

Public Review
Draft

SAN LUIS OBISPO COUNTY

MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN 2025-2030

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1 Adoption Resolutions

The following is a record of adoption of this plan by San Luis Obispo County since its inception in 2005. Jurisdictional adoption resolutions can be referenced in Appendix D.

1.1 County of San Luis Obispo Board of Supervisors 2005 Adoption

Adoption by Local Governing Body: §201.6(c)(5)

November 1, 2005

To the Citizens, Visitors, Employees, and Officials of San Luis Obispo County:

As the costs of damage from natural disasters continue to increase, the County of San Luis Obispo realizes the importance of identifying effective ways to reduce vulnerability to disasters. Natural hazard mitigation plans assist communities in reducing risk from natural hazards by identifying resources, information, and strategies for risk reduction, while helping to guide and coordinate mitigation activities.

As a result the County of San Luis Obispo has developed this Local Hazard Mitigation Plan (LHMP) which provides guidance on how to reduce risk from natural hazards. This LHMP works in conjunction with other County plans, including the General Plan, and hazard mitigation plans developed for specific programs such as flood control and fire prevention.

This letter promulgates the San Luis Obispo County Local Hazard Mitigation Plan and constitutes the adoption of the Plan. This Local Hazard Mitigation Plan becomes effective on approval by the San Luis Obispo County Board of Supervisors on the date indicated below.

Original signed by Shirley Bianchi

Chairperson, Board of Supervisors
County of San Luis Obispo

November 1, 2005

1.2 County of San Luis Obispo Board of Supervisors 2011 Adoption

Adoption by Local Governing Body: §201.6(c)(5)

August 16, 2011

To the Citizens, Visitors, Employees, and Officials of San Luis Obispo County:

As the costs of damage from natural disasters continue to increase, the County of San Luis Obispo continues to realize the importance of identifying effective ways to reduce vulnerability to disasters. Natural hazard mitigation plans assist communities in reducing risk from natural hazards by identifying resources, information, and strategies for risk reduction, while helping to guide and coordinate mitigation activities.

As a result the County of San Luis Obispo has developed this updated and revised Local Hazard Mitigation Plan (LHMP) which provides guidance on how to reduce risk from natural hazards.

The LHMP works in conjunction with other County plans, including the General Plan, and hazard mitigation plans developed for specific programs such as flood control and fire prevention.

This letter promulgates the San Luis Obispo County Local Hazard Mitigation Plan and constitutes the adoption of the Plan. This Local Hazard Mitigation Plan becomes effective on approval by the San Luis Obispo County Board of Supervisors on the date indicated below.

Original signed by Adam Hill

Chairperson, Board of Supervisors
County of San Luis Obispo

August 16, 2011

1.3 San Luis Obispo County Flood Control and Water Conservation District 2013 Adoption

Adoption by Local Governing Body: §201.6 (c)(5)

December 10, 2013

To the Citizens, Visitors, Employees, and Officials of San Luis Obispo County:

As the costs of damage from natural disasters continue to increase, the County of San Luis Obispo continues to realize the importance of identifying effective ways to reduce vulnerability to disasters. Natural hazard mitigation plans assist communities in reducing risk from natural hazards by identifying resources, information, and strategies for risk reduction, while helping to guide and coordinate mitigation activities.

As a result, the County of San Luis Obispo has developed this updated and revised Local Hazard Mitigation Plan (LHMP) which provides guidance on how to reduce risk from natural hazards.

The LHMP works in conjunction with the other County plans, including the General Plan, and hazard mitigation plans developed for specific programs such as flood control and fire prevention.

This letter promulgates the San Luis Obispo County Local Hazard Mitigation Plan and constitutes the adoption of the Plan. This Local Hazard Mitigation Plan becomes effective on approval by the San Luis Obispo County Flood Control and Water Conservation District on the date indicated below.

Bruce Gibson
Acting Chairperson, Board of Supervisors
San Luis Obispo County Flood Control
And Water Conservation District

December 10, 2013

1.4 County of San Luis Obispo Board of Supervisors 2013 Adoption

Adoption by Local Governing Body: §201.6 (c)(5)

December 10, 2013

To the Citizens, Visitors, Employees, and Officials of San Luis Obispo County:

As the costs of damage from natural disasters continue to increase, the County of San Luis Obispo continues to realize the importance of identifying effective ways to reduce vulnerability to disasters. Natural hazard mitigation plans assist communities in reducing risk from natural hazards by identifying resources, information, and strategies for risk reduction, while helping to guide and coordinate mitigation activities.

As a result, the County of San Luis Obispo has developed this updated and revised Local Hazard Mitigation Plan (LHMP) which provides guidance on how to reduce risk from natural hazards.

The LHMP works in conjunction with the other County plans, including the General Plan, and hazard mitigation plans developed for specific programs such as flood control and fire prevention.

This letter promulgates the San Luis Obispo County Local Hazard Mitigation Plan and constitutes the adoption of the Plan. This Local Hazard Mitigation Plan becomes effective on approval by the San Luis Obispo County Board of Supervisors on the date indicated below.

Bruce Gibson
Acting Chairperson, Board of Supervisors

December 10, 2013

1.5 County of San Luis Obispo Board of Supervisors 2019-2020 Plan Adoption Resolution

IN THE BOARD OF SUPERVISORS

COUNTY OF SAN LUIS OBISPO, STATE OF CALIFORNIA

Tuesday, June 16, 2020

PRESENT: Supervisors John Peschong, Bruce S. Gibson, Debbie Arnold and Chairperson Lynn Compton

ABSENT: Supervisor Adam Hill

RESOLUTION NO. 2020-139

RESOLUTION OF THE BOARD OF SUPERVISORS ADOPTING THE SAN LUIS OBISPO COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE 2019

WHEREAS, The County of San Luis Obispo recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

WHEREAS, an adopted Multi-Jurisdictional Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple Federal Emergency Management Agency (FEMA) pre- and post-disaster mitigation grant programs; and

WHEREAS, the County of San Luis Obispo fully participated in the FEMA-prescribed mitigation planning process to prepare this Multi-Jurisdictional Hazard Mitigation Plan; and

WHEREAS, the California Office of Emergency Services and FEMA, Region IX officials have reviewed the San Luis Obispo County Multi-Jurisdictional Hazard Mitigation Plan and approved it contingent upon this official adoption of the participating governing body;

NOW, THEREFORE, BE IT RESOLVED by the Board of Supervisors of the County of San Luis Obispo that:

1. The County of San Luis Obispo adopts the San Luis Obispo County Multi-Jurisdictional Hazard Mitigation Plan as an official plan; and

2. The County of San Luis Obispo adopts the San Luis Obispo County Multi-Jurisdictional Hazard Mitigation Plan by reference into the safety element of their general plan in accordance with the requirements of Government Code sections 8685.9 and

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65302.6; and

3. The County of San Luis Obispo will submit this adoption resolution to the California Office of Emergency Services and FEMA Region IX officials to enable the plan's final approval in accordance with the requirements of the Disaster Mitigation Act of 2000 and to establish conformance with the requirements of Government Code sections 8685.9 and 65302.6.

Upon motion of Supervisor Gibson, seconded by Supervisor Peschong, and on the following roll call vote, to wit:

AYES: Supervisors Gibson, Peschong, Arnold and Chairperson Compton

NOES: None

ABSENT: Supervisor Hill

ABSTAINING: None

the foregoing resolution is hereby adopted.

Lynn Compton
Chairperson of the Board of Supervisors

ATTEST:

WADE HORTON
Ex-Officio Clerk of the Board of Supervisors

By: T'Ana Christiansen
Deputy Clerk

Date: June 16, 2020

APPROVED AS TO FORM AND LEGAL EFFECT:

RITA L. NEAL
County Counsel

By: /s/ Ann Duggan
Deputy County Counsel

Dated: May 15, 2020

STATE OF CALIFORNIA)
COUNTY OF SAN LUIS OBISPO) ss.

I, **WADE HORTON**, Ex-Officio Clerk of the Board of Supervisors thereof, do hereby certify the foregoing to be a full, true and correct copy of an order entered in the minutes of said Board of Supervisors, and now remaining of record in my office.

Witness, my hand and seal of said Board of Supervisors on June 19, 2020.

WADE HORTON,
Ex-Officio Clerk of the Board of Supervisors

By: T'Ana N. Christiansen
Deputy Clerk

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1.6 County of San Luis Obispo Board of Supervisors 2025-2030 Plan Adoption Resolution

Placeholder for adoption.

2 Executive Summary

2.1 Purpose of Plan

Each year, natural disasters in the United States take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars each year to help communities, organizations, businesses, and individuals recover from disasters. These losses only partially reflect the true cost of disasters because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Additionally, many natural disasters are predictable. Many more are repetitive, often with the same results. Many of the damages caused by these events can be alleviated or even eliminated.

Hazard mitigation planning plays an important role in building resilience through identifying vulnerabilities and potential solutions in mitigation actions. The County of San Luis Obispo, its municipalities and special districts developed this local hazard mitigation plan, which underwent a comprehensive update in 2025. The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. The goal of this plan is to develop practical, meaningful, attainable and cost-effective mitigation solutions to reduce vulnerability to the identified hazards and ultimately reduce both human and financial losses from hazard events.

2.2 Multi-Jurisdictional Hazard Mitigation Planning

All citizens and businesses of San Luis Obispo are the ultimate beneficiaries of this MJHMP. The plan reduces the risk for those who live in, work in, and visit the County. It also provides a viable planning framework for all foreseeable natural hazards that may impact the County. Participation in the development of the plan by key stakeholders in the County helps ensure that outcomes will be mutually beneficial. The resources and background information in the plan are applicable Countywide, and the plan's goals and recommendations can lay the groundwork for the development and implementation of local mitigation activities and partnerships. Additionally, FEMA encourages multi-jurisdictional planning under its guidance for the DMA.

The San Luis Obispo County MJHMP is a multi-jurisdictional plan that geographically covers people, property, and critical assets within the County's jurisdictional boundaries (hereinafter referred to as the planning area). The following jurisdictions participated in the development of this plan:

Lead Jurisdiction:

- County of San Luis Obispo

Municipalities:

- City of Arroyo Grande
- City of Atascadero
- City of Grover Beach
- City of Morro Bay
- City of Paso Robles
- City of Pismo Beach
- City of San Luis Obispo

Community Services Districts:

- Avila Beach CSD
- Cambria CSD
- Ground Squirrel Hollow CSD
- Heritage Ranch CSD
- Los Osos CSD
- Nipomo CSD
- Oceano CSD
- San Miguel CSD
- San Simeon CSD
- Templeton CSD

Special Districts:

- San Luis Obispo County Flood Control and Water Conservation District (FCWRD)
- Cayucos Sanitary District
- Port San Luis Harbor District
- South San Luis Obispo County Sanitation District

Development of this mitigation plan includes assessing mitigation capabilities, securing political support, and soliciting input and approval from each of the communities involved. Risk assessments were performed that identified and evaluated priority natural and human-caused hazards that could impact the County and its jurisdictions. Historical hazard events are described. The future probability of these identified hazards and their impact on communities within the County is described. Vulnerability assessments summarize the identified hazards' impact to critical structures, infrastructure, and future development. Estimates of potential dollar losses to vulnerable structures are presented where available. The risk and vulnerability assessments were used to determine mitigation goals and objectives to minimize long-term vulnerabilities to the identified hazards. These goals and objectives were the foundation behind the development of a comprehensive range of specific attainable mitigation actions.

This plan was originally developed in 2005, updated in 2011, 2013, and 2019, before this most recent comprehensive update in 2025. A significant change to the plan in 2019 was the inclusion of the municipalities and special districts, broadening it from a County-specific plan to a multi-jurisdictional hazard mitigation plan (MJHMP) prepared in coordination with the participating entities and input from the public. This approach was continued for the 2025 update, with two new Community Service Districts (CSDs) joining to adopt the plan.

2.3 Federal Regulatory Framework

The Federal Emergency Management Agency (FEMA) has made reducing losses from natural disasters one of its primary goals. Hazard mitigation planning and subsequent implementation of projects, measures, and policies developed through those plans, is the primary mechanism in achieving these goals. Mitigation planning has resulted in the implementation of projects that have successfully reduced disaster damages.

This revised plan was developed pursuant to the regulations of the Disaster Mitigation Act (DMA) of 2000. The DMA revises the Robert T. Stafford Disaster Relief and Emergency Assistance Act by adding Section 322, which provides new and revitalized emphasis on hazard

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mitigation, including new requirements for local mitigation plans. These local mitigation planning regulations are implemented through 44 CFR Part 201.6.

The DMA requires state and local governments to develop MJHMPs to maintain their eligibility for certain federal disaster assistance and hazard mitigation funding programs. Communities at risk from natural disasters cannot afford to jeopardize this funding.

