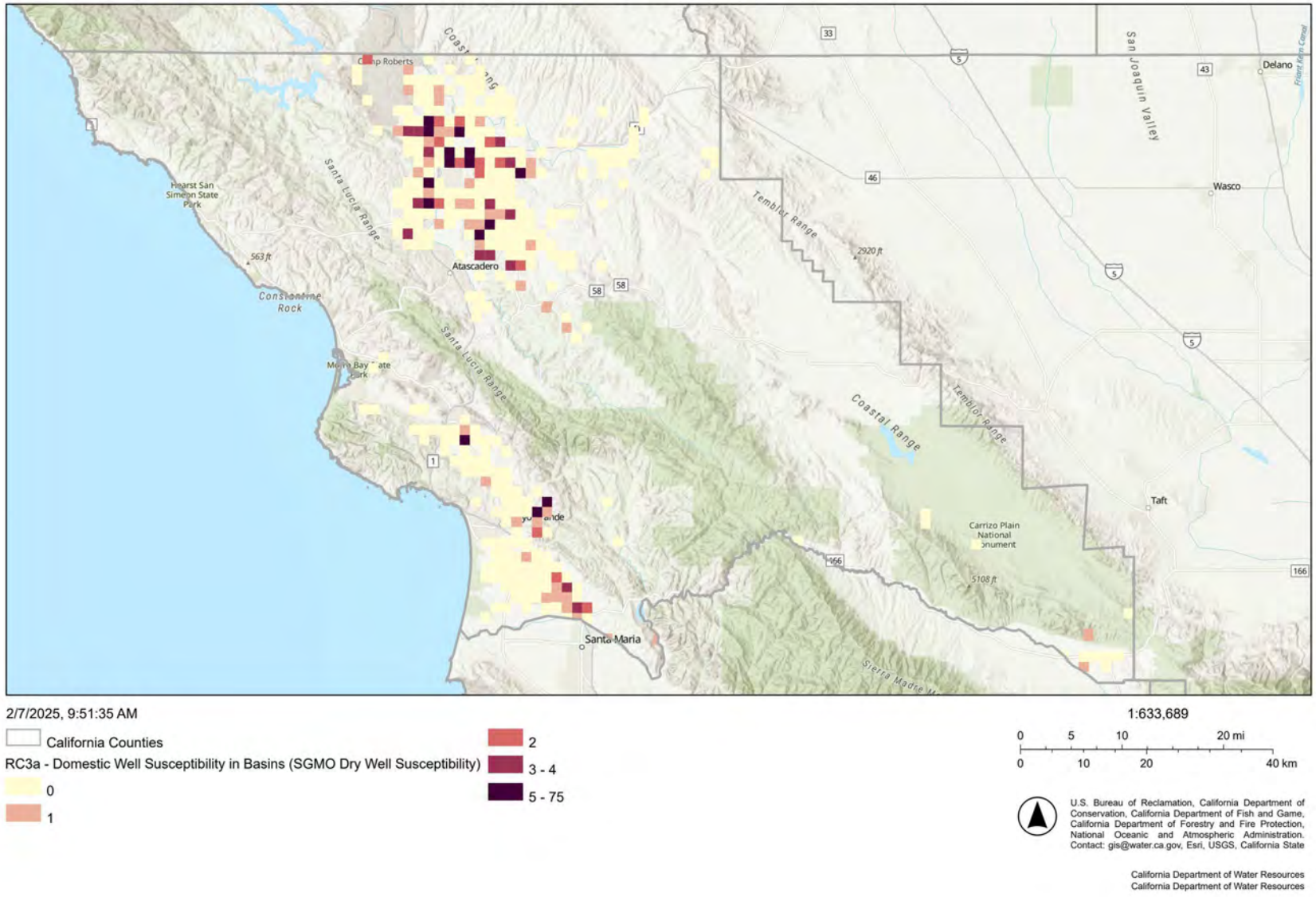
Another key factor contributing to water shortage vulnerability in the County is Overdrafted groundwater basins. Groundwater basins in the County, designated by DWR as critically overdrafted, include the Salinas Valley – Paso Robles Area Basin, Cuyama Valley, and the Los Osos Valley – Los Osos Area Basin. The San Joaquin Valley – Kern County Basin is also overdrafted and extends partially into San Luis Obispo County (Figure 2-11).

Another indicator contributing to water shortage vulnerability in the County is the amount of irrigated agriculture. Irrigated agriculture demands large water volumes, depleting surface and groundwater resources, thus increasing water shortage vulnerability for domestic wells and state small water systems (Figure 2-12).



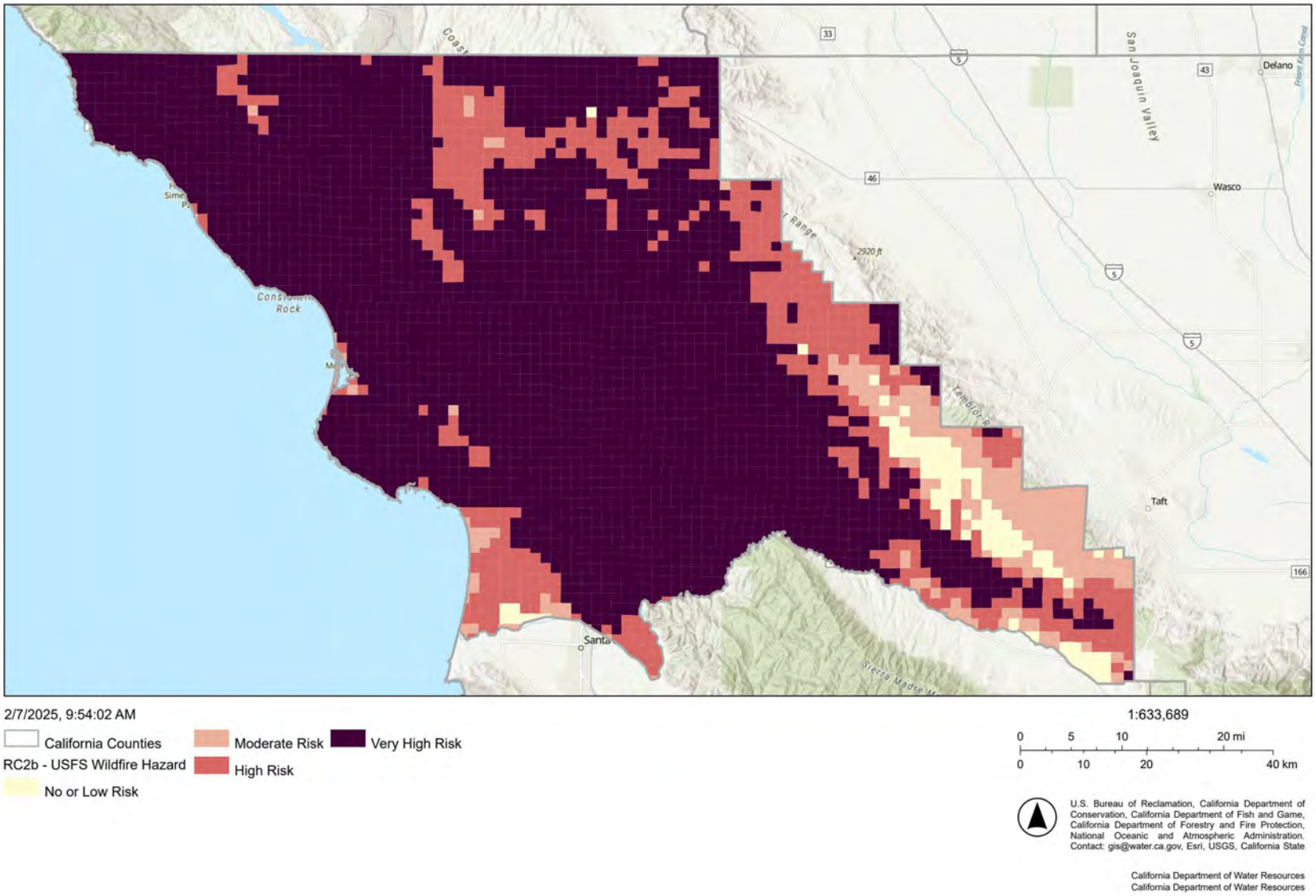
Source: Water Shortage Vulnerability Explorer Tool, https://arcg.is/1LCKGO, Accessed: 02/2025

Figure 2-6. Fractured Rock Areas in the County of San Luis Obispo



Source: Water Shortage Vulnerability Explorer Tool, https://arcg.is/1LCKGO, Accessed: 02/2025

Figure 2-7. Dry Domestic Well Susceptibility in Basins in the County of San Luis Obispo



Source: Water Shortage Vulnerability Explorer Tool, https://arcg.is/1LCKGO, Accessed: 02/2025

Figure 2-8. USFS Wildfire Hazard in the County of San Luis Obispo

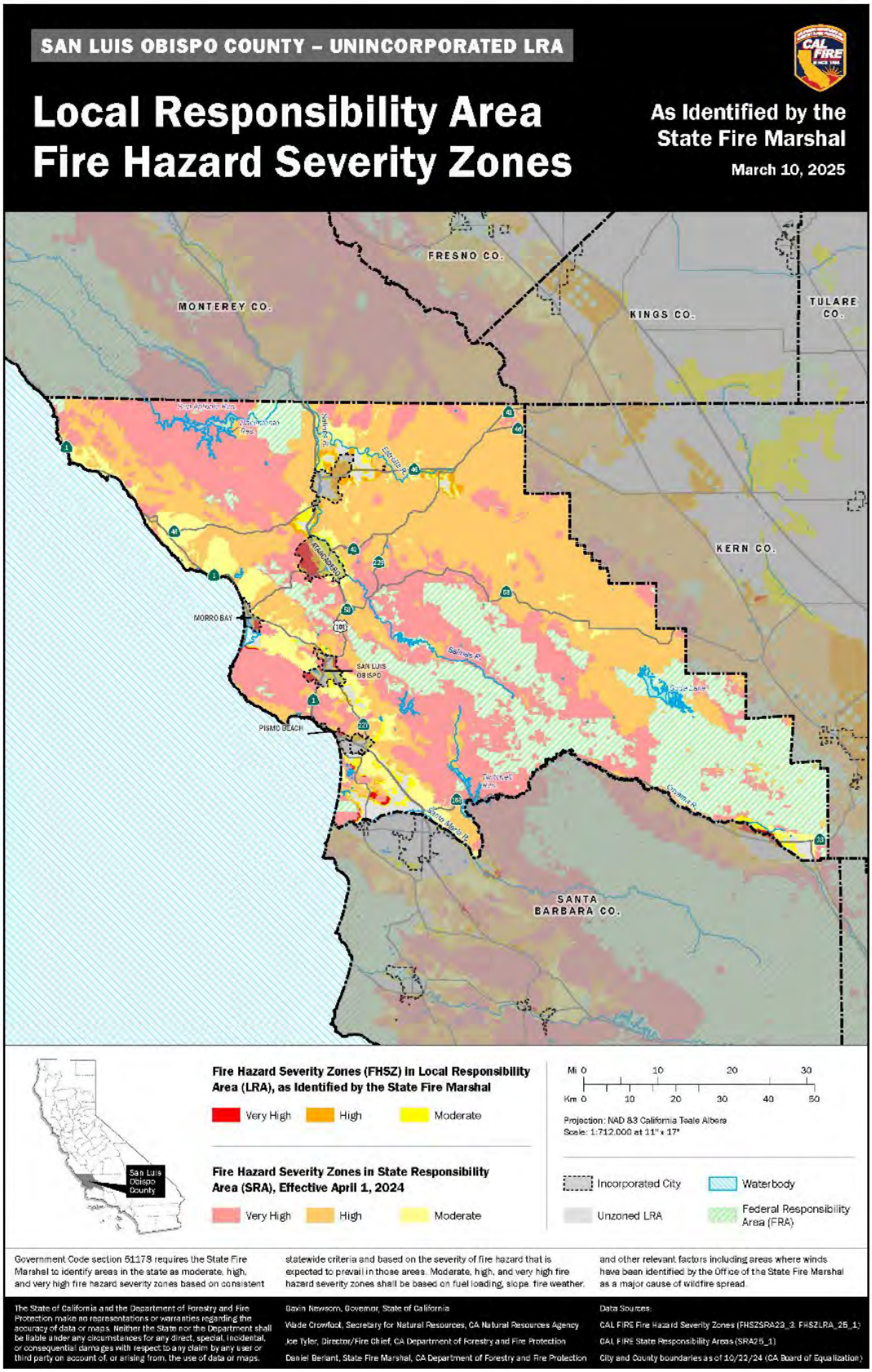
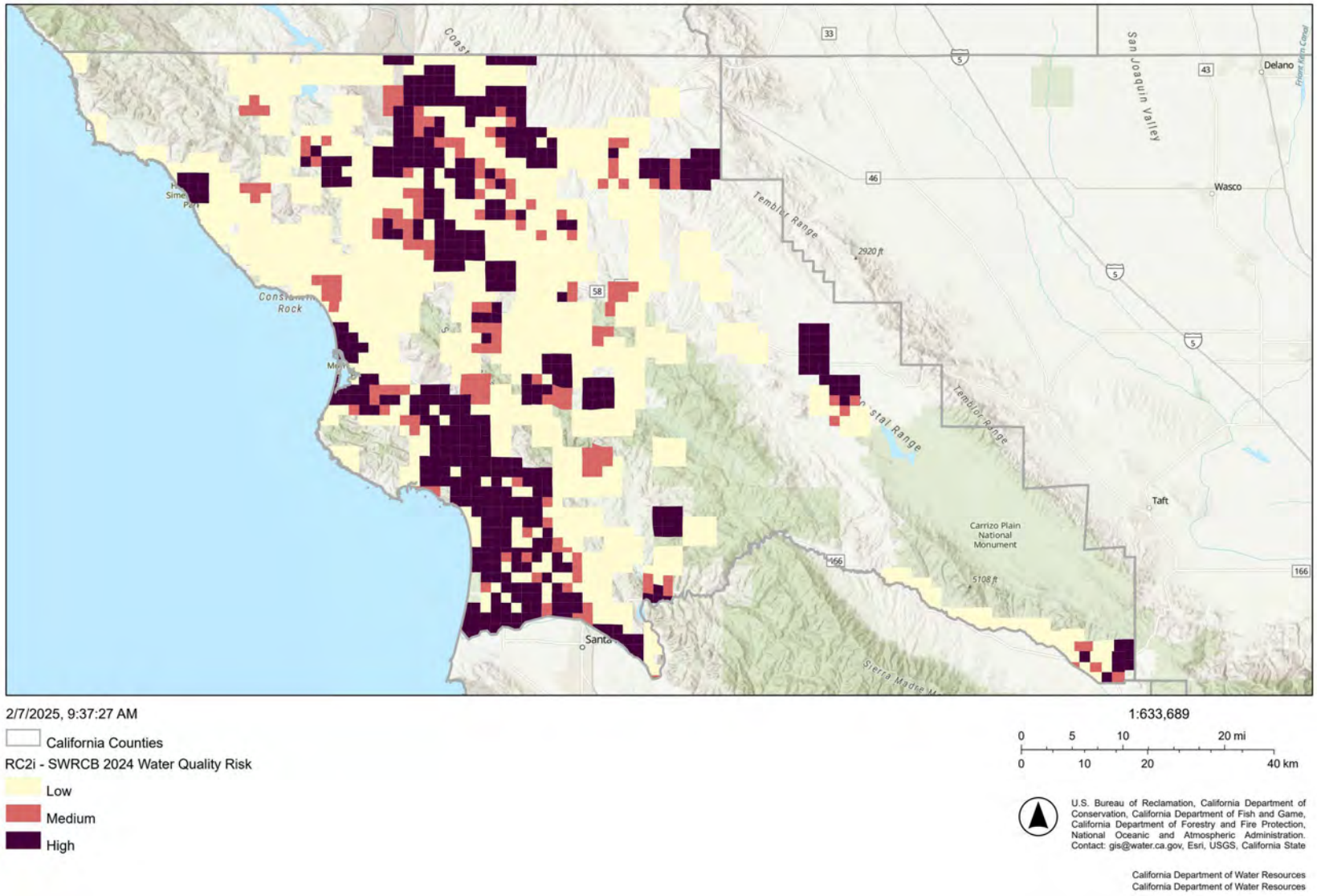
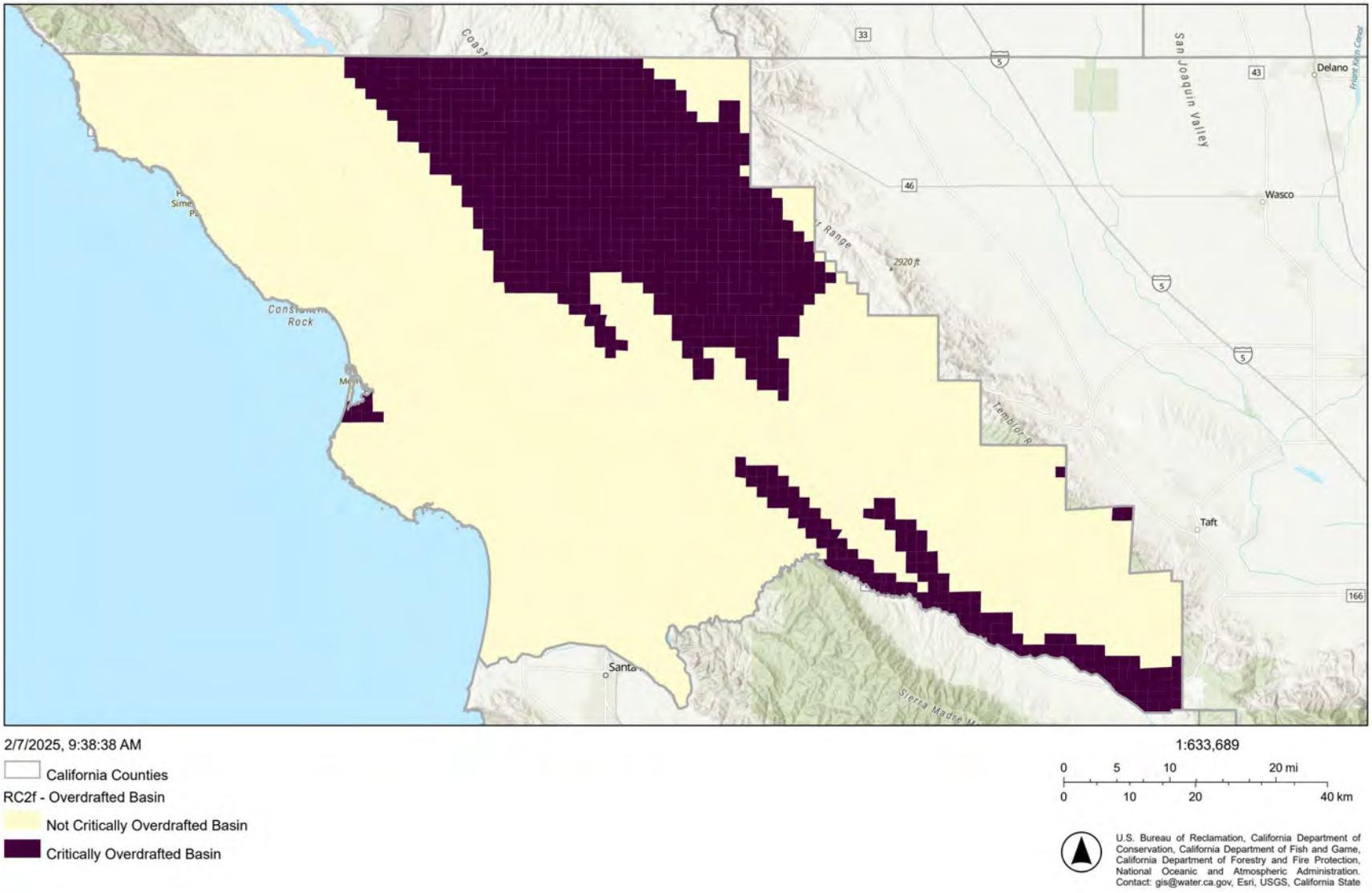