2.4 State and Local Regulatory Framework

The previous 2019 update occurred concurrent with the beginning of an update of the County General Plan Safety Element update to ensure consistency with hazards and mutually reinforcing policies. In 2025 San Luis Obispo was continuing to update the General Plan Safety Element. The MJHMP and Safety Element cover common natural hazard issues and contain mutually-reinforcing policies and implementation programs. The MJHMP and Safety Element are considered complementary documents that both address natural hazards and both contain goals and project actions or implementation programs to enhance the County's mitigation efforts related to public health and safety. In addition to following the DMA requirements the previous and current updates addressed the following State of California legislation requirements that relate to the General Plan and MJHMP:

- **Assembly Bill 2684:** Requires a city or county, upon the next update of one or more of the elements included in the general plan on or after January 1, 2028, to review and update its safety element to address extreme heat. It authorizes a city or county that has adopted an extreme heat action plan or other document that fulfills commensurate goals and objectives to use that information in the safety element and, upon doing so, requires the city or county to incorporate the information into the safety element the other plan.
- **Senate Bill 552:** Requires state and local governments to share the responsibility in preparing and acting in the case of a water shortage event and improve the ability to manage future droughts and help prevent catastrophic impacts on drinking water for communities vulnerable to impacts of climate change. The bill establishes new requirements for small water suppliers, county governments, DWR, and the State Water Board to implement more proactive drought planning and be better prepared for future water shortage events or dry years.
- **SB 99:** Requires counties to identify residential developments in hazard areas that lack at least two emergency evacuation routes. The CAL FIRE Office of State Fire Marshal's Subdivision Review Program identifies these residential developments in San Luis Obispo County and further strategies to improve public safety within these developments will be addressed in the County's next General Plan Safety Element update.
- **AB 747 and AB 1409:** Mandate the identification and assessment of emergency evacuation routes and plans in the Safety Elements of General Plans or LHMPs updated after January 2022. AB 747 requires that evacuation routes be evaluated for their capacity, safety, and viability, ensuring they can accommodate residents during emergencies. AB 1409 expands on this by necessitating the inclusion of detailed evacuation locations under various emergency scenarios.
- **SB 379:** Requires inclusion of climate adaptation strategies in General Plan Safety Elements and encourages inclusion of climate change discussion in LHMP updates;
- **AB 691:** Requires local trustees of state lands, like Port San Luis and the City of Morro Bay to assess the impacts of sea level rise on the state lands and public trust assets they manage and propose adaptation strategies to build resiliency to coastal climate change impacts.
- **SB 1000:** Requires environmental justice and social equity considerations in the General Plan update; these considerations were also addressed in the inclusion of social

vulnerability and related discussion in Section 4 San Luis Obispo County Profile and mitigation action prioritization criteria detailed in Section 7.

- **AB 2140:** As outlined in California Government Code Section 65302.10, this legislation recommends adoption by reference or incorporation of the LHMP into the Safety Element of the General Plan, following LHMP approval. Adoption by reference or incorporation of the MJHMP into the Safety Element of the General Plan follows plan approval and makes the County and each participating jurisdiction eligible to be considered for part or all of its local-share costs on eligible public assistance funding to be provided by the State through the California Disaster Assistance Act (CDAA). The CDAA allows the State to pay up to 18.75% of the non-federal share that would otherwise fall upon a county, city, or local government to pay for public assistance projects. The legislature passed AB 2140 to provide additional funding after a disaster occurs. The local share is 25% of the total project cost; therefore, the legislation allows city, counties, and local governments that comply to be eligible for only the remaining local share (6.25%). AB 2140 is an optional State incentive to help counties and cities become more resilient to natural hazards. Compliance with AB 2140 also expires when the MJHMP expires, and the County and each participating municipality must re-adopt the plan into the Safety Element during update cycles to ensure continued compliance and funding eligibility.

This Local Hazard Mitigation Plan was prepared jointly by the County of San Luis Obispo; the Cities of Arroyo Grande, Atascadero, Grover Beach, Morro Bay, Paso Robles, Pismo Beach, and San Luis Obispo; the Community Services Districts of Avila Beach, Cambria, Ground Squirrel Hollow, Heritage Ranch, Los Osos, Nipomo, Oceano, San Miguel, San Simeon, and Templeton; and special districts including the San Luis Obispo County Flood Control and Water Conservation District, the Cayucos Sanitary District, the Port San Luis Harbor District, and the South San Luis Obispo County Sanitation District. The risk assessment and mitigation strategies within this plan were developed jointly to benefit all of the above jurisdictions and make them more resilient to future disasters.

2.5 Plan Organization

The sections that comprise the County's MJHMP include:

- **Section 1: Promulgation and Adoption** – This section includes the promulgation and adoption documentation for the MJHMP and addresses the formal adoption of the plan by each governing body to demonstrate the commitment of the community and elected officials to the County's goal of becoming disaster-resistant.
- **Section 2: Introduction and Executive Summary** – This section describes the purpose of the MJHMP update, the benefits of hazard mitigation planning, the federal and State regulatory requirements, and the background of the County's hazard mitigation planning process.
- **Section 3: Planning Process** – This section identifies the planning process; the HMPC members; the meetings held as part of the planning process; documents the outreach efforts with both stakeholder and the public; and the review and incorporation of existing plans, reports, and other appropriate information. It also summarizes how stakeholders were invited to participate in the process, and how they provided feedback during the development of the plan.
- **Section 4: County Profile** – This section provides the history and background of the County, including population trends and the demographic and economic conditions that have shaped the area.
- **Section 4: Hazard Identification and Risk Assessment (HIRA)** – This section describes the process through which the HMPC and our local partners identified, screened, and selected

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the hazards to be profiled. The hazard analysis includes the description, location, extent, and probability of future events for each hazard. This section also includes a Vulnerability Assessment. The Vulnerability Assessment covers all hazards and considers the impact on the following assets: people; property; critical facilities and lifelines; economy; cultural, historic, and natural resources; and future development trends.

- **Section 6: Capability Assessment –** This section includes the County's capability assessment, which assesses the programs, plans, and administrative and technical capabilities related to hazard mitigation that are already in place at the County.
- **Section 7: Mitigation Strategy** – The mitigation strategy section provides a plan for reducing the potential losses identified in the vulnerability analysis. Mitigation goals and potential actions to minimize the risks and losses associated with each hazard will be described along with a strategy for implementation.
- **Section 8: Implementation and Monitoring** – This section describes the method and schedule for monitoring, evaluating, updating, and implementing the plan to ensure it remains an active and applicable document.
- **Section 9: References** – This section lists the sources cited in the plan.

Appendices

- Appendix A Hazard Mitigation Planning Committee
- Appendix B Mitigation Categories and Alternatives
- Appendix C Planning Process Documentation
- Appendix D Jurisdictional Adoption Resolutions
- Appendix E Critical Facilities
- Appendix F Climate Change Adaptation Planning Guide Consistency Summary
- Appendix G References
- Appendix H Drought Vulnerability Assessment

Annexes

- Annex A: City of Arroyo Grande
- Annex B: City of Atascadero
- Annex C: City of Grover Beach
- Annex D: City of Morro Bay
- Annex E: City of Paso Robles
- Annex F: City of Pismo Beach
- Annex G: City of San Luis Obispo
- Annex H: Avila Beach CSD
- Annex I: Cambria CSD
- Annex J: Ground Squirrel Hollow CSD
- Annex K: Heritage Ranch CSD
- Annex L: Los Osos CSD
- Annex M: Nipomo CSD
- Annex N: Oceano CSD

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- Annex O: San Miguel CSD
- Annex P: San Simeon CSD
- Annex Q: Templeton CSD
- Annex R: San Luis Obispo County Flood Control and Water Conservation District (FCWCD)
- Annex S: Cayucos Sanitary District
- Annex T: Port San Luis Harbor District
- Annex U: South San Luis Obispo County Sanitation District

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3 Planning Process

DMA REQUIREMENTS §201.6(B) AND §201.6(C)(1):
An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: *An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;* *An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and non-profit interests to be involved in the planning process; and* *Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.* *[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

3.1 Background on Mitigation Planning in San Luis Obispo County

The primary purpose of the San Luis Obispo County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update is to reduce or eliminate long-term risk to people and property from natural hazards and their effects on the San Luis Obispo County planning area. San Luis Obispo County recognized the need and importance of a Local Hazard Mitigation Plan (LHMP) and initiated its development in 2005 after receiving a grant from the Federal Emergency Management Agency (FEMA), which also served as the primary funding source for this plan. The original LHMP was developed in 2005, updated in 2011, and in 2014. The plan was last updated in 2019.

The planning process followed during the 2025 update was similar to what was used in the original plan development. This planning process utilized the input from a multi-jurisdictional Hazard Mitigation Planning Committee (HMPC). A significant change from the 2019 Plan is the addition of two community service districts including the Cambria CSD and Oceano CSD. WSP Environment and Infrastructure (WSP) contracted with the County to provide professional planning services during the development of the original plan and current update. The process is described further in this section and documented in Appendix C.

3.2 What's New in the Plan Update

DMA REQUIREMENT §201.6(D)(3):
A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

The updated MJHMP complies with Federal Emergency Management Agency (FEMA) guidance and California Office of Emergency Services guidelines for LHMPs. The update followed the requirements noted in the Disaster Mitigation Act (DMA) of 2000 and the requirements outlined in the FEMA's Local Mitigation Planning Handbook, released in May 2023, that has become the official guide for local governments, including special districts, to develop, update and implement local mitigation plans.

This MJHMP update involved a comprehensive review and update of each section of the 2019 plan, the integration of a detailed risk assessment (including a parcel-level analysis and critical facility analysis), targeted outreach to stakeholder organizations that represent socially vulnerable populations, and an assessment of the progress in evaluating, monitoring and implementing the mitigation strategy outlined in the previous plan. Both the previous 2019 plan and the 2025 update profiled and assessed 15 natural and human-caused hazards. The planning process provided an opportunity to review jurisdictional priorities related to hazard significance and mitigation action, and revisions were made where applicable to the Base Plan and the municipal and special district annexes. Only the information and data still valid from the 2019 plan was carried forward as applicable into this MJHMP update. Two annexes for the Cambria CSD and Oceano CSD were added and changes were made to reflect new or updated data, the plan was revised to comply with the latest FEMA policy requirements.

Representatives from multiple departments for each of the participating jurisdictions were engaged and involved in the development of the 2024 MJHMP through four planning workshops/meetings, and in certain instances one-on-one meetings.

3.2.1 Changes in Jurisdictional Participation

The MJHMP update included the same jurisdictions that participated in 2019 with two exceptions. For the 2025 MJHMP update, the Oceano CSD and Cambria CSD were added as new participating jurisdictions to the multi-jurisdictional planning process.

3.2.2 Plan Section Review and Analysis - 2019 Update

During the 2025 plan update, the HMPC updated each of the sections of the previously approved plan to include new information. WSP developed a summary of each section in the plan and guided the HMPC through the elements that needed updating during the kickoff meeting in October 2024. This included analyzing each section using FEMA's local plan update guidance (2023) and the Local Mitigation Planning Policy Guide (2022, effective April 19 2023) to ensure that the plan met the latest requirements. In addition, the FEMA Local Mitigation Plan Review Tool that was provided with the approval of the 2019 version of this plan was referenced, in particular the 2019 FEMA comments on opportunities for improvement were considered and addressed in the 2025 update. The HMPC and WSP determined that nearly every section of the plan would need revision to align the plan with the latest 2023 FEMA planning guidance and requirements and recent California legislation. A summary of the changes in this plan update is highlighted in Table 3-1 below.

Table 3-1 San Luis Obispo County Hazard Mitigation Plan Update Highlights

PLAN SECTION	SUMMARY OF PLAN REVIEW, ANALYSIS, AND UPDATES
1. Promulgation and Adoption	• Includes history of previous adoptions • Plan will be re-adopted as part of the update process •
2. Introduction and Executive Summary	• Revised to reflect updated plan and 2025 planning process
3. Planning Process	• Describes and documents the planning process for the 2025 update, including coordination among agencies • Describes how 2019 plan was integrated with/into other planning efforts. • Removed 2019 planning process info. • Describes changes to jurisdictional participation • Summarizes the stakeholder invited to participate in the planning process, including those that attended and provided feedback on the 2025 planning process • Describes 2025 public participation process • Describes the Hazard Mitigation Planning Committee • Describes the 10 step process followed for the update
4. County Profile	• Updated with recent census data and current economy description Updated land use and development trends
5. Hazard Assessment	• Coastal Storm hazards discusses coastal erosion and sea level rise • Adverse Weather is separated into three profiles: Thunderstorm/ Heavy Rain/ Freeze/ Hail/ Dense Fog, High Wind/ Tornado, and Extreme Heat • Debris Flow has been added to Landslides • Tsunami and Seiche has been added • Subsidence is called Land Subsidence

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PLAN SECTION	SUMMARY OF PLAN REVIEW, ANALYSIS, AND UPDATES
	• Wildfire has been thoroughly updated to incorporate the new State Responsibility Area (SRA) and Local Responsibility Area (LRA) Fire Hazard Severity Zone (FHSZ) maps and a revised analysis • Climate change information is included as part of each hazard profile • Updated list of disaster declarations to include recent data. • Updated tables include recent National Center for Environmental Information data. • Updated past occurrences for each hazard to include recent data.
5. Risk Assessment	• 2019 Plan on Vulnerability Assessment is now included with the Risk Assessment section as subsections by hazard. • Updated critical facilities identified from the 2019 plan. • Updated growth and development trends to include recent Census and local data sources. • Updated historic and cultural resources using local/state/national sources. • Updated property values for vulnerability and exposure analysis, using updated building information based on assessor's data. • Updated estimate flood losses using the latest Digital Flood Insurance Rate Map (DFIRM) and assessor's data. • Updated National Flood Insurance Program (NFIP) data and Repetitive Loss structure data from the previous plan. • Incorporated new hazard loss estimates since 2019, as applicable. • Used updated GIS inventory data to assess Fire Hazard Severity Zones the County, which is used for evaluating wildfire threat. • Updated HAZUS-MH Level I earthquake vulnerability analysis data • Updated information regarding specific vulnerabilities to hazards, including maps and tables of specific assets at risk, specific critical facilities at risk, and specific populations at risk. • Updated maps in plan where appropriate.
6. Capability Assessment	• Reviewed mitigation capabilities and update to reflect current capabilities. • Added capability summary tables for regulatory, administrative/technical, and fiscal mitigation capabilities. • Added capabilities for new hazards profiled in Section 5. • Added information on how capabilities could be expanded or enhanced.
7. Mitigation Strategy	• Indicated what actions have been implemented may reduce previously identified vulnerabilities. • Updated mitigation strategy based on the results of the updated risk assessment, completed mitigation actions, and implementation obstacles and opportunities since the completion of the 2019 plan. • Reviewed and updated goals and objectives based on HMPC input. • Included updated information on how actions are prioritized, or how priorities have changed. • Reviewed mitigation actions from the 2019 plan and developed a status report for each; identified if actions have been completed, deleted, or deferred/carried forward. Updated priorities on actions. • Identify examples of successful implementation to highlight positive movement on actions identified in 2019 plan. • Identified new mitigation actions proposed by the HMPC with more detail on implementation than the previous plan. • Developed a summary table of mitigation actions for all participating jurisdictions.
8. Implementation and Monitoring	• Reviewed and updated procedures for monitoring, evaluating, and updating the plan.