Figure 2-9. Local Responsibility Area Fire Hazard Severity Zones



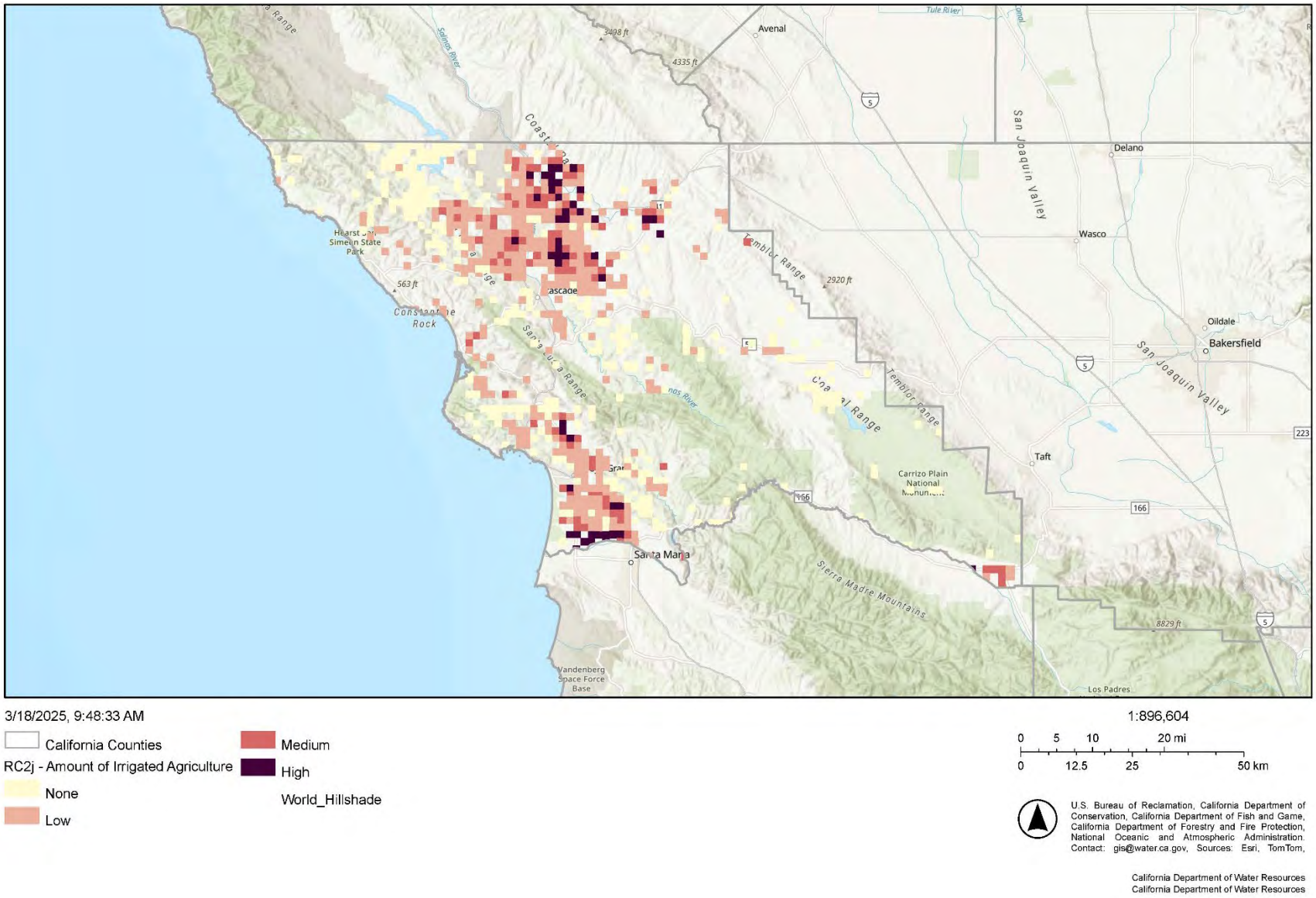
Source: Water Shortage Vulnerability Explorer Tool, https://arcg.is/1LCKGO, Accessed: 02/2025

Figure 2-10. SWRCB 2024 Water Quality Risk in the County of San Luis Obispo



Source: Water Shortage Vulnerability Explorer Tool, https://arcg.is/1LCKGO, Accessed: 02/2025

Figure 2-11. Critically Overdrafted Basins in the County of San Luis Obispo



Source: Water Shortage Vulnerability Explorer Tool, https://arcg.is/1LCKGO, Accessed: 03/2025

Figure 2-12. Amount of Irrigated Agriculture in the County of San Luis Obispo

Table 2-4 summarizes all physical vulnerability indicators within the county.