PLAN SECTION	SUMMARY OF PLAN REVIEW, ANALYSIS, AND UPDATES
	• Revised to reflect current methods. • Updated the system for monitoring progress of mitigation activities by identifying additional criteria for plan monitoring and maintenance. • Added drought resilience aspects related to HB 552
Jurisdictional Annexes	• Developed annexes for new participating jurisdictions in 2019. • Moved previous information in 2019 plan on San Luis Obispo County Flood Control and Water Conservation District into jurisdictional annex A City of Arroyo Grande B City of Atascadero C City of Grover Beach D City of Morro Bay E City of Paso Robles F City of Pismo Beach G City of San Luis Obispo H Avila Beach CSD I Cambria CSD J Ground Squirrel Hollow CSD K Heritage Ranch CSD L Los Osos CSD M Nipomo CSD N Oceano CSD O San Miguel CSD P San Simeon CSD Q Templeton CSD R SD - Cayucos Sanitary District S SD - Port San Luis Harbor District T SD - San Luis Obispo FCWCD U SD - South San Luis Obispo County Sanitation District
Appendices	Appendix A: Hazard Mitigation Planning Committee Appendix B: Mitigation Categories and Alternatives Appendix C: Planning Process Documentation Appendix C.1: Outreach Strategy Appendix D: Jurisdictional Adoption Resolutions Appendix E: Critical Facilities Appendix F: Climate Change Adaptation Planning Guide Consistency Summary Appendix G: References Appendix H: Drought Risk Assessment

3.3 Local Government Participation

In the 2025 plan update, the following jurisdictions participated in the planning process and will be adopting the updated plan following FEMA approval. All incorporated cities in the County participated in this planning process as well as four (4) special districts, and ten (10) community service districts (CSD). The County and the municipalities have the authority to regulate development within their jurisdictions; the County has authority for regulating development within the unincorporated areas including the CSDs.

Lead Jurisdiction:

- County of San Luis Obispo

Municipalities:

- City of Arroyo Grande
- City of Atascadero

- City of Grover Beach
- City of Morro Bay
- City of Paso Robles
- City of Pismo Beach
- City of San Luis Obispo

Community Service Districts:

- Avila Beach CSD
- Cambria CSD
- Ground Squirrel Hollow CSD
- Heritage Ranch CSD
- Los Osos CSD
- Nipomo CSD
- Oceano CSD
- San Miguel CSD
- San Simeon CSD
- Templeton CSD

Special Districts:

- San Luis Obispo County Flood Control and Water Conservation District
- Cayucos Sanitary District
- Port San Luis Harbor District
- South San Luis Obispo County Sanitation District

The DMA planning regulations and guidance stress that each local government seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

- Participate in the process as part of the HMPC
- Detail areas within the planning area where the risk differs from that facing the entire area
- Identify potential mitigation actions
- Formally adopt the plan

For the San Luis Obispo County planning area's HMPC, "participation" meant the following:

- Providing facilities for meetings
- Attending and participating in the HMPC meetings
- Completing and returning Wood Plan Update Guide worksheets
- Collecting and providing other requested data (as available)
- Identifying mitigation actions for the plan
- Reviewing and providing comments on plan drafts and jurisdictional annexes
- Informing the public, local officials, and other interested parties about the planning process and providing opportunity for them to comment on the plan
- Coordinating, and participating in the public input process
- Coordinating the formal adoption of the plan by the governing boards

The County and all jurisdictions with annexes to this plan and seeking FEMA approval met all of these participation requirements.

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In most cases one or more representatives for each jurisdiction attended the multi-jurisdictional meetings described in Table 3-2. The HMPC was organized to bring together a local planning team to help collect data, identify mitigation actions and implementation strategies, and review and provide data on annex drafts. In some cases, the jurisdictions had limited capacity to attend or had conflicts with HMPC meetings; in these cases, alternative forms of communication were used to provide input into the process. In these cases, alternative forms of communication were used to allow the HMPC to provide input during the process and in some instances a representative from another department attended the HMPC meeting on behalf of the main representative. Alternative forms of communication included email correspondence, Consultant office hours, and completion of the Plan Update Guides and other worksheet handouts and materials. Appendix C provides additional information and documentation of the planning process.

3.4 Planning Process

WSP established the planning process for the San Luis Obispo County MJHMP using the DMA planning requirements and FEMA's associated guidance. The original FEMA planning guidance is structured around a four-phase process:

1. Organize Resources
2. Assess Risks
3. Develop the Mitigation Plan
4. Implement the Plan and Monitor Progress

FEMA's May 2023 Local Mitigation Planning Handbook recommends a nine-step process within the original four phase process. Into this four-phase process, WSP integrated a more detailed 10-step planning process used for FEMA's Community Rating System (CRS) and Flood Mitigation Assistance programs. Thus, the modified 10-step process used for this plan meets the funding eligibility requirements of the Hazard Mitigation Assistance grants (including Hazard Mitigation Grant Program [HMGP], Pre-Disaster Mitigation program, Building Resilient Infrastructure and Communities, Flood Mitigation Assistance), Community Rating System, and the flood control projects authorized by the U.S. Army Corps of Engineers (USACE).

In May 2023, FEMA released the Local Mitigation Planning Handbook that has become the official guide for local governments, including special districts, to develop, update and implement local mitigation plans. While the requirements under Section 201.6 have not changed, the Handbook guides local governments on developing or updating hazard mitigation plans to meet the requirements under the CFR Title 44 – Emergency Management and Assistance Section 201.6, Local Mitigation Plans for FEMA approval and eligibility to apply for FEMA HMA grant programs. It offers practical approaches, tools, worksheets, and local mitigation planning examples for how communities can engage in effective planning to reduce long-term risk from natural hazards and disasters. The Handbook complements and liberally references the Local Mitigation Plan Review Guide (October 1, 2011), which is the official guidance for federal and state officials responsible for reviewing local mitigation plans in a fair and consistent manner.

Table 3-2 shows the four-phase DMA process, the detailed CRS planning steps and work plan used to develop the plan and the nine handbook planning tasks from FEMA's 2023 Local Mitigation Planning Handbook. Sections that follow describe each planning step in more detail.

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Table 3-2 San Luis Obispo County Hazard Mitigation Planning Process

FEMA'S 4-PHASE DMA PROCESS	MODIFIED 10-STEP CRS PROCESS	FEMA LOCAL MITIGATION PLANNING HANDBOOK TASKS
1) Organize Resources		
201.6(c)(1)	1) Organize the Planning Effort	1: Determine the planning area and resources
201.6(b)(1)	2) Involve the Public	2: Build the planning team - 44 CFR 201.6 (C)(1)
201.6(b)(2) and (3)	3) Coordinate with Other Departments and Agencies	3: Create an outreach strategy - 44 CFR 201.6(b)(1)
		4: Review community capabilities - 44 CFR 201.6 (b)(2)&(3)
2) Assess Risks		
201.6(c)(2)(i)	4) Identify the Hazards	5: Conduct a risk assessment - 44 CFR 201.6 (C)(2)(i) 44 CFR 201.6(C)(2)(ii)&(iii)
201.6(c)(2)(ii)	5) Assess the Risks	
3) Develop the Mitigation Plan		
201.6(c)(3)(i)	6) Set Goals	6: Develop a mitigation strategy - 44 CFR 201.6(c)(3)(i); 44 CFR 201(c)(3)(ii) and 44 CFR 201.6(c)(3)(iii)
201.6(c)(3)(ii)	7) Review Possible Activities	
201.6(c)(3)(iii)	8) Draft an Action Plan	
4) Implement the Plan and Monitor Progress		
201.6(c)(5)	9) Adopt the Plan	7: Review and adopt the plan
201.6(c)(4)	10) Implement, Evaluate, and Revise the Plan	8: Keep the plan current
		9: Create a safe and resilient community - 44 CFR 201.6(c)(4)

3.4.1 Phase 1: Organize Resources

3.4.1.1 Planning Step 1: Organize the Planning Effort

In 2024, the San Luis Obispo Office of Emergency Services (OES) was awarded a Hazard Mitigation Grant Program (HMGP) planning grant to develop an updated MJHMP. Following the awarded of funding, the County initiated a formal procurement process to solicit qualified consultants with expertise in hazard mitigation planning. This effort culminated in the selection of a consulting team, WSP, who was tasked with leading the plan update process. The planning process was formally initiated in the fall of 2024, marking the beginning of coordinated efforts between the County, participating jurisdictions, stakeholders, and the public to assess risk, identify mitigation strategies, and strengthen community resilience across the region.

WSP worked with OES to establish the framework and organization for development of the plan. WSP assisted County staff with coordination with other governmental agencies and public process elements to develop the updated MJHMP for San Luis Obispo County. Organizational efforts were initiated with a series emails to inform and educate jurisdictions within the County of the purpose and need for an update to the countywide MJHMP. Representatives from participating jurisdictions, HMPC members from the 2019 plan, and new stakeholders were used as a starting point for the invite list, with additional invitations extended as appropriate throughout the planning process. The HMPC was re-established as a result of this effort. The list was also reviewed to ensure it included neighboring communities;

local and regional agencies involved with hazard mitigation activities; agencies that have the authority to develop (i.e., cities); businesses, academia, and other non-profit organizations; and community-based organizations (CBOs) that represent at-risk and socially vulnerable populations (i.e., El Camino Homeless Organization [ECHO]). The details on representatives of the membership of the HMPC, organized by agency and organization is detailed in Appendix A. See Section 3.4.1.3 for more specifics on stakeholder group involvement.

Table 3-3 List of HMPC Participants for 2025 MJHMP Update

FIRST/LAST NAME	ORGANIZATION	TITLE
County of San Luis Obispo		
Andi Franco	SLO County Social Services	Division Manager
Ann Fletcher	SLO County Public Works-Stormwater	Stormwater Program Coordinator
Blaine Reely	SLO County	Groundwater Sustainability Director
Brian Wilder	SLO County Parks	Superintendent
Cindy Triechler	SLO County Public Works	Deputy Director
Garrett McElvenvy	SLO County Public Works	Supervising Engineer
Cory Hanh	SLO County Building and Planning	Long-range Planning Division Manager
John Diodati	SLO County Public Works	Director
John Owens	SLO County Fire Department	Fire Chief
Justin Nelson	SLO County Police Department	Sheriff
Lacey Minnick	SLO County Public Works	Facilities Planning/MGMT
Mark Herbst	SLO County GIS	Assessment Analysist
Scott Jalbert	SLO County OES	Director
Scott Milner	SLO County OES	Emergency Services Coordinator
Schani Siong	SLO County Building and Planning	Long- range planning supervising Planner
Trevor Keith	SLO County Building and Planning	Planning Director
Sara Dalton	SLO Public Utilities - Safety	Safety Coordinator
David Grim	SLO County	Development Services Division Manager
John Waddell	SLO County	Deputy Director - Transportation & Development Group
Mladen Bandov	SLO County	Wastewater Utilities Division Manager
Nola Engelskirger	SLO County	Water Utilities Division Manager
City of Arroyo Grande		
Bill Robeson	City of Arroyo Grande	Assistant City Manager
Brian Pedrotti	City of Arroyo Grande	Director of Community Development
Dave Culver	City of Arroyo Grande	Police Commander
Dan Kies	City of Arroyo Grande	Public Works Manager
John Bendetti	City of Arroyo Grande	Senior Engineer
Natalie Riddering	City of Arroyo Grande	Planning/Engineering Permit Technician
Shayna Gropen	City of Arroyo Grande	Assistant Planner
City of Atascadero		
Dave Van Son	City of Atascadero	Battalion Chief
Bruce St John	City of Atascadero Community Development	Chief Building Official
Casey Bryson	City of Atascadero Fire & Emergency Services	Fire Chief
Jeff Wilshusen	City of Atascadero Police Department	Police Commander
Kelly Gleason	City of Atascadero Community Development	Planning Manager
Matt Pigeon	City of Atascadero	Deputy Public Works Director