Table 2-4. Summary of Observed Conditions for Physical Vulnerability Indicators in the County of San Luis Obispo

Physical Vulnerability Indicator	Observed Conditions
Climate Change	
Absolute Projected Temperature Change (RC1a)	Projected change in the maximum temperature by end of century shows approximately 3°C (northern central portion of the County) to approximately 2°C (entire west coast and southern portion) increase in average temperature throughout the County. Increased temperatures could increase water supply demands from users, evapotranspiration, and others, thereby increasing vulnerability to drought and/or water shortage impacts.
Sea level rise impacts through saltwater intrusion into coastal aquifers (RC1b)	Delta areas of the County and the regions near Morro Bay are tidally influenced. Potential influence from higher salinity water intrusion from the coast and Morro Bay impacts groundwater quality and makes the coastal areas highly vulnerable to saltwater intrusion. Current and future saltwater intrusion into groundwater increases vulnerability of domestic wells and state small water systems.
Rescaled Climate change projections of wildfire by mid-century (RC1c)	Projections indicate moderate to significant increases in wildfire risk throughout the County by 2035-2064. The largest increase is projected for the south-central portion of the County and the northwest in the Santa Lucia Range, while the northeastern region is anticipated to be the least affected. The projected increase in wildfire frequency and severity includes inherent high risks that increase the vulnerability of water sources.
Current Environmental Conditions and Events	
Current Dry Year (RC2a)	Precipitation in water year 2024 was above the historic average in all areas of the County. However, data from California Water Watch indicates the maximum precipitation for the 2024-2025 water year, as of January 2025 is below the historical average (DWR 2024a). Due to the observed historical pattern and the uncertainty associated with defining the water year until after winter precipitation season is over, this indicator is included in the vulnerability assessment.
Multiple Dry Years (RC2aa)	Data show that almost all the County has been experiencing two dry years in the last five years (2020-2024) with a small portion of the County near Santa Margarita having 3 dry years. The eastern portion of the county near the Carrizo Plain experienced no dry years. A higher number of recent dry years may increase physical vulnerability of water supply conditions.
USFS Wildfire Risk (RC2b)	The majority of the County is designated a Very High-Risk wildfire hazard. Areas near the Carrizo Plain have Moderate to Low Risk. As these groups show the current risk of wildfire, research shows that a higher risk contributes to higher physical vulnerability for water sources.

Physical Vulnerability Indicator	Observed Conditions
Fractured Rock Areas (RC2c)	Fractured rock is present along mountainous regions which includes the Santa Lucis Range, Garcia Mountain, Irish Hills, La Palma Range and the Caliente Range. 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.
State Water Resources Control Board 2024 Water Quality Risk (RC2i)	This indicator displays potential risk per square mile section based on raw source groundwater quality data. This indicator is not intended to predict or estimate the water quality at any given location but is intended to prioritize areas for SAFER funding (State Water Board, 2025). Areas of high potential water quality risk within the County are areas southeast of Shandon, Whitney Gardens area, Paso Robles, Templeton, Atascadero, Morro Bay, Los Osos, San Luis Obispo, Grover Beach, Oceano, Santa Maria Mesa, and California Valley.
Subsidence (RC2d)	Little to no subsidence has been reported in the County. Higher subsidence creates higher vulnerable conditions.
Presence of Saltwater Intrusion (RC2e)	Coastal areas and all portions of the County are currently experiencing saltwater intrusion. This extends further inland near Morro Bay and Avila Beach. The increased salinity not only affects the taste and potability of the water but also threatens agricultural activities that depend on the availability of fresh water. In times of drought or reduced rainfall, the situation exacerbates as the demand for water rises, amplifying the stress on these compromised aquifers.
Overdrafted Basin (RC2f)	Over-drafted basins increase physical vulnerability to water shortage and drought. Groundwater basins in the County that are identified by DWR as being critically over-drafted include the Salinas Valley – Paso Robles Area Basin, Cuyama Valley and the Los Oso Valley – Los Oso Area Basin. The San Joaquin Valley – Kern County Basin is also overdrafted and partially within the County of San Luis Obispo.
Groundwater Decline Levels (RC2g)	Moderate groundwater decline levels are present in the County within the Salinas Valley – Paso Robles Area Basin, Salinas Valley – Atascadero Area Basin, San Luis Obispo Valley Basin, and the Santa Maria Valley – Santa Maria Bason. High groundwater decline is present in the County in the Salinas Valley – Paso Robles Area Basin west of Linne.
Amount of Irrigated Agriculture (RC2j)	The County of San Luis Obispo is farmed mostly in the northern portion of the County (within the Salinas Valley – Paso Robles Area Basin) and south of Nipomo (within the Santa Maria River Valley – Santa Maria Basin). Presence of agricultural activities could indicate competing demands on groundwater suppliers, as well as water quality concerns both of which could create higher vulnerability for domestic wells and state small water systems, especially during a drought or water shortage event.

Physical Vulnerability Indicator	Observed Conditions
Infrastructure Susceptibility	
Domestic Well Susceptibility in Basins (RC3a)	This factor analyzes locations where there are many susceptible wells to go dry, if the current groundwater trends in the County continue. Data show high dry well susceptibility in the western portion of the Salinas Valley – Paso Robles Area Basin and Salinas Valley – Atascadero Area Basin, the San Luis Obispo Valley, the western portion of the Santa Maria River Valley – Arroyo Grande Basin.
Fractured Rock Area Competing Demand (RC3c)	The 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 a dry period. San Luis obispo County's data show this trend in the fractured rock areas. The specific areas include west of paso Robles, near Linne, Wellsona, west of lake Nacimiento, north of Creston, and the Nipomo area.
Record of Shortage	
Observed Shortage (RC5a)	Areas that have already experienced outages are more likely to experience it during future dry years, due to combinations of aquifer sensitivity/fluctuations and shallow wells. Due to presence of a handful of reports in the County, this indicator is included in the assessment. There are 364 dry well reports throughout the County but are primarily in alluvial groundwater basins (DWR 2024c). Evaluating the dry well data provides 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.

2.5 Risk Assessment Findings

The areas within the County with domestic wells and/or SSWSs that are vulnerable to a water supply shortages, the drivers of those physical vulnerabilities, and the corresponding total social vulnerability scores are presented in Table 2-5 Table 2-5. Summary of Risk Assessment Findings in the County of San Luis Obispoand shown in Figure 2-13.

Table 2-5. Summary of Risk Assessment Findings in the County of San Luis Obispo

Area with Water Shortage Vulnerability and Domestic Wells/SSWSs	Physical Vulnerability Indicators	Social Vulnerability Score	Location in Figure
Communities in Fractured Rock Basins (West of Lake Nacimiento, Northern portion of the Santa Lucia Range, north of Arroyo Grande, Nipomo Valley)	Fractured Rock Area Wildfire Hazard Competing Demand Water Quality Risk Irrigated Agriculture	Medium	A
Areas within the Salinas Valley - Paso Robles Area Basin and the Salinas Valley – Atascadero Valley Basin	Overdrafted Basin Water Quality Groundwater Decline Wildfire Risk Household Outages Irrigated Agriculture	Medium	B
Areas within the Santa Maria River Valley – Santa Maria Basin and the Santa Maria River Valley – Arroyo Grande Basin	Water Quality Groundwater Decline Household Outages Irrigated Agriculture	Medium	C