FIRST/LAST NAME	ORGANIZATION	TITLE
Luke Knight	City of Atascadero Technology Department	Deputy City Manager
Robert Molle	City of Atascadero Police Department	Police Commander
Ryan Betz	City of Atascadero	Public Works Analyst/ADA Coordinator
Nick DeBar	City of Atascadero	Public Works Director
City of Grover Beach		
Erin Wiggin	City of Grover Breach – Public Works	CIP Project Manager
Greg Ray	City of Grover Beach	Public Works Director
Jim Munro	City of Grover Beach	Police Chief
Matt Bronson	City of Grover Beach	City Manager
Megan Martin	City of Grover Beach – Community Development	Community Development Director
City of Morro Bay		
Airlin Singewald	City of Morro Bay Community Development	Director
Amy Watkins	City of Morro Bay Police Department	Police Chief
Chad Ouimet	City of Morro Bay Community Development	Chief Building Inspector
Cindy Cecil	City of Morro Bay	City Engineer
Daniel McCrain	City of Morro Bay	Fire Chief
Ed Griggs	City of Morro Bay	Police Chief
Greg Kwolek	City of Morro Bay	Public Works Director
Matt Vierra	City of Morro Bay Fire Department	Deputy Chief
City of Paso Robles		
Caleb Davis	City of Paso Robles Police	Commander
Darin Nash	City of Paso Robles Planning	City Planner
David LaCaro	City of Paso Robles Public Works	Operations Manager
Freda Berman	City of Paso Robles Public Works	Director
Jonathan Stornetta	City of Paso Robles Fire	Fire Chief
Lynda Plescia	City of Paso Robles Community Services	Rec Services Manager
Catherine Piatti	City of Paso Robles Finance	Finance Manager
Paul Patti	City of Paso Robles Fire	Battalion Chief
Paul Robles	City of Paso Robles	Deputy Chief
City of Pismo Beach		
Dan Herlihy	City of Pismo Beach Police Department	Police Commander
Eric Eldridge	City of Pismo Beach Public Works - Engineering	City Engineer
Jake Smith	City of Pismo Beach Public Works - Operations	Acting Utilities Manager
Jorge Garcia	City of Pismo Beach	City Manager
Mark Wilson	City of Pismo Beach Public Works - Operations	Facilities Manager
Mike Stoker	City of Pismo Beach Community Development - Building	Building Official
Matthew Downing	City of Pismo Beach	City Manager
Mike James	City of Pismo Beach	Assistant City Manager

FIRST/LAST NAME	ORGANIZATION	TITLE
Paul Lee	City of Pismo Beach Fire Department	CAL FIRE Battalion Chief
Scot Graham	City of Pismo Beach Community Development - Planning	Director of Community Development
City of San Luis Obispo		
Ethan Estrada	City of SLO- Community Development	Assistant Planner
Greg Cruce	City of SLO Public Works	Deputy Director
Nemo Stephenson	City of SLO Public Works	Maintenance Superintendent
Whitney McDonald	City of San Luis Obispo	City Manager
Todd Tuggle	City of San Luis Obispo - Fire Department	Fire Chief
Lucia Pohlman	City Administrator	Sustainability and Natural Resources Analyst
Timmi Tway	Community Development	Community Development Director
Joe Little	Fire Department	Emergency Communications Coordinator
Avila Beach CSD		
Brad Hagemann	Avila Beach CSD	General Manager
Cambria CSD		
David Aguirre	Cambria CSD	Facilities and Resources
Jim Green	Cambria CSD	Utilities Department Manager
Kayla Graves	Cambria CSD	Fire Engineer
Michael Burkey	Cambria CSD Fire Department	Fire Chief
Linda Hendy	Cambria CSD Community Health Department	Administrator/Finance Authority
Matthew McElhenie	Cambria CSD	General Manager
Tristan Reaper	Cambria CSD	Program Manager
Ground Squirrel Hollow CSD		
Dan Gilmore	Ground Squirrel Hollow CSD	General Manager
Heritage Ranch CSD		
Doug Groshart	Heritage Ranch CSD - Administration	District Engineer
Scott Duffield	Heritage Ranch CSD	General Manager
Brian Vogel	Heritage Ranch CSD Operations	Operations Manager
Kristen Gelos	Heritage Ranch CSD Administration	Administrative Manager
Los Osos CSD		
Laura Durban	Los Osos CSD - Administration	Admin Services Manager
Margaret Falkner	Los Osos CSD - Utilities	Utilities System Supervisor
Ron Munds	Los Osos CSD	General Manager
Paul Provence	Los Osos CSD - Fire Department	Battalion Chief
Nipomo CSD		
Dennis Grane	Nipomo CSD	General Manager
Derek Calleja	Nipomo CSD	Utilities
Francisco Maldonado	Nipomo CSD	Utilities
Peter Sevcik	Nipomo CSD	Utilities
Ray Dienzo	Nipomo CSD	Administration
Tyler Voelker	Nipomo CSD	Utilities
Oceano CSD		
Carey Casciola	Oceano CSD	Accounting and Business Manager

FIRST/LAST NAME	ORGANIZATION	TITLE
Doug Sparling	Oceano CSD	Utility Systems Operator
Peter Brown	Oceano CSD	General Manager
Tony Marraccino	Oceano CSD	Utilities Manager
San Miguel CSD		
Scott Young	San Miguel Fire	Fire Chief
San Simeon CSD		
Carinna Ellison	San Simeon CSD	FRM Operations
Kathy East	San Simeon CSD	Office/Bookkeeper
Patrick Faverty	San Simeon CSD	Community School District
Ruth Montgomery	San Simeon CSD	GM/Office Asst
Templeton CSD		
Tom Peterson	Templeton CSD	Fire Chief
San Luis Obispo County Flood Control and Water Conservation District		
Brendan Clark	Flood Control District	Water Resources Supervising Engineer
Courtney Howard	Flood Control District	Water resource Division Manager
Joshua Porter	Flood Control District	WR Engineer
Kate Ballantyne	Flood Control District	Deputy Director
Cayucos Sanitary District		
Gayle Good	Cayucos Sanitary District - Administration	Admin Accounting Manager
Justin Owens	Cayucos Sanitary District - Collections	Lead Collections
Rick Koon	Cayucos Sanitary District	District Manager
Sarah Hooper	Cayucos Sanitary District - Water Treatment Plant	Chief Plant Operator
Port of San Luis Harbor District		
Chris Munson	Port San Luis Harbor District	Manager
Jaime Cuevas	Port San Luis Harbor District	Utility Crew
Natalie Teeter	Port San Luis Harbor District	Planner/Analyst
South San Luis Obispo County Sanitation District		
Mychal Jones	South SLO County Sanitation District	Superintendent/Chief Plant Operator
WSP USA Consultant Team		
Jeffrey Brislawn	WSP	Project Manager
Juliana Prosperi	WSP	Deputy Project Manager
Joshua Schnitzlein	WSP	Senior Environmental Planner
Melissa Baum	WSP	Environmental Planner
Bailey Nock	WSP	Hazard Mitigation Planner
Carlie Hager	WSP	Hazard Mitigation Planner

Source: WSP 2025

Planning Meetings

The planning process officially began with a kickoff meeting on October 30, 2024. The meeting covered the scope of work and an introduction to the DMA requirements. Participants were provided with a Plan Update Guide, which included worksheets to facilitate the collection of information necessary to support update of the plan. Using FEMA guidance, WSP designed these worksheets to capture information on past hazard events, identify hazards of concern to each of the participating jurisdictions, quantify values at risk to identified hazards, inventory existing capabilities, and record possible mitigation actions. A copy of WSP's LHMP Update Guide for this project is included in Appendix C. The County and each jurisdiction seeking FEMA approval of their plan completed and returned the worksheets in either the LHMP

Update Workbook or shared their most recent LHMP for incorporation into the plan document, a provision that applied solely to Cambria CSD.

During the planning process, the HMPC communicated through face-to-face meetings, email, and telephone conversations. Draft documents were posted on a SharePoint and in some cases emailed so that the HMPC members could easily access and review them. The HMPC formally met four times during the planning period (October 20, 2024 – May 2025). The purposes of these meetings are described in Table 3-2. The planning consultant sent meeting handouts ahead of time to the participating jurisdictions to review and provide feedback before or at the meeting. In addition to these meetings some jurisdictions held meetings with subcommittees to discuss the needed input for the plan update. In a couple cases some municipalities were not able to attend the planning workshops due to scheduling conflicts or limited staff capacity. The County OES Emergency Manager and the planning consultant worked with the jurisdictions individually in those cases to obtain necessary information and input into the planning process. This was done through direct emails from the planning consultant and follow-up phone conversations with the consultant and the County Planner where necessary. The schedule of the four planning meetings/workshops held during the planning process are listed in Table 3-4.

Table 3-4 Schedule of Planning Meetings

MEETING TYPE	MEETING TOPIC	MEETING DATE(S)	MEETING LOCATION(S)
HMPC #1	Kick-off meeting: introduction to DMA, the planning process, planning for public involvement and hazard identification	October 30, 2024	San Luis Obispo Hybrid in person/virtual
HMPC #2	Hazard Identification and Risk Assessment results, capability assessment updates	January 14, 2025	San Luis Obispo – in person
HMPC #3	Update of mitigation goals and objectives, capabilities, previous mitigation action progress	February 26, 2025	San Luis Obispo -in person
HMPC #4	Development and prioritization of mitigation action recommendations	April 2, 2025	Virtual

HMPC Meeting #1 -Kickoff Meeting

On October 30, 2024, the HMPC convened in person to discuss the process for completing the update of this plan. The kickoff meeting was well attended with forty-nine (49) individuals present. The audience was a mix of county departments, local governments, special districts and stakeholders. Representatives from the County department included: Planning & Building, Office of Emergency Services, Public Works and the Agricultural Department. All participating municipalities and Community Service Districts had representatives present at the meeting. Stakeholders present at the meeting included representatives from the San Luis Obispo County Fire Safe Council, and a Professor of City and Regional Planning from Cal Poly, San Luis Obispo. A complete list of those in attendance at the kickoff meeting can be found in the sign-in sheets in Appendix C.

Following introductions, WSP reviewed the DMA requirements and the suggested planning process to follow to meet the requirements as well as the expected schedule of the process. The roles of the HMPC and stakeholders was discussed including the participation requirements for the different roles.

During the kickoff meeting the HMPC validated the 15 identified hazards within the 2019 plan with minor revisions and collaboratively prioritized the hazards for the purpose of identifying which are “of most concern” to the County. More details are included in Section 5 Risk Assessment.

The HMPC also discussed other agencies that should be part of this planning process, as well as related planning efforts to be coordinated with and recent studies to be incorporated. Part

of this discussion was also related to creating a stakeholder and public outreach strategy to involve the public throughout the planning process. Suggestions on public involvement tools included:

- Outreach through social media
- Posting information on local government websites
- Utilize City of San Luis Obispo's City Hall web platform
- Create and disseminate an online public survey

The kickoff meeting ended with WSP sharing handouts to assist in the planning process. These handouts included the Plan Update Guide Workbook which outlined data collection needs for each participating jurisdiction.

HMPC Meeting #2 – Risk and Goals

On January 14, 2025, the HMPC convened in person to discuss the results of the risk and vulnerability assessment. Twenty-four (24) members of the HMPC were present for the discussion. WSP began the meeting with a presentation on the results of the risk assessment for natural hazards A handout summarizing the hazard significance for each jurisdiction was shared for HMPC to review. The group went through each hazard together and discussed the results as well as shared any local insight to inform the HIRA update. Refer to the meeting summary in Appendix C for notes related to each hazard discussed. Part of this discussion was also related to development trends.

Following the discussion on the results of the risk assessment, the HMPC was provided a handout that summarized current goals and objectives from the County HMP, jurisdictional HMPs and the State HMP. WSP explained this update process provides an opportunity to review the previous plan's goals to determine if they are still valid, comprehensive, and reflect current priorities and updated risk assessment. The HMPC was also encouraged to share their jurisdiction's goal statements with their local planning teams prior to the next meeting to discuss if changes are necessary.

WSP also shared the online public survey with the HMPC. The survey had been open for one month and already received 225 responses at that time. A link was shared with the HMPC to easily distribute by email and for posting on websites. The meeting ended with a review of the next steps and planning process schedule.

HMPC Meeting #3 – Goals, Capabilities, and Mitigation Action Status

The HMPC reconvened on February 26, 2025, to discuss goal revisions and updates, updates to the capability assessment and status of mitigation actions from the previous County and jurisdictional LHMPs. The meeting began with a status update of the planning process and a review of the additional vulnerability assessment data related to hazardous material incidents. This was followed by discussion on the revised goals, with some additional adjustments suggested by the group. The capability assessment update was also discussed; it was emphasized that each jurisdiction should consider options for enhancing or expanding their mitigation capabilities. Progress on mitigation actions was also summarized in anticipation of developing new actions in a subsequent meeting.

HMPC Meeting #4 – Mitigation Action Workshop

On April 2, 2025, the HMPC convened in person to identify new mitigation actions to include in the updated plan. This encompassed a review of possible mitigation activities, alternatives, and related climate adaptation strategies. The group also discussed criteria for mitigation action selection and prioritization. This was followed by a brainstorming session to elicit the development of new mitigation actions. Entities responsible for new mitigation action implementation were identified. Mitigation action worksheets were distributed to allow

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additional details to be added following the workshop. Lastly, a refresher on Plan Implementation and next steps were discussed.

HMPC Meeting #4 – Mitigation Action Workshop

The HMPC and Local Planning Teams (LPTs) for each participating jurisdiction met bi-monthly from October 2024 through May 2025 to collect GIS information, review analysis, review the status of deliverables, discuss planning progress, organize mitigation status updates and input related to new mitigation actions, and address questions. These meetings provided an opportunity for other HMPC participants and stakeholders to join if they missed one of the HMPC meetings, or the stakeholder and public workshops.