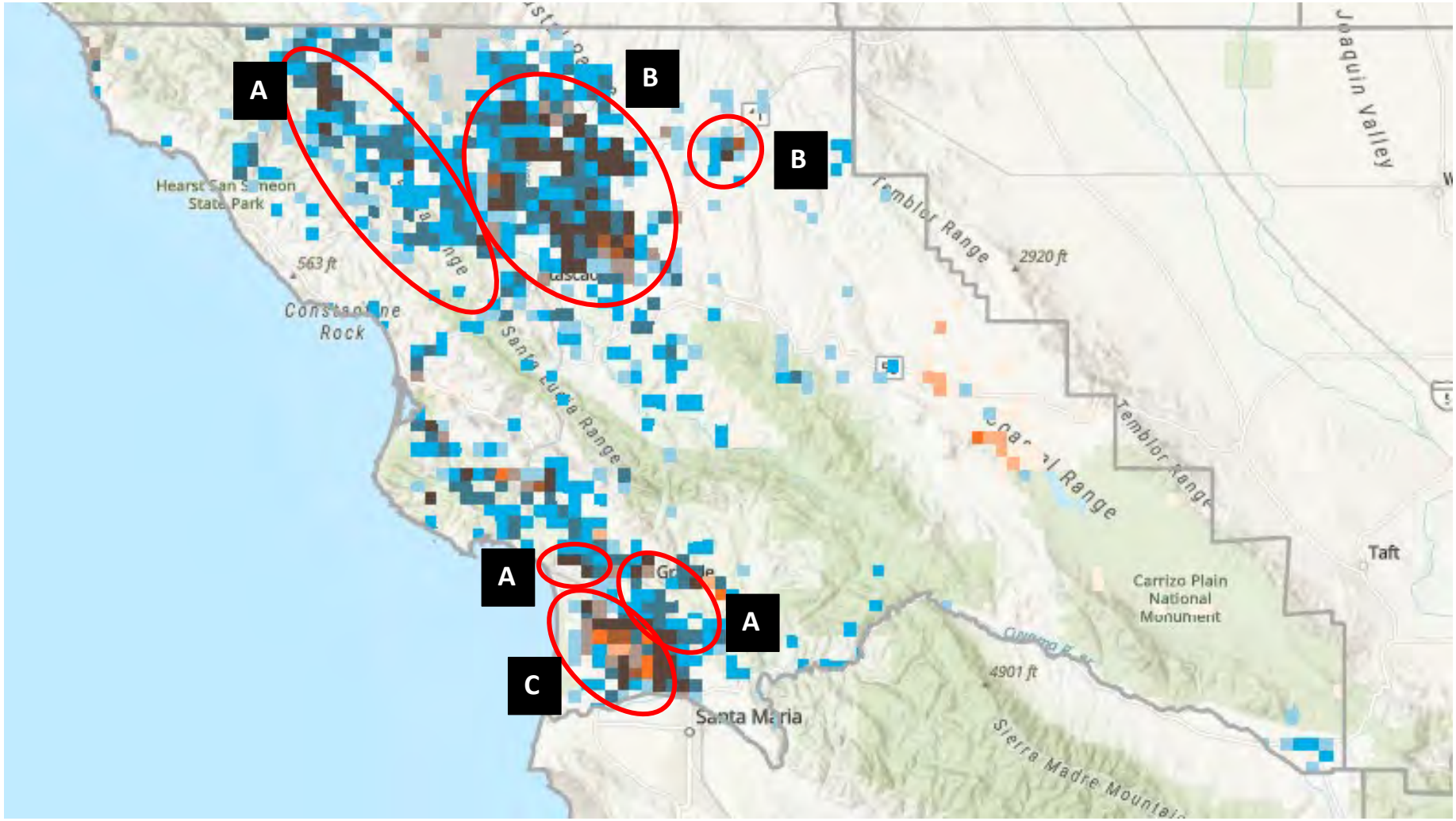


Figure 2-13. Summary of Risk Assessment Findings Showing Areas with Water Shortage Vulnerability and Domestic Wells/State Small Water Systems in the County of San Luis Obispo

2.6 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, and other stakeholders during the development of the County Risk Assessment.

Preliminary data gaps identified during preparation of this document:

Groundwater Well Completion Reports: As described in Table 1-1, the domestic well data presented is a composite of results that draw from the California Department of Water Resource's Groundwater Live database and a database maintained by the County of San Luis Obispo. The complete county dataset for wells installed after 1977 and before 1977 are 13,570 and 2,140, respectively. As of this report, the state's data identifies 2,886 wells[5]. A significant factor in this disparity is normalizing the county's database to the state's database.

Groundwater Monitoring: Figure 2-14. Groundwater Sustainability Agency Monitoring Wells in County of San Luis Obispo represents facilities of the California Statewide Groundwater Elevation Program. Other groundwater monitoring facilities maintained by the county to track groundwater levels are not represented in this figure.

[5] Source: California Department of Water Resources Water Shortage Vulnerability Explorer Tool

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Appendix A: Groundwater Details Table

Table A-1: Groundwater Details Table

Groundwater Subbasin Number	Groundwater Subbasin	Census Place Name	Census Place Population (2020)	Census Place MHI (2020)	Number of Domestic Wells[1]	2025 Water Quality Risk (All Contaminants)[2]
3-004.06	SALINAS VALLEY - PASO ROBLES AREA	Creston	31	--	1	low
					38	medium
		El Paso de Robles (Paso Robles)	31,480	$69,297	68	high
					156	low
					14	medium
		San Miguel	2,536	$63,171	12	high
		Shandon	1,054	$72,860	16	high
					27	low
		Whitley Gardens	44	$0	5	high
			44	$0	3	low
		--	--	--	1,282	high
					2,634	low
					615	medium
					39	unknown
3-004.11	SALINAS VALLEY - ATASCADERO AREA	Atascadero	30,444	$79,620	60	high
		El Paso de Robles (Paso Robles)	31,480	$69,297	10	high
		Garden Farms	418	$70,809	15	high
			418	$70,809	2	medium
		Santa Margarita	1,025	--	3	low
		Templeton	7,965	$92,083	109	high
			7,965	$92,083	35	low
			7,965	$92,083	41	medium
		--	--	--	444	high
					108	low

Groundwater Subbasin Number	Groundwater Subbasin	Census Place Name	Census Place Population (2020)	Census Place MHI (2020)	Number of Domestic Wells[1]	2025 Water Quality Risk (All Contaminants)[2]
					71	medium
3-008.01	LOS OSOS VALLEY - LOS OSOS AREA	Los Osos	16,174	$81,707	230	high
					30	low
3-008.02	LOS OSOS VALLEY - WARDEN CREEK	Los Osos	16,174	$81,707	4	low
		--	--	--	3	high
					8	low
					4	medium
3-009	SAN LUIS OBISPO VALLEY	California Polytechnic State University	7,713	$166,500	1	high
		Edna	408	$137,568	71	high
		Los Ranchos	1,675	$198,056	56	high
		San Luis Obispo	47,402	$58,546	67	high
					5	low
		--	--	--	186	high
					12	low
					3	medium
3-012.01	SANTA MARIA RIVER VALLEY - SANTA MARIA	Arroyo Grande	17,924	$88,068	36	high
		Blacklake	797	$110,242	40	low
		Callender	1,638	$87,612	109	high
					10	low
					5	medium
		Grover Beach	13,481	$66,408	1	high
					6	low
		Los Berros	301	$118,750	88	high
					14	low
		Nipomo	18,182	$86,423	253	high

Groundwater Subbasin Number	Groundwater Subbasin	Census Place Name	Census Place Population (2020)	Census Place MHI (2020)	Number of Domestic Wells[1]	2025 Water Quality Risk (All Contaminants)[2]
					70	low
					6	medium
		Oceano	7,601	$66,261	12	high
					4	low
		Pismo Beach	8,042	$90,837	1	low
		Woodlands	2,331	$135,814	17	high
					1	low
		--	--	--	346	high
					142	low
					144	medium
					1	unknown
3-012.02	SANTA MARIA RIVER VALLEY - ARROYO GRANDE	Arroyo Grande	17,924	$88,068	12	high
					3	low
		--	--	--	69	high
					39	low
3-013	CUYAMA VALLEY	--	--	--	4	high
					5	low
					1	medium
					4	unknown
3-019	CARRIZO PLAIN	--	--	--	60	high
					100	low
					78	medium
					108	unknown
3-033	SAN CARPOFORO VALLEY	--	--	--	2	unknown
3-035	SAN SIMEON VALLEY	--	--	--	9	high
3-036	SANTA ROSA VALLEY	Cambria	5,555	$73,136	5	low

Groundwater Subbasin Number	Groundwater Subbasin	Census Place Name	Census Place Population (2020)	Census Place MHI (2020)	Number of Domestic Wells[1]	2025 Water Quality Risk (All Contaminants)[2]
		--	--	--	2	high
					31	low
3-037	VILLA VALLEY	--	--	--	7	low
					3	unknown
3-038	CAYUCOS VALLEY	--	--	--	1	low
3-039	OLD VALLEY	Cayucos	2,228	$70,602	1	low
		--	--	--	12	low
					1	medium
3-040	TORO VALLEY	Cayucos	2,228	$70,602	2	low
		Morro Bay	10,592	$73,864	--	--
		--	--	--	6	low
3-041	MORRO VALLEY	Morro Bay	10,592	$73,864	10	high
		--	--	--	5	high
3-042	CHORRO VALLEY	Morro Bay	10,592	$73,864	--	--
		--	--	--	4	high
					12	low
3-043	RINCONADA VALLEY	--	--	--	2	high
					1	low
					3	medium
3-044	POZO VALLEY	--	--	--	12	high
					18	low
					5	unknown
3-045	HUASNA VALLEY	--	--	--	27	low
					7	unknown
3-046	RAFAEL VALLEY	--	--	--	1	unknown
3-047	BIG SPRING AREA	--	--	--	1	unknown

Groundwater Subbasin Number	Groundwater Subbasin	Census Place Name	Census Place Population (2020)	Census Place MHI (2020)	Number of Domestic Wells[1]	2025 Water Quality Risk (All Contaminants)[2]
N/A	Fractured Rock	Arroyo Grande	17,924	$88,068	36	high
		Atascadero	30,444	$79,620	58	high
					101	low
					43	unknown
		Avila Beach	1,455	$118,188	90	high
					31	low
					2	medium
		California Polytechnic State University	7,713	$166,500	1	high
		Cambria	5,555	$73,136	6	high
					14	low
					12	unknown
		Cayucos	2,228	$70,602	2	high
					6	low
					7	medium
		Edna	408	$137,568	--	--
		El Paso de Robles (Paso Robles)	31,480	$69,297	--	--
		Garden Farms	418	$70,809	29	high
		Grover Beach	13,481	$66,408	--	--
		Lake Nacimiento	3,021	$72,101	8	low
					2	unknown
		Los Berros	301	$118,750	18	high
					41	low
		Los Osos	16,174	$81,707	5	high
					3	low
					23	medium

Groundwater Subbasin Number	Groundwater Subbasin	Census Place Name	Census Place Population (2020)	Census Place MHI (2020)	Number of Domestic Wells[1]	2025 Water Quality Risk (All Contaminants)[2]
		Los Ranchos	1,675	$198,056	31	high
		Morro Bay	10,592	$73,864	7	high
					1	medium
		Nipomo	18,182	$86,423	6	high
					21	low
		Oak Shores	325	--	10	low
		Oceano	7,601	$66,261	--	--
		Pismo Beach	8,042	$90,837	2	high
					9	low
					6	unknown
		San Luis Obispo	47,402	$58,546	85	high
					7	low
					6	medium
		San Simeon	550	$49,194	2	low
		Santa Margarita	1,025	--	2	low
		Templeton	7,965	$92,083	4	high
					12	low
					72	medium
		--	--	--	2,273	high
					3,114	low
					601	medium
					427	unknown
					1	--

--: No data

MHI: Median Household Income

1: Refer to Figure 1-5 Locations of Domestic Wells and State Small Water Systems in San Luis Obispo County

[3]: Information presented in this table and figure are based on well-completion reports data. Geographic information on well completion reports may be inaccurate and/or place the well not at the actual well location. As a result, the number of domestic wells may be overestimated. Groundwater totals included in this table is a composite of data maintained by the State of California via its Groundwater Live database and data provided by the County of San Luis Obispo.

Appendix B: Local Responsibility Fire Hazard Severity Zones Maps

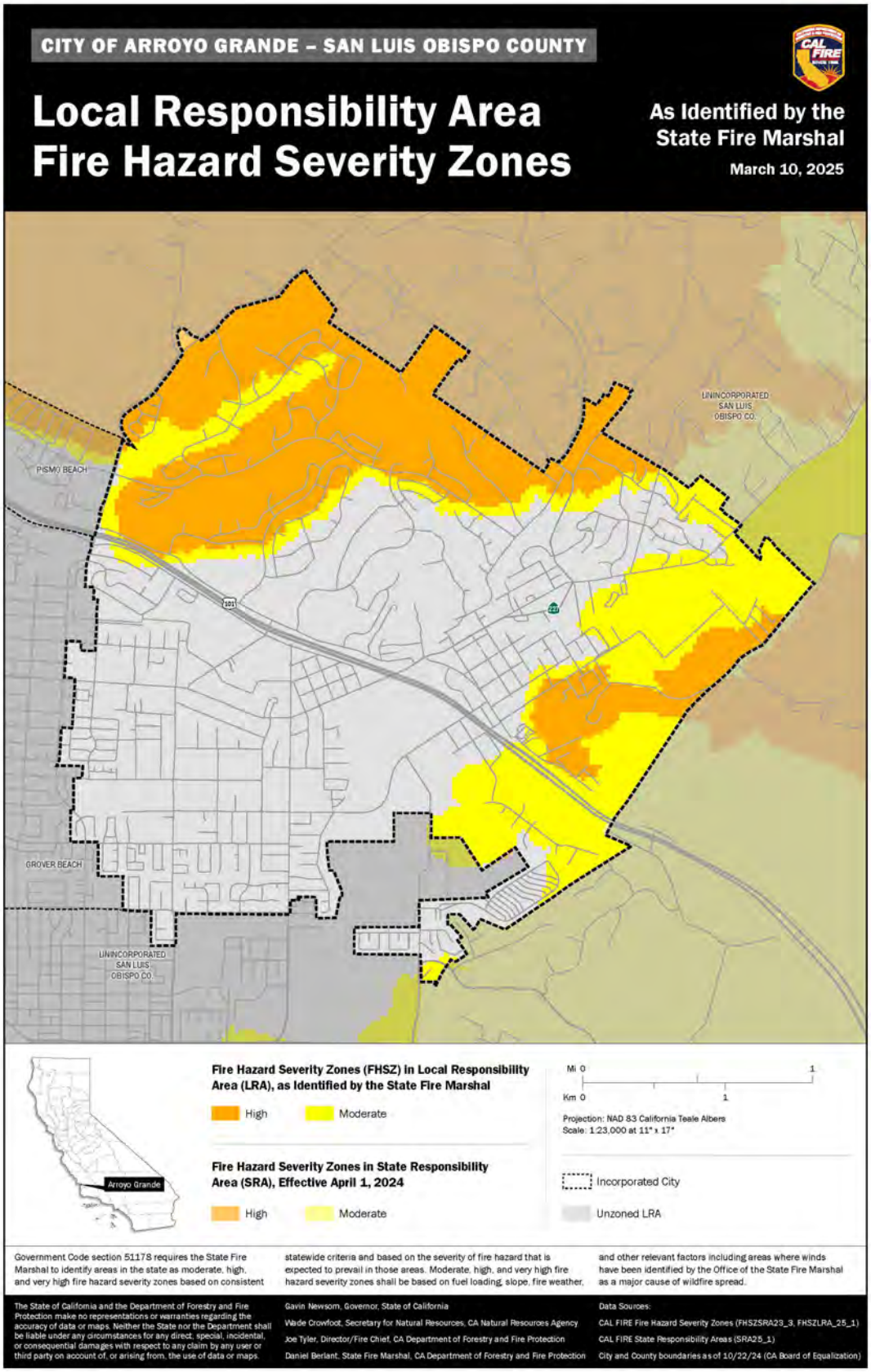

Figure B-1. Local Responsibility Area Fire Hazard Severity Zones - City of Arroyo Grande

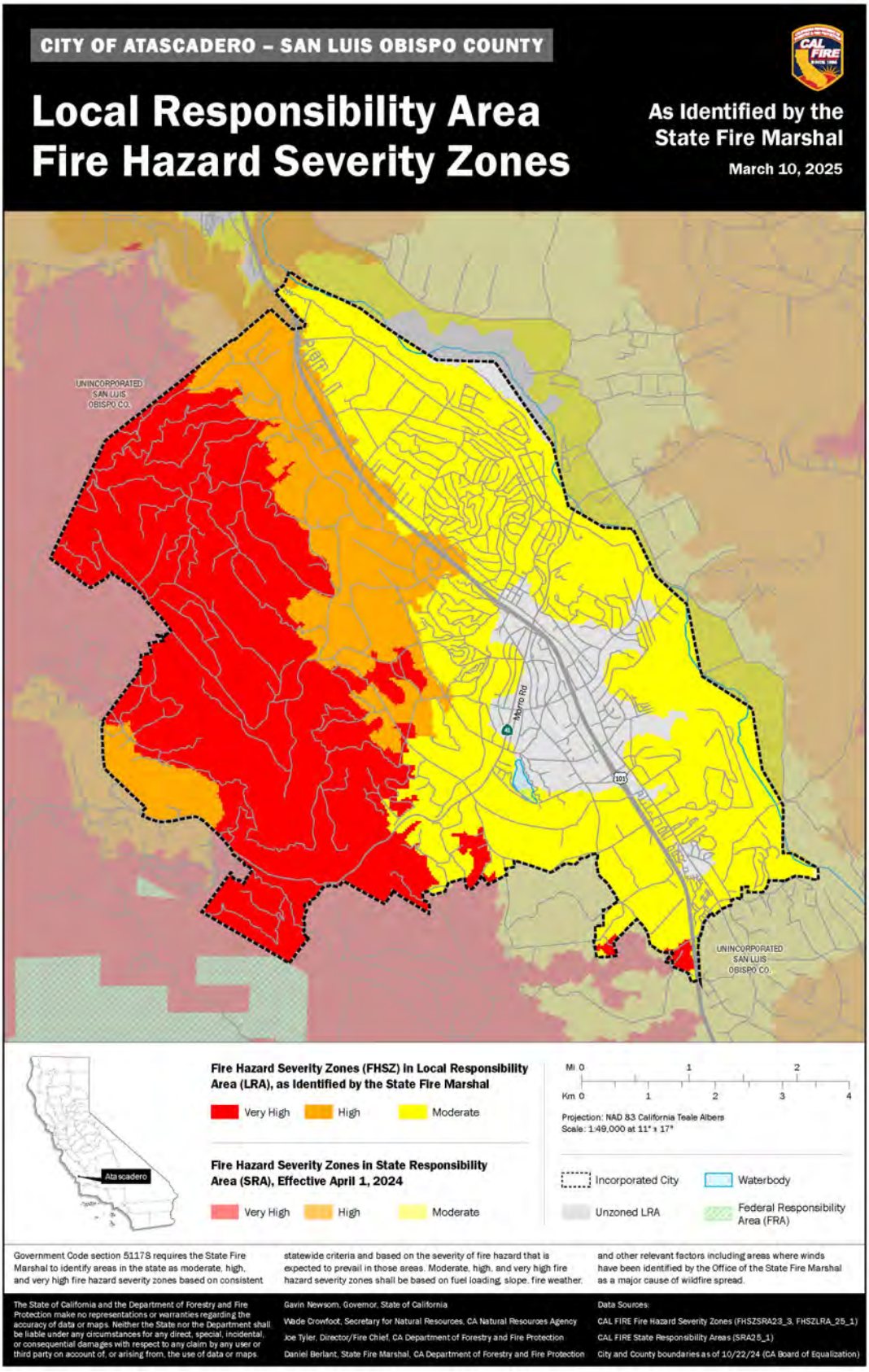

Figure B-2. Local Responsibility Area Fire Hazard Severity Zones – City of Atascadero