Additional Meetings

Water Resources Advisory Committee (WRAC)

Select members of the HMPC and County staff met with the Water Resources Advisory Committee (WRAC) during their regularly scheduled meetings. The purpose of attending and coordinating with the WRAC was to integrate the drought vulnerability assessment into the MJHMP and ensure the plan met SB 552 requirements.

Volunteer Organizations Active in Disasters (VOAD)

During the development of the MJHMP, select members of the HMPC collaborated with the Volunteer Organization Active in Disaster (VOAD) group to ensure community-based input and alignment with local response capabilities. The HMPC engaged the VOAD group early in the process, sharing data on the planning process, local hazards, vulnerabilities, and potential hazard event impacts. VOAD representatives contributed insights based on their on-the-ground experience and identified gaps and feedback related to emergency preparedness and mitigation. The MJHMP was a specific topic of conversation at a meeting on 3/12/2025 with the OES VOAD coordinator and WSP consultants. The HMPC also shared draft mitigation strategies focused on community outreach, volunteer coordination, and support for vulnerable populations. This collaboration helped strengthen the overall plan, and ensured it was both practical and inclusive of community resources and capabilities.

Disaster Planning Advisory Committee (DPAC)

During the development of the MJHMP, the HMPC collaborated with the Disaster Planning Advisory Committee (DPAC) group to ensure a well-informed and community-driven planning process. The HMPC involved the DPAC in the process as a discreate stakeholder group involved in disaster planning by an update on the MJHMP process at a meeting on 2/20/2025. DPAC members, representing a range of local government agencies and stakeholders, contributed valuable knowledge on community vulnerabilities and resources. This collaboration strengthened the overall plan, and ensured it was practical and aligned with community priorities.

Board of Supervisors

During the development of the MJHMP, County staff and the HMPC maintained regular communication with the County Board of Supervisors to ensure alignment with county priorities and receive policy-level input on the draft mitigation strategies. The HMPC provided periodic updates throughout the planning process, including summaries of the risk assessment, community outreach efforts, and proposed mitigation goals and actions. The draft risk assessment and mitigation strategies were formally presented to the Board of Supervisors for their review, and feedback was requested to ensure the strategies supported county-wide objectives and resource capabilities. Board input helped refine and prioritize mitigation actions, particularly those with major infrastructure investment using Proposition 4 funding and major land use planning component. This collaboration ensured the plan was actionable and supported by the highest level of county leadership.

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3.4.1.2 Planning Step 2: Involve the Public

Involving the public assures support from the community at large and is a required part of the planning process per the DMA 2000. Early discussions with the San Luis Obispo County planning staff and input received in the first HMPC meeting established the initial plan for public involvement in the plan update. Public outreach began with the development of an Outreach Strategy (see Appendix C.1), followed by the creation of an online public survey that was shared with each participating jurisdiction to post on their websites and disseminate via email to local stakeholders. The public outreach activities described here were conducted with participation from and on behalf of all jurisdictions participating in this plan.

Throughout the planning process two public workshops were held to inform the public of the purpose of the DMA and the hazard mitigation planning process for the San Luis Obispo County planning area. At the first workshop, stakeholders and the public in attendance were provided comment cards to leave any comments related to the County's MJHMP as well as provide their contact information if they would like to receive ongoing updates and information related to the planning process.

At the kick-off meeting, the HMPC discussed additional options for public involvement and agreed to an approach using established public information mechanisms and resources within the community. Public involvement activities included press releases, website postings, flyer development and distribution, public meetings, and the collection of public comments on the draft plan. To promote the first workshop County staff reached out to local media outlets to inform the public of the opportunity to participate and posted on several community calendars, and social media sites.

Figure 3-1 below is the flyer the County HMPC used to advertise the first public workshop on January 14, 2024. Press releases can be found in Appendix C.

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Figure 3-1 San Luis Obispo County's Flyer for Public Workshop #1, January 14, 2024

The County of San Luis Obispo

MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Stakeholder & Public Workshop

January 14, 2025
3:00-4:30 pm

In Person: Katcho Achadjian Government Center
1055 Monterey Street, 1st Floor, Room 161 San Luis Obispo, CA

Or join virtual: MS Teams meeting link

Meeting ID: 341 359 656 184; Passcode: ce2Ti9P7

Dail in by Phone +1 213-267-3760,,668260420#

Please assist the County by participating in our Stakeholder and Public Workshop by learning about the 2025 Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) and update process.



San Luis Obispo County, in collaboration with the City of San Luis Obispo, 7 local jurisdictions, 10 community service districts and 4 special districts are updating the 2025 MJHMP. The process involves plan integration, fostering partnerships among all levels of government in the County, and strengthening non-governmental and private partnerships. It will also include an updated risk assessment and mitigation strategy.

You are invited to a Stakeholder and Public Workshop for the 2025 San Luis Obispo County MJHMP Update!

The 2025 MJHMP update is in progress and the County is requesting stakeholder and public input on the plan development process. The 2025 MJHMP outlines actions to reduce risks and vulnerabilities associated with natural hazards within the County and serves as a blueprint for ensuring that the County can adapt to and mitigate hazards. The 5-year update to the 2025 MJHMP also ensures the County remains eligible for Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance funding.

IF YOU HAVE QUESTIONS OR WOULD LIKE ADDITIONAL INFORMATION, PLEASE CONTACT:

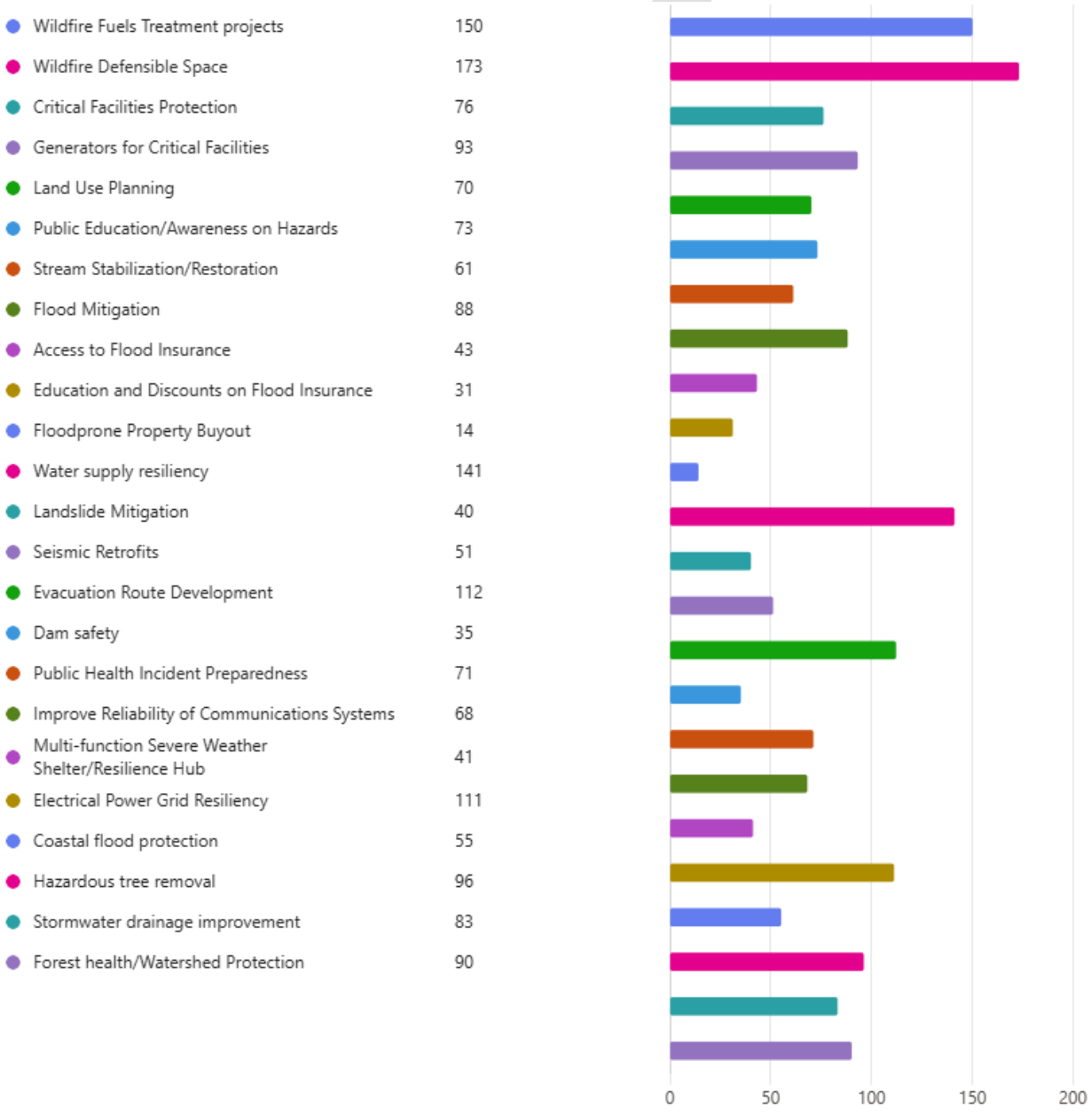
Scott Milner
Emergency Services Coordinator
San Luis Obispo County
smilner@co.slo.ca.us

COUNTY OF SAN LUIS OBISPO

Online Public Survey

During the plan update's drafting stage, an online public survey was developed as a tool to gather public input. The survey was for the public to provide feedback to the San Luis Obispo County Multi-jurisdictional Hazard Mitigation Planning Committee on reducing hazard impacts. The survey provided an opportunity for public input during the planning process, prior to finalization of the plan update. The survey gathered public feedback on concerns about hazards and input on strategies to reduce their impacts. The survey was released in January and closed on February 21, 2025. The HMPC provided links to the public survey by distributing it using social media, email, and posting the link on websites. The County provided laptops that could be used to fill out the survey at the first public meeting, as well as flyers with the survey link as handouts.

Figure 3-2 Example of Public Survey Response



Two hundred and twenty-four (224) people filled out the survey online. Results showed that the public perceives the most significant hazards to be wildfire, earthquake and drought and water shortage. Figure 3-2 above, shows the responses to question 3 of the survey, which solicited the public's opinion on the mitigation actions that should have the highest priority in the updated hazard mitigation plan. Wildfire fuels treatment projects, wildfire fuels treatment projects, water supply resiliency, evacuation route development, and electrical power grid resiliency were cited as the most popular mitigation actions. This information was shared with the HMPC during the update of the mitigation strategy as a source of potential mitigation ideas. A summary of all the survey data and documentation of the public feedback can be found in Appendix C.

Public Workshops

Two public workshops were held during the planning process to inform the public, receive input to integrate into the plan update and keep the public updated on the progress being made in the planning process.

The first workshop was held on January 14, 2025 with twenty-six (26) of the public were present, in person and virtually, including several stakeholders and representatives from the County. The intent of the first was to introduce the public to the hazard mitigation planning process for the County's Plan Update as well as answer any questions and gather public input to be integrated into the plan update. In addition it was an opportunity to help staff identify risks, hazards and vulnerabilities from the public's perspective. The HMPC received five comment cards from meeting that helped to inform the Planning Team on the public initial thoughts on hazard mitigation and hazards in their community each can be found in Appendix C.

The second public workshop was held virtually on May 29, 2025 and was well attended with X members of the public, as well as stakeholders. The primary intent of the second workshop was to gather feedback on mitigation strategies to reduce the identified hazard vulnerabilities, answer questions and collect input to share with the HMPC. This workshop was also an opportunity to inform the public on the Safety Element update of the County's General Plan and how that effort related to the County's Hazard Mitigation Plan.

Example press releases and sign in sheets are located in Appendix C. Prior to finalizing the plan the draft was available online on the San Luis Obispo County website.

Table 3-5 Public Meeting Schedule

MEETING TOPIC	MEETING DATE	MEETING LOCATION
Introduce the Disaster Mitigation Act of 2000 and the hazard mitigation planning process for the County's plan update. Reviewed the results of the risk assessment and discussed mitigation action strategies.	January 14, 2025	San Luis Obispo County Office
Discuss and gather feedback on the draft plan, answer questions and collect input to share with the HMPC before finalizing the updated plan.	May 29, 2025	Teams/Virtual

Source: WSP 2025

Public Review Period

On May 21, 2025, a public review draft of this plan was released for comment and made available for download via the County website. Comments were collected through June 9, 2025. The draft plan was advertised through social media, mass emailing and an advertisement through the media mechanisms noted previously. An electronic comment form was provided with the draft plan. X comments were received and are documented in Appendix C. This did/did not result in edits.....

3.4.1.3 Planning Step 3: Coordinate with Other Departments and Agencies

Early in the planning process, federal, state, and local agencies and organizations were invited to participate as stakeholders in the process. Stakeholders include local, regional, state, and federal agencies involved in hazard mitigation activities or those beyond the County and local government that have the authority to regulate development, including the California Coastal Commission and the Xolon Salinan Tribe. San Luis Obispo County staff worked with the WSP team to create a list of potential stakeholders.