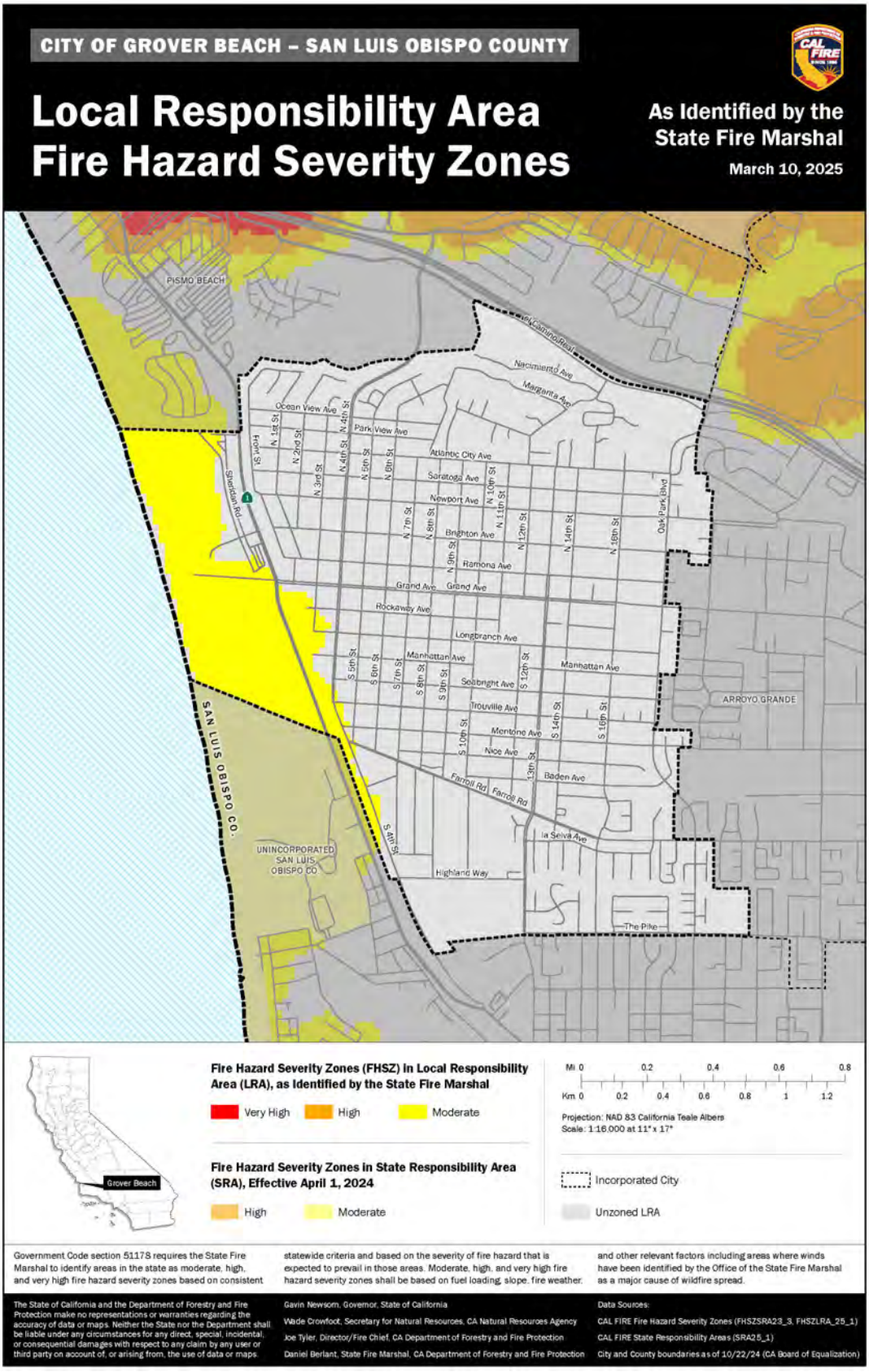

Figure B-3. Local Responsibility Area Fire Hazard Severity Zones – City of Grover Beach

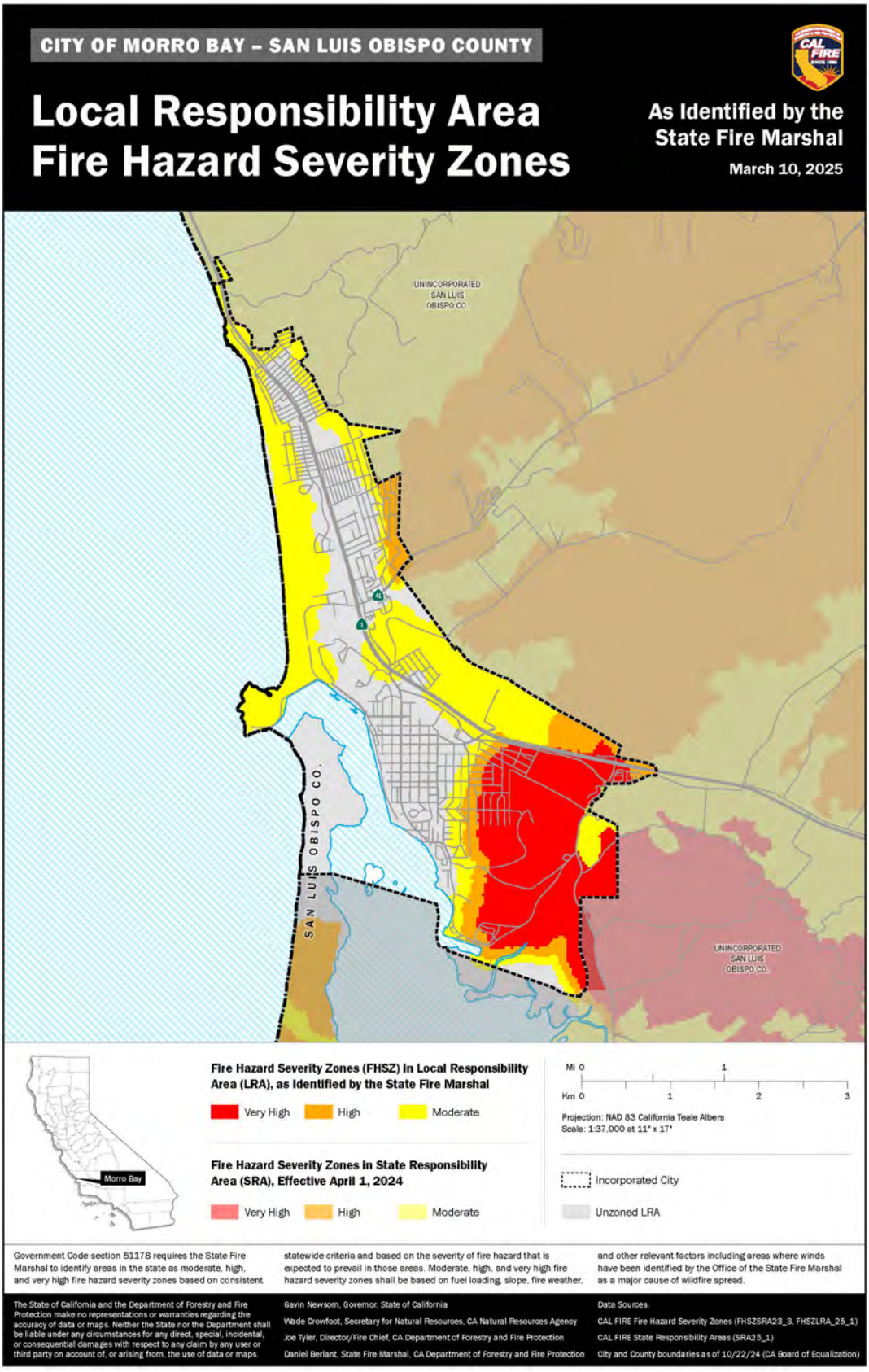

Figure B-4. Local Responsibility Area Fire Hazard Severity Zones - City of Morro Bay