Stakeholders could participate in various ways, either by contributing input at HMPC meetings, being aware of planning activities through an email group, providing information to support the effort, or reviewing and commenting on the draft plan. Based on their involvement in other hazard mitigation planning efforts, and status in the County, representatives from the following agencies and organizations were invited to participate as stakeholders in the process; an asterisk indicates they participated in HMPC meetings or the Stakeholder or Public workshops:

Federal, State, and Local Agencies

- California Coastal Commission*
- California Department of Fish and Wildfire
- California Department of Transportation
- California Geological Survey
- California State Parks*
- Bureau of Reclamation
- California Department of Forestry and Fire Protection*
- National Weather Service
- National Ocean and Atmospheric Administration
- USDA Forest Service

Agencies that have Authority to Regulate Development

- City of Arroyo Grande*
- City of Atascadero*
- City of Grover Beach*
- City of Morro Bay*
- City of Paso Robles*
- City of Pismo Beach*
- City of San Luis Obispo*
- Avila Beach CSD*
- Cambria CSD*
- Ground Squirrel Hollow CSD*
- Heritage Ranch CSD*
- Los Osos CSD*
- Nipomo CSD*
- Oceano CSD*
- San Miguel CSD*
- San Simeon CSD*

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- Templeton CSD*
- SD - Cayucos Sanitary District*
- SD - Port San Luis Harbor District*
- SD - San Luis Obispo FCWCD*
- USD - South San Luis Obispo County Sanitation District*

Neighboring Communities/Counties

- Kern County*
- Santa Barbara County*
- Monterey County*

Business, Academia, Utility Providers, Dam Owners and Operators and Non-Profits

- Cal Poly, San Luis Obispo* - Hazard Working Group

Representatives that Provide Support to Underserved Communities

- SLO Fire Safe Council*
- Associate Warden CMC
- Department of State Hospitals*
- Xolon Salinan Tribe
- Tenet Health
- San Luis Obispo Council of Governments (SLOCOG)*

The majority of the listed stakeholders were invited to participate in the planning process, including an invitation to the kickoff meeting. Several opportunities were provided for the above groups to engage throughout the planning process. At the start, the County Emergency Services Coordinator served as the project manager, and sent emails inviting these groups to actively participate on the HMPC. They were also invited via email to the public meetings.

Ongoing coordination with key agencies, organizations, and advisory groups enabled the HMPC to evaluate shared challenges, development policies, and mitigation strategies. This collaboration also helped identify any conflicts or inconsistencies with regional mitigation policies, plans, programs and regulations. Communication was maintained through phone calls and emails with key individuals representing other regional programs.

Various stakeholder outreach platforms, outlined in the Outreach Strategy (See Appendix C) were utilized Additional engagement efforts are detailed in Section 3.4.1.1, Additional Meetings.

Groups marked with asterisks next to the stakeholder list names were invited to participate in the process by attending public workshops. Others contributed by providing requested data, either directly or via their websites, in line with the Plan Update Guide. As part of both HMPC and public outreach efforts, all stakeholder groups were invited to review and comment on the plan prior to its submission to Cal OES and FEMA.

During the public review for the draft plan, key agencies were once again specifically solicited to provide any final input to the draft plan document. This input was solicited both through membership on the HMPC and by direct emails to key stakeholder groups. These stakeholders were also invited to attend the HMPC and public meetings to discuss unresolved issues and to offer feedback on the draft plan and final mitigation strategies.

In summary, throughout the planning process, numerous opportunities were provided for stakeholder involvement. Initial invitations encouraged participation through the HMPC. Additional contributions were made by providing relevant data, either directly or from organizational websites. Public workshops were offered as another opportunity for

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engagement, including the review and comment period prior to the plan submission to Cal OES and FEMA. As part of the draft plan review, key agency stakeholders were contacted directly for input. Their comments were incorporated into Section 4 Community Profile to enhance clarity and accuracy. This process aligned with Steps 2 and 3 in the FEMA Local Mitigation Planning Handbook.

A list of Countywide stakeholders identified and invited to participate in the planning process is shown in were also sent to the agencies, academic institutions, and CBOs listed in Table 3-6.

Table 3-6 Stakeholder Invited to Participate in the Planning Process

STAKEHOLDER TYPE	AGENCY/ORGANIZATION
Stakeholder agencies involved in hazard mitigation activities:	SLO County Fire Safe Council
	SLO County Fire Safe Council
	SLO County Fire Safe Council
	Atascadero State Hospital
	Atascadero State Hospital
	Waste Management Union Pacific
	Cambria Community School District
	Cambria Community Health Department
	San Luis Obispo County Public Works
	California State Parks
	CERT
	Central Coast Water Authority
	Fire Safe Focus Group
	CAL Fire
	WRAC (RTAC, SSTA)
	CAL FIRE
	CAL FIRE – Arroyo Grande
	CAL FIRE
	County of Santa Barbara Water Agency
	Waste Management Union Pacific
	Five Cities Fire Authority (FCFA) – Fire Chief
	WRAC
	Arroyo Grande
	South SLO County
Stakeholder agencies that have the authority to regulate development	North Coast Advisory Council – Land Use Committee
	California Coastal Commission
Neighboring Communities	Cambria Community School District – Board of Directors
	San Luis Obispo Council of Governments (SLOCOG)
	South County SLO CSD
	SLOSO – Los Osos
	Coastal San Luis Resource Conservation District
	County of Monterey DEM
	County of Kern OEM
	County of Santa Barabara OEM
	Santa Barbara County Flood Control & Water Conservation District
	Cupertino Union School District

STAKEHOLDER TYPE	AGENCY/ORGANIZATION
Representatives of Business, Academia, and Other Private Organizations	Atascadero Unified School District
	Atascadero Unified School District
	Atascadero Chamber of Commerce
	South SLO County - Chamber of Commerce
	Atascadero Mutual Water Company – Board Member
	Atascadero Chamber of Commerce
	Friends of Fiscalini – Executive Director
	North Morro Bay – Community Member
	Cal Poly - Natural Hazard Planning Group
Representatives Supporting Underserved Communities	North Coast Advisory Committee (NCAC)
	El Camino Homeless Organization (ECHO)
	Community Action Partnership of SLO
	People Helping People
	CAPSLO
	5Cities Homeless Coalition
	YTT Northern Chumash Tribe
	Xolon Salinan Tribe
	Atascadero State Hospital
	LOCAC- Los Osos
	Wendy Lewis
	ROSENXT - SLO

Source: San Luis Obispo 2025

Other agencies and organizations invited based on input from the first HMPC meetings, included the following entities:

- Groundwater Sustainability Agencies (Water Resources Advisory Committee [WRAC])
- Local Native American Tribes
    - YTT Northern Chumash Tribe
    - Xolon Salinan Tribe
- Tenet Health
- San Luis Obispo Council of Governments (SLOCOG)
- 5Cities Homeless Coalition
- Disaster Planning Advisory Committee (DPAC)
- Cal Poly – Natural Hazard Planning Group
- Local Advisory Councils
- California Conservation Corps
- ECHO - El Camino Homeless Organization
- Community Action Partnership of San Luis Obispo County (CAPSLO)

Stakeholders that participated in the first stakeholder workshop included the Central Coast Water Authority (CCWA), ROSENXT - SLO, California Department of Forestry and Fire Protection (CAL FIRE), North Morro Bay – Community Group (Community At-Large Member), and the Regional Transit Advisory Committee (RTAC).

Incorporation of Existing Plans and Other Information

The coordination and synchronization with other community planning mechanisms and efforts are vital to the success of this plan. To have a thorough evaluation of hazard mitigation practices already in place, appropriate planning procedures should also involve identifying and reviewing existing plans, policies, regulations, codes, tools, and other actions are designed to

reduce a community's risk and vulnerability from natural hazards. San Luis Obispo County uses a variety of mechanisms to guide growth and development. Integrating existing planning efforts, mitigation policies, and action strategies into this plan establishes a credible, comprehensive document that weaves the common threads of a community's values together. The development and update of this plan involved a comprehensive review of existing plans, studies, reports, and initiatives from the County of San Luis Obispo and each participating municipality that relate to hazards or hazard mitigation. A high-level summary of the key plans, studies and reports is summarized in the Table 3-7. Information on how they informed the update are noted and incorporated where applicable.

Table 3-7 Summary of Review of Key Plans, Studies and Reports

PLAN, STUDY, REPORT NAME	HOW PLAN INFORMED LHMP
County of San Luis Obispo General Plan and Elements (Safety, Agricultural, Conservation and Open Space, Land Use)	Provided background information on the county including some information related to jurisdictions. The elements were used to provide information on risk and vulnerabilities to hazards and the existing policies the County has in place related to hazards and mitigation.
Municipal General Plans (including Safety Elements, Land Use Elements, and Housing Elements)	Informed the municipal annexes and in some cases the community service district annexes on past hazard events, mitigation policies, combining designations and existing and projected development. The City of San Luis Obispo recently adopted the Climate Adaptation and Safety Element, replacing the previous Safety Element from 2012. Morro Bay also updated their General and Local Coastal Plan in 2021.
Local Hazard Mitigation Plans (City of Atascadero, City of Morro Bay, City of Paso Robles, City of Pismo Beach, City of San Luis Obispo, Los Osos CSD and the City Arroyo Grande/ City Grover Beach/Lucia Mar Unified School District/South San Luis Obispo County Sanitation District)	Informed the HIRA sections, mitigation action plans and capability assessments for the applicable annexes
Area Plans (Estero, Inland, North Coast, San Luis Bay Coastal, South County Coastal)	Informed the community and district profiles
Community Plans (Avila Beach, San Miguel, Nipomo, Los Osos)	Informed the community service district profiles
Urban Water Management Plans (Arroyo Grande, Atascadero)	Informed the drought and water shortage sections of the applicable annexes
Climate Adaptation Plan and Sea Level Rise Assessments (Morro Bay and Port San Luis)	The county collaborated with the Local Government Commission and other partners to develop integrated climate change adaptation strategies. City of San Luis Obispo Climate Adaptation and Safety Element (CASE) was adopted January 2023. Morro Bay adopted a General Plan and Local Coastal Program in May of 2021 which includes climate adaptation policies focusing on sea-level rise, infrastructure resilience, and environmental justice.
San Luis Obispo County Flood Insurance Study	Reviewed for information on past floods and flood problems to inform risk assessment (Section 5) Utilized Digital Flood Insurance Rate Maps effective June 6, 2024 to update maps and flood risk assessment in Section 5.

PLAN, STUDY, REPORT NAME	HOW PLAN INFORMED LHMP
State of California Multi-Hazard Mitigation Plan (2023)	Reviewed information on climate change and hazard assessment data to ensure consistency with this plan update Reviewed list of hazards to inform risk assessment (Section 5) Reviewed goals for consistency during the update of the MJHMP goals
NOAA National Centers for Environmental Information-State Climate Summaries	Reviewed information on climate change to inform risk assessment (Section 5)
California Department of Finance/U.S. Census Bureau, American Community Survey	Informed the background on the community including demographic trends
2020 Economic Profile, San Luis Obispo Chamber of Commerce	Informed the economic section of the Community Profile including the top employers in the County
California County Level Economic Forecast 2018 - 2050, California Department of Transportation Office of State Planning	Informed the development trends section of the Community Profile and how the State is forecasting the County's growth in terms of population, economy and housing production
County of San Luis Obispo EnergyWise Plan, ClimateWise Integrated Climate Change Adaptation Planning in San Luis Obispo, California's Fourth Climate Change Assessment: Central Coastal Region Report (2018)	Inform climate change projections and possible effects on the County and the "climate change considerations" for each hazard profiled
San Luis Obispo County Integrated Regional Water Management Plan (Draft 2019) and San Luis Obispo County Stormwater Resource Plan	Informed the background section on adverse weather in general. Including how the county is divided into watershed groups and annual precipitation information
USDA Risk Management Agency Crop Indemnity Reports	Informed the adverse weather section vulnerability assessment on how crops have been impacted by weather events in the past. Also informed the Drought and Agricultural Pests and Disease sections of the HIRA
California Climate Adaptation Strategy, 2024 and California OES Contingency Plan for Excessive Heat Emergencies (2022)	Informed the Extreme Heat profile and climate change considerations
Dam and Levee Failure Evacuation Plan, County of San Luis Obispo	Informed the Dam Failure profile and vulnerability assessment and provided information on levees of concern in the Flood profile. Also informed applicable jurisdictional annexes
Land Subsidence from Groundwater Use in California (2013) James W. Borchers and Michael Carpenter, Luhdorff & Scalmanni Consulting Engineers	Informed the Land Subsidence profile
Tsunami Response Plan, County of San Luis Obispo	Informed the Tsunami profile the base plan HIRA and applicable jurisdictional annexes
Community Wildfire Protection Plan, San Luis Obispo County (March 2019)	Informed the Wildfire profile in the base plan HIRA and applicable jurisdictional annexes
Community Health Assessment, County of San Luis Obispo Health Agency; COVID 19 After Action Report	Provided background information on the county and informed the biological agents
State Responsibility Area (SRA) Fire Hazard Severity Zone (FHSZ) maps	Wildfire analysis updated to incorporate the new maps that became available in March 2025 and anticipated to be effective in mid-2025.

Other technical data, reports and studies were reviewed and considered, as appropriate, during the collection of data to support Planning Steps 4 and 5, which include the hazard identification, vulnerability assessment, and capability assessment. Information from the following agencies and groups were reviewed in the development and update of this plan. Specific references relied on in the development of this plan are also sourced throughout the document as appropriate.