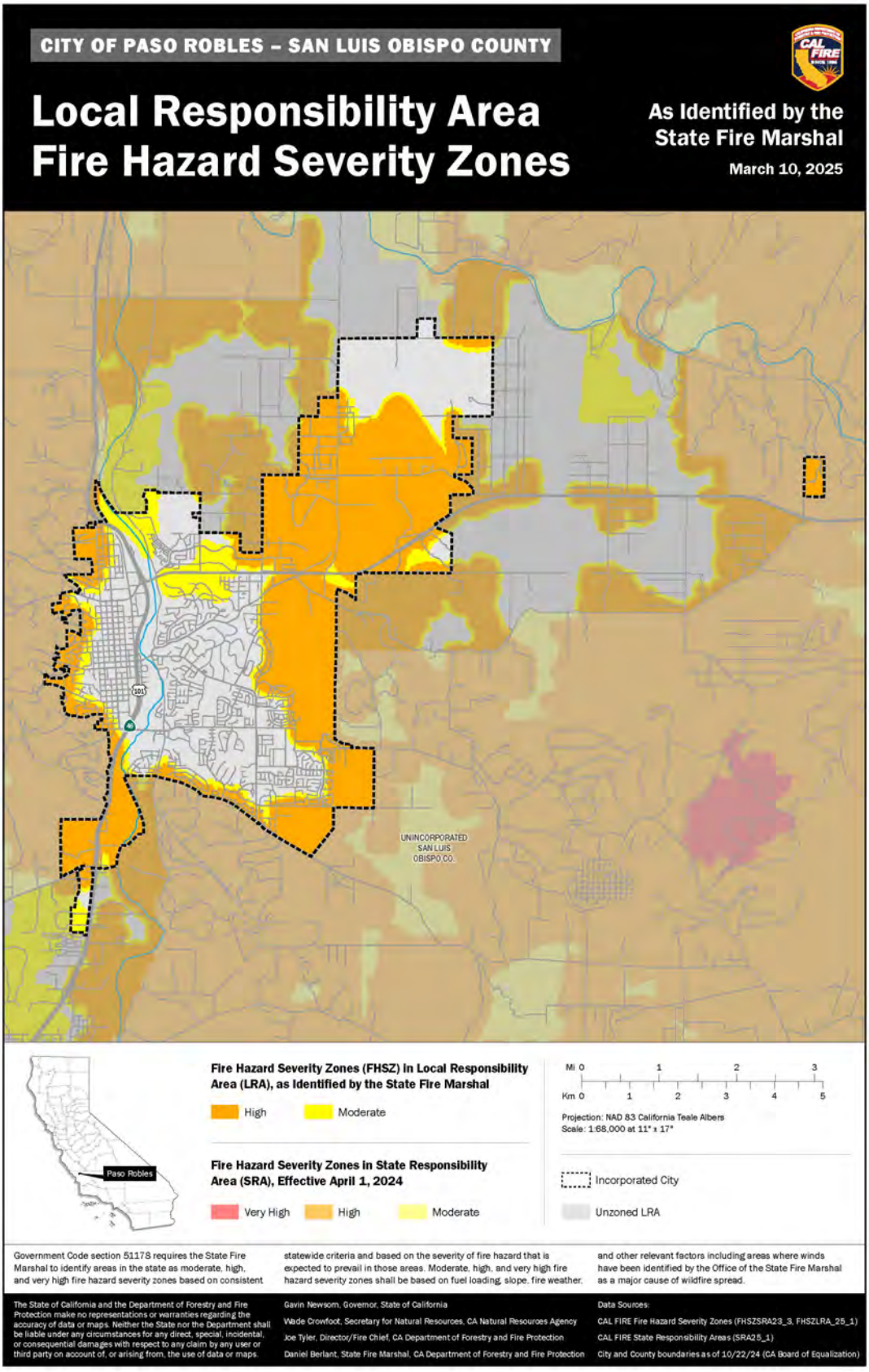

Figure B-5. Local Responsibility Area Fire Hazard Severity Zones - City of Paso Robles

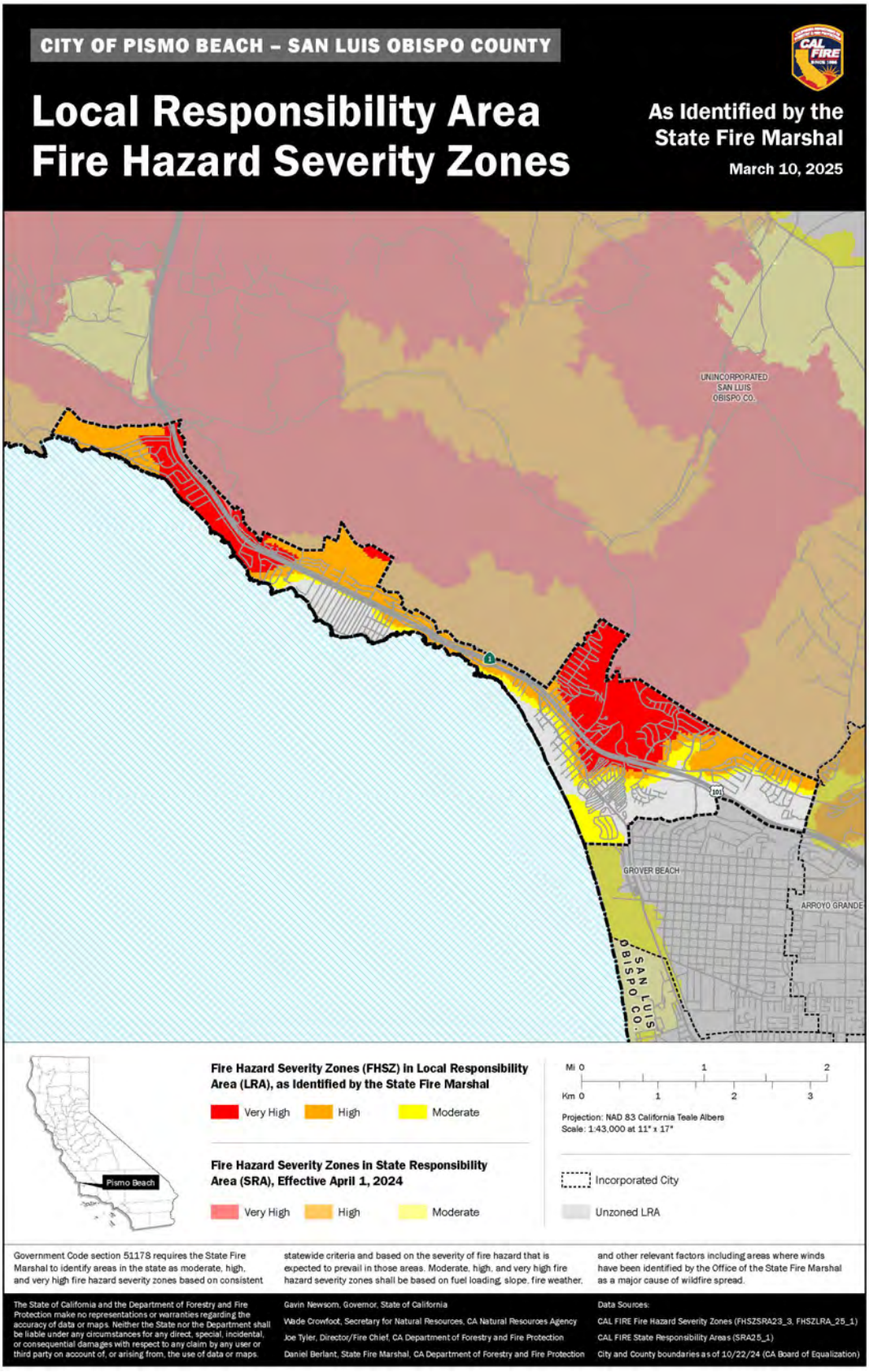

Figure B-6. Local Responsibility Area Fire Hazard Severity Zones - City of Pismo Beach