- California Department of Forestry and Fire Protection
- California Department of Parks and Recreation Office of Historic Preservation
- California Department of Transportation
- California Department of Public Health
- California Natural Resources Agency
- California Department of Water Resources
- California Geological Survey
- County of San Luis Obispo Agricultural Department
- County of San Luis Obispo Public Health Department
- County of San Luis Obispo Information Technology Department
- County of San Luis Obispo Planning and Building Department
- County of San Luis Obispo Public Works Department
- County of San Luis Obispo Office of Emergency Services
- California Coastal Commission
- California Water Foundation
- San Luis Obispo County Flood Control and Water Conservation District
- National Oceanic and Atmospheric Administration National Climatic Data Center
- National Register of Historic Places
- Natural Resource Conservation Service
- National Weather Service
- U.S. Fish and Wildlife Service
- U.S. Geological Survey
- Western Regional Climate Center
- San Luis Tribune
- Center for Western Weather and Water Extremes

Integration of 2019 Plan into Other Plans and Planning Mechanisms

In addition, the 2019 MJHMP was incorporated into several County plans and planning mechanisms. The risk assessment informed the update of the County 2025 Emergency Operations Plan. Mitigation projects were proposed as part of County work plans for actual implementation related to drought and fire. On June 26, 2030, the County Board of Supervisors approved an amendment to the San Luis Obispo General Plan Safety Element by Resolution 2020-139. Through this amendment effective June 26, 2020. the Multi-Jurisdictional Hazard Mitigation Plan was incorporated by reference in compliance with California Assembly Bill 2140, stating:

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"The County of San Luis Obispo adopts the San Luis Obispo County Multi-Jurisdictional Hazard Mitigation Plan by reference into the Safety Element of the General Plan in accordance with the requirements of Government Code Sections 8685.9 and 65302.6."

The 2025 HMP update was coordinated with and done in parallel with the update of the 1999 Safety Element of the County General Plan to ensure consistency of policies.

Several of the participating jurisdictions previously participated in other single or multi-jurisdictional plans, primarily the municipalities. Where those plans have been integrated into other planning mechanisms is noted in the jurisdictional annexes.

Table 3-8 Incorporation of 2019 MJHMP into Other Planning Mechanisms

PLANNING MECHANISM	DETAILS
20XX General Plan – Safety Element and other sections	2019 MJHMP fully incorporated by reference into Safety Element of the General Plan and the current Draft Safety Element update
2025 Emergency Operations Plan	LHMP risk assessment data incorporated into the Base EOP in the Hazard Analysis Summary; other LHMP data used in developing the EOP Annexes
Community Wildfire Protection Plans	LHMP risk assessment data and mitigation projects, specific to wildfires are used and considered in the CWPP update: likewise, this MJHMP update will be implemented through the FIRESHED project.
Capital Improvement Plans and Budgets	Mitigation projects are considered and included in annual CIPs as feasible

Source: WSP Analysis 2025

3.4.2 Phase 2: Assess Risks

3.4.2.1 Planning Step 4: Identify the Hazards

WSP led the HMPC in an effort to review the list of hazards identified in the 2019 plan and document all the hazards that have, or could, impact the planning area, including documenting recent drought, flood, wildfire and winter storm events. Data collection worksheets were used in this effort to aid in determining hazards and vulnerabilities and where risk varies across the planning area. The profile of each of these hazards was then updated in 2025 with information from the HMPC and additional sources. Web resources, existing reports and plans, and existing GIS layers were used to compile information about past hazard events and determine the location, previous occurrences, probability of future occurrences, and magnitude/severity of each hazard. Geographic information systems (GIS) were used to display, analyze, and quantify hazards and vulnerabilities where data permitted. The potential for climate change to affect the frequency and intensity of the hazards was summarized based on latest available science, where applicable. A more detailed description of the hazard identification and risk assessment process and the results are included in Section 5 Risk Assessment.

3.4.2.2 Planning Step 5: Assess the Risks

After updating the profiles of the hazards that could affect the County, the HMPC collected information to describe the likely impacts of future hazard events on the participating jurisdictions. This step included two parts: a vulnerability assessment and a capability assessment.

Vulnerability Assessment—Participating jurisdictions updated their assets at risk to natural hazards—overall and in identified hazard areas. These assets included total number and value of structures; critical facilities and infrastructure; natural, historic, and cultural assets; and

economic assets. The HMPC also analyzed development trends in hazard areas. The latest DFIRM was used to refine the estimate flood losses during the update, where available for the NFIP participating communities.

Capability Assessment— The HMPC also conducted a capability assessment update to review and document the planning area's current capabilities to mitigate risk and vulnerability from natural hazards. By collecting information about existing government programs, policies, regulations, ordinances, and emergency plans, the HMPC can assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities identified. This information for the County is included in Section 6 and in the respective jurisdictional annexes. This addressed FEMA planning task 4: Review community capabilities - 44 CFR 201.6 (b)(2) & (3).

Results of the risk assessment was presented, and comments discussed at the second meeting of the HMPC in January 2024.

A more detailed description of the risk assessment process and the results are included in Section 5 Risk Assessment.

3.4.3 Phase 3: Develop the Mitigation Plan

3.4.3.1 Planning Step 6: Set Goals

WSP facilitated a discussion session with the HMPC to review the 2019 plan's goals and objectives. The HMPC discussed definitions and examples of goals, objectives, and actions and considered the goals of the state hazard mitigation plan and other relevant local plans when reviewing and revising the goals and objectives. The resulting updated goals and objectives are presented in Section 7 Mitigation Strategy.

3.4.3.2 Planning Step 7: Review Possible Activities

WSP facilitated a discussion at an HMPC meeting to review the alternatives for mitigating hazards. This included a brainstorming session with the HMPC to identify a comprehensive range of mitigation actions for each identified hazard, and a method of selecting and defending recommended mitigation actions using a series of selection criteria. More specifics on the process and the results of this collaborative process are captured in Section 7 Mitigation Strategy.

As part of the review of mitigation options long term climate change adaptation strategies were also discussed. HMPC members were encouraged to incorporate climate change adaptation measures into the mitigation strategy of their respective jurisdictions utilizing resources and guidance available on the Cal-Adapt website.

3.4.3.3 Planning Step 8: Draft an Action Plan

Based on input from the HMPC regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7, WSP produced a complete first draft of the plan. This complete was shared electronically with the HMPC for review and comment. Other agencies were invited to comment on this draft as well. HMPC and agency comments were integrated into the second draft, which was advertised and distributed to collect public input and comments. WSP integrated comments and issues from the public, as appropriate, along with additional internal review comments and produced a final draft for the California Office of Emergency Services and FEMA Region IX to review and approve, contingent upon final adoption by the governing boards of each participating jurisdiction.

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3.4.4 Phase 4: Implement the Plan and Monitor Progress

3.4.4.1 Planning Step 9: Adopt the Plan

In order to secure buy-in and officially implement the plan, the plan was adopted by the governing boards of each participating jurisdiction on the dates included in the adoption resolutions in Appendix D: Adoption Resolutions. The final plan will be included in the safety element of the County General Plan and result in the County's eligibility for Assembly Bill (AB) 2140. This adoption makes the jurisdiction eligible for consideration for part or all of its local costs on eligible public assistance to be provided by State share funding through the California Disaster Assistance Act.

3.4.4.2 Planning Step 10: Implement, Evaluate, and Revise the Plan

The true worth of any mitigation plan is in the effectiveness of its implementation. Up to this point in the plan update process, all of the HMPC's efforts have been directed at researching data, coordinating input from participating entities, and updating and developing appropriate mitigation actions. Each recommended action includes key descriptors, such as hazard(s) addressed, lead manager and priority, to help initiate implementation. An overall implementation strategy is described in Section 8 Plan Implementation and Monitoring.

Finally, there are numerous organizations within the San Luis Obispo County planning area whose goals and interests' interface with hazard mitigation. Coordination with these other planning efforts, as addressed in Planning Step 3, is paramount to the ongoing success of this plan and of mitigation in San Luis Obispo County and is addressed further in Section 8. A plan update and maintenance schedule and a strategy for continued public involvement are also included in Section 8.

Implementation and Maintenance Process: 2025 Plan

The 2025 LHMP included a process for implementation and maintenance which was generally followed, with some variation. Implementation of the plan including the status of mitigation actions is captured in Section 7 and the jurisdictional annexes. In general, the County and participating jurisdictions have made progress in the implementation of the plan. Successes of note are detailed in Section 7. An updated implementation and maintenance section can be referenced in Section 8.

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4 San Luis Obispo County Profile

4.1 County History

The area that today comprises San Luis Obispo County was home to the Chumash people thousands of years before the present age. Important settlements existed in many coastal areas such as Morro Bay and Los Osos.

Mission San Luis Obispo de Tolosa was founded on September 1, 1772, in the area that is now the City of San Luis Obispo. The namesake of the mission, city and county is Saint Louis of Toulouse, the young bishop of Toulouse (Obispo and Tolosa in Spanish) in 1297.

San Luis Obispo County, the 16th largest County in California, is one of the original 27 California counties created by Act of the State Legislature on February 18, 1850.

4.2 Geography

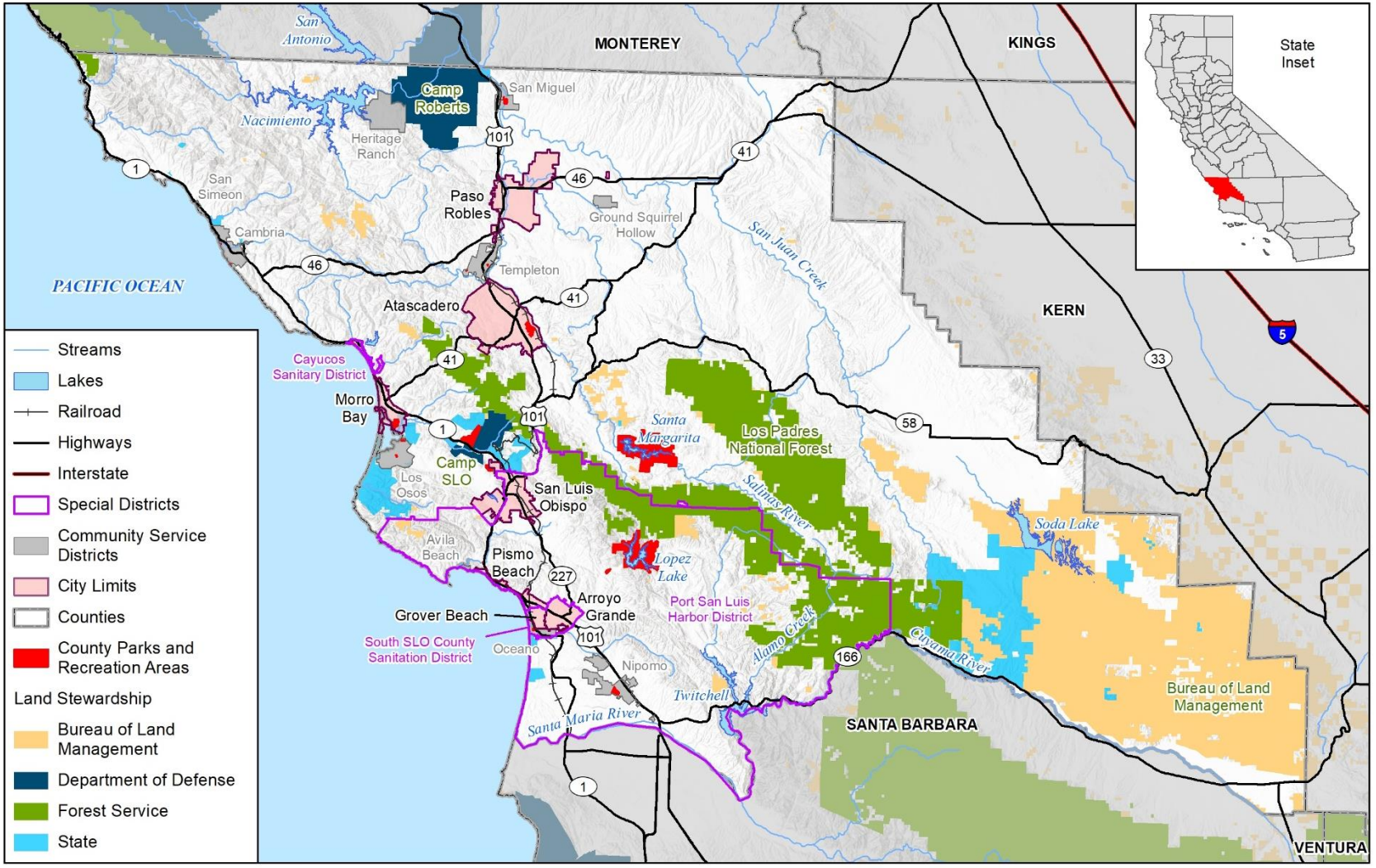
Located along California's Central Coast, San Luis Obispo County is midway (190 miles/306 kilometers) between Los Angeles and San Francisco and is accessible north-to-south by U.S. Highway 101 and scenic Highway 1. Routes from the east include State Highways 41, 46, 58 and 166. San Luis Obispo County is bordered by Santa Barbara County to the south, Monterey County to the north and Kern County to the east. Kings County shares a small border with San Luis Obispo County at the northeast corner of the County (Figure 4.1).

The County encompasses 3,316 square miles or 2,114,750 acres and stretches along 80 miles of coastline. The highest point is Caliente Mountain (5,104 feet). The lowest point is sea level.

A series of ancient volcanic peaks, referred to as the "nine sisters", lie between Morro Bay and San Luis Obispo. Most notable of the peaks is Morro Rock, often called the sentinel of the Pacific Ocean.

The Central Coast of California is susceptible to a number of natural hazards. This HMP profiles the most significant of these hazards. Historical data, catastrophic potential, relevance to the jurisdiction, and the probability and potential magnitude of future occurrences were all used to reduce and prioritize the list of hazards to those most relevant to San Luis Obispo County.

Figure 4.1 San Luis Obispo County



Map compiled 2/2025;
Intended for planning purposes only.
Data Source: San Luis Obispo County

4.3 Cities and Communities

The incorporated cities within San Luis Obispo County are:

- Arroyo Grande
- Atascadero
- Grover Beach
- Morro Bay
- Paso Robles
- Pismo Beach
- San Luis Obispo

Unincorporated communities and Census Designated Places (CDP) include:

- Avila Beach
- Blacklake
- Callender
- California Valley
- Cambria
- Cayucos
- Cholame
- Creston
- Edna
- Garden Farms
- Halcyon
- Harmony
- Lake Nacimiento
- Los Berros
- Los Osos-Baywood Park
- Los Ranchos
- Nipomo
- Oak Shores
- Oceano
- Pozo
- San Miguel
- San Simeon
- Santa Margarita
- Shandon
- Templeton
- Whitley Gardens
- Woodlands

In addition to traditionally noted cities and communities, areas such as the Camp Roberts military installation, Camp San Luis, and California Polytechnic State University-San Luis Obispo can be considered communities in and of themselves. San Luis Obispo County works and interacts with these institutions in many ways similar to how the County interacts with other communities outside the scope of this plan. However, it is recognized these listed entities fall under the authority and jurisdiction of the State of California and/or the U.S. Government.

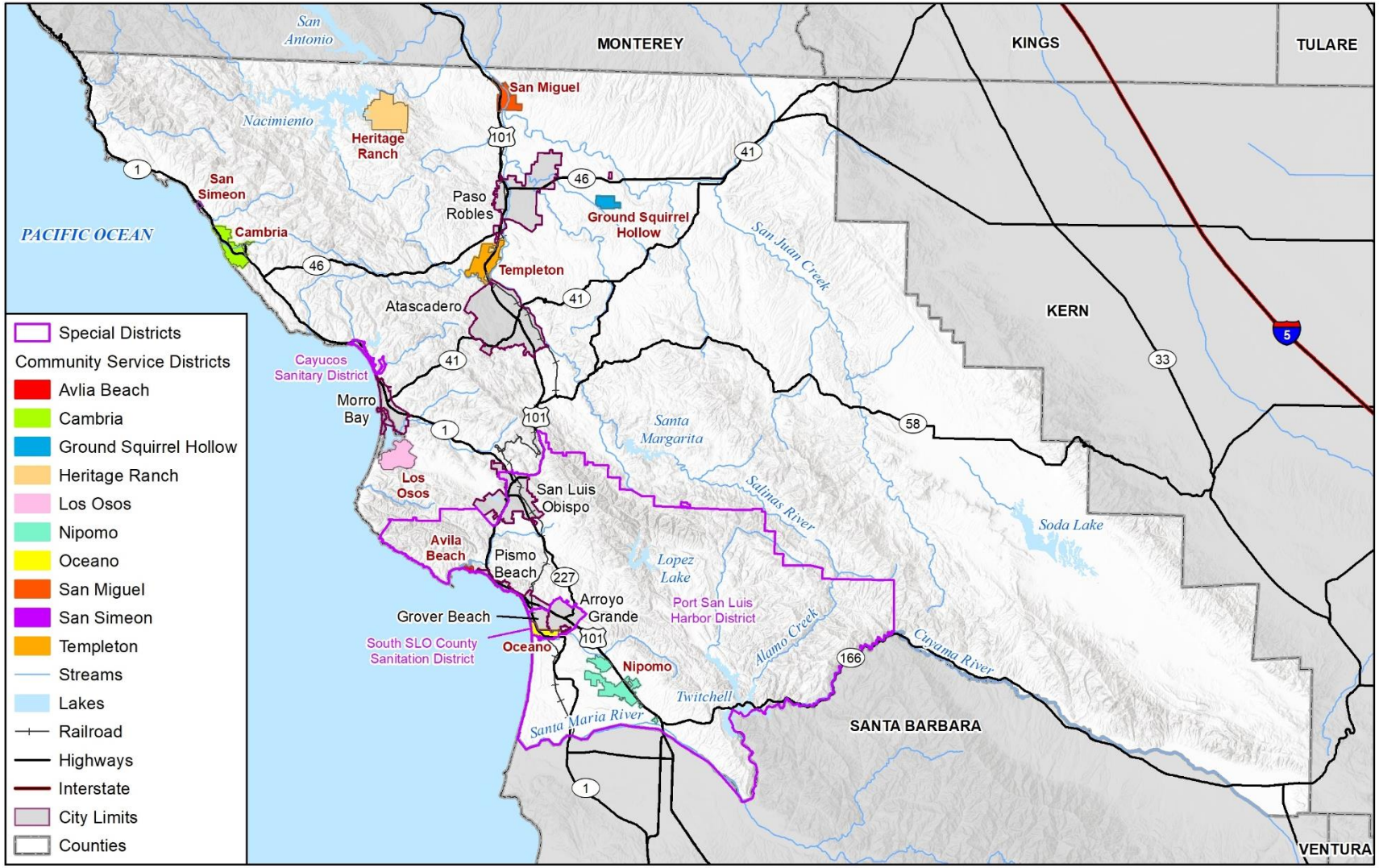
Additionally, the County contains several Community Services Districts (CSDs) or other special districts. California state law allows residents of an unincorporated area to initiate the formation of a CSD to provide any of a wide variety of services, including water, garbage collection, wastewater management, security, fire protection, public recreation, street lighting, mosquito abatement, conversion of overhead utilities to underground, library services, ambulance services, and graffiti abatement. A CSD may span unincorporated areas, multiple cities and/or counties. Once a CSD is formed, the residents elect a board to oversee CSD management and operations.

Following is a list of all CSDs and special districts in San Luis Obispo County. Districts that are participating jurisdictions in this plan update process are **bolded**. Figure 4.2 . Additionally, CSDs and special districts that participated in the 2025 planning process are mapped in Figure 4.2.

- Arroyo Grande Cemetery District
- Atascadero Cemetery District
- Atascadero Public Financing Authority
- Atascadero Unified School District Educational Facilities Corporation
- **Avila Beach CSD**
- California Valley CSD
- Cambria Cemetery District
- Cambria Community Healthcare District
- **Cambria CSD**
- Cayucos Fire Protection District
- **Cayucos Sanitary District**
- Cayucos-Morro Bay Cemetery District
- Central California Schools Financing Authority
- Central Coast Cities Joint Powers Self - Insurance Fund - Compensation
- Central Coast Cities Joint Powers Self-Insurance Fund-Liability
- City of Arroyo Grande Public Financing Authority
- City of Pismo Beach Public Facilities Corporation
- Coastal San Luis Resource Conservation District
- County Service Area No. 1
- County Service Area No. 7
- County Service Area No. 9
- County Service Area No. 10
- County Service Area No. 12
- County Service Area No. 16
- County Service Area No. 17
- County Service Area No. 18
- County Service Area No. 21
- County Service Area No. 22
- County Service Area No. 23
- Creston Hills Ranch CSD
- El Paso de Robles Public Financing Authority
- Five Cities Fire Authority
- Garden Farms Community Water District
- **Ground Squirrel Hollow CSD**
- **Heritage Ranch CSD**
- Independence Ranch CSD
- Linne CSD
- **Los Osos CSD**
- **Nipomo CSD**
- Nipomo Lighting District
- **Oceano CSD**
- Paso Robles Cemetery District
- Paso Robles Joint Unified School District Educational Facilities Corporation
- Pismo Beach Public Financing Authority
- **Port San Luis Harbor District**
- San Luis Obispo County Air Pollution District
- San Luis Obispo County Financing Authority
- **San Luis Obispo County Flood Control and Water Conservation District**
- San Luis Obispo County Integrated Waste Management Authority
- San Luis Obispo Public Financing Authority
- San Miguel Cemetery District
- **San Miguel CSD**
- **San Simeon CSD**
- Santa Margarita Cemetery District
- Santa Margarita Fire Protection
- Schools Insurance Program for Employees
- Shandon Cemetery District
- South San Luis Obispo County Sanitation District
- Squire Canyon CSD
- Templeton Cemetery District
- **Templeton CSD**
- Templeton Unified School District Educational Facilities Corporation
- Upper Salinas/Las Tablas Resource Conservation District

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Figure 4.2 Participating Community Service Districts and Special Districts



4.3.1 Population and Demographics Profile

Population and demographic data described below were updated in December 2024 using data from the 2023 and 2018 American Community Survey (ACS) 5-Year Estimates.

4.3.1.1 Population

The U.S. Census Bureau estimated the total population of San Luis Obispo County was 281,486 as of 2023, essentially the same as was reported in 2018 (Table 4-1). However, the distribution of population within the county has changed between 2018 and 2023. Changes were modest in the seven participating city jurisdictions, but were often relatively large among census designated places (CDP).

Table 4-1 Population Change, 2018-2023

PLACE	2018	2023	PERCENT CHANGE
San Luis Obispo County	281,455	281,486	0.0
Arroyo Grande city	18,039	18,412	2.1
Atascadero city	30,037	29,735	-1.0
Avila Beach CDP	1,273	1,365	7.2
Blacklake CDP	892	1,122	25.8
California Polytechnic State University CDP	n/a	7,529	n/a
Callender CDP	1,583	2,764	74.6
Cambria CDP	5,725	6,038	5.5
Cayucos CDP	2,692	2,517	-6.5
Creston CDP	30	n/a	n/a
Edna CDP	186	378	103.2
Garden Farms CDP	345	248	-28.1
Grover Beach city	13,538	12,687	-6.3
Lake Nacimiento CDP	2,884	3,464	20.1
Los Berros CDP	541	172	-68.2
Los Osos CDP	16,292	15,048	-7.6
Los Ranchos CDP	1,730	1,521	-12.1
Morro Bay city	10,592	10,717	1.2
Nipomo CDP	17,445	17,266	-1.0
Oak Shores CDP	282	153	-45.7
Oceano CDP	7,678	7,098	-7.6
Paso Robles (El Paso de Robles) City	31,656	31,399	-0.8
Pismo Beach city	8,116	8,024	-1.1
San Luis Obispo city	47,160	48,039	1.9
San Miguel CDP (San Luis Obispo County)	2,807	2,956	5.3
San Simeon CDP	583	301	-48.4
Santa Margarita CDP	1,252	665	-46.9
Shandon CDP	1,141	1,042	-8.7
Templeton CDP	7,938	8,608	8.4
Whitley Gardens CDP	164	101	-38.4

PLACE	2018	2023	PERCENT CHANGE
Woodlands CDP	1,743	2,005	15.0

Source: U.S. Census Bureau 5-year American Community Survey data for 2018 and 2023, www.census.gov/.
Note: CDP indicates a Census Designated Place and may not have the same boundaries as the participating Community Service Districts.
Note: Paso Robles city data reported as El Paso de Robles (Paso Robles) city in ACS data.
Note: CDP data were not provided for California Polytechnic State University in 2018 or for Creston CDP in 2023.

4.3.1.2 Income and Poverty

The SLO County median household income in 2023 was $93,398, 3% lower than the average for California but 23% higher than average in the United States (Table 4-2). On a per capita basis, average SLO County resident income is 3% and 15% higher than the California and United States averages, respectively. The proportion of people living below the poverty level is remarkably similar in SLO County, California, and the United States, 12%-13% in all three jurisdictions.

With regard to trends in income and poverty within SLO County, after adjusting for inflation median household income rose 9% from 2018 to 2023 (Table 4-3). Per capita income rose 14% during this period, also adjusted for inflation. The distribution of households in the county with regard to income is shown in Figure 4.3. Relative to 2018, unemployment rose slightly to 5.1% in 2023. Health insurance coverage rose slightly to 94.2%, slightly higher than California and U.S. averages.

The percentage of people with income below the poverty level declined slightly in SLO County to 12.8% of all individuals, marginally higher than California (12.0%) and U.S. (12.4%) averages. Poverty increases to 17.8% in SLO County for families with a female householder and no husband present and 6.8% of individuals aged 65 and older.

Table 4-2 Demographic and Social Characteristics, SLO County, California, and USA (2023)

	UNITED STATES	CALIFORNIA	SAN LUIS OBISPO COUNTY
Population	332,387,540	39,242,785	281,486
Median Age	38.7	37.6	40.2
Percent 65 years and over	16.8	15.3	21.6
Percent under 18 years	22.2	22.2	17.6
Percent with disability	13	11.3	13
Percent Speak English less than "Very Well"	8.4	17.3	5.8
Percent Racial & Ethnic Minority Status	36.6	56	27.6
Per Capita Income (2023 dollars)	$43,289	$47,977	$49,581
Median Household Income (2023 dollars)	$78,538	$96,334	$93,398
Median Home Value (2023 dollars)	$303,400	$695,400	$777,200
Unemployment, percent	5.2	6.4	5.1
Percent of Individuals Below Poverty Level	12.4	12	12.8
Percent of Population Over 25 with High School Diploma or Equivalent	89.4	84.6	91.8
Percent of Population Over 25 with Bachelor's Degree or Higher	35	36.5	39.2
Percent with Health Insurance	91.4	93.1	94.2

	UNITED STATES	CALIFORNIA	SAN LUIS OBISPO COUNTY
Percent of housing units, mobile homes	5.7	3.5	7.7
Percent of Housing Units with no Vehicles Available	8.3	7.0	4.0

Source: U.S. Census Bureau, 2018 & 2023 5-year American Community Survey. www.census.gov/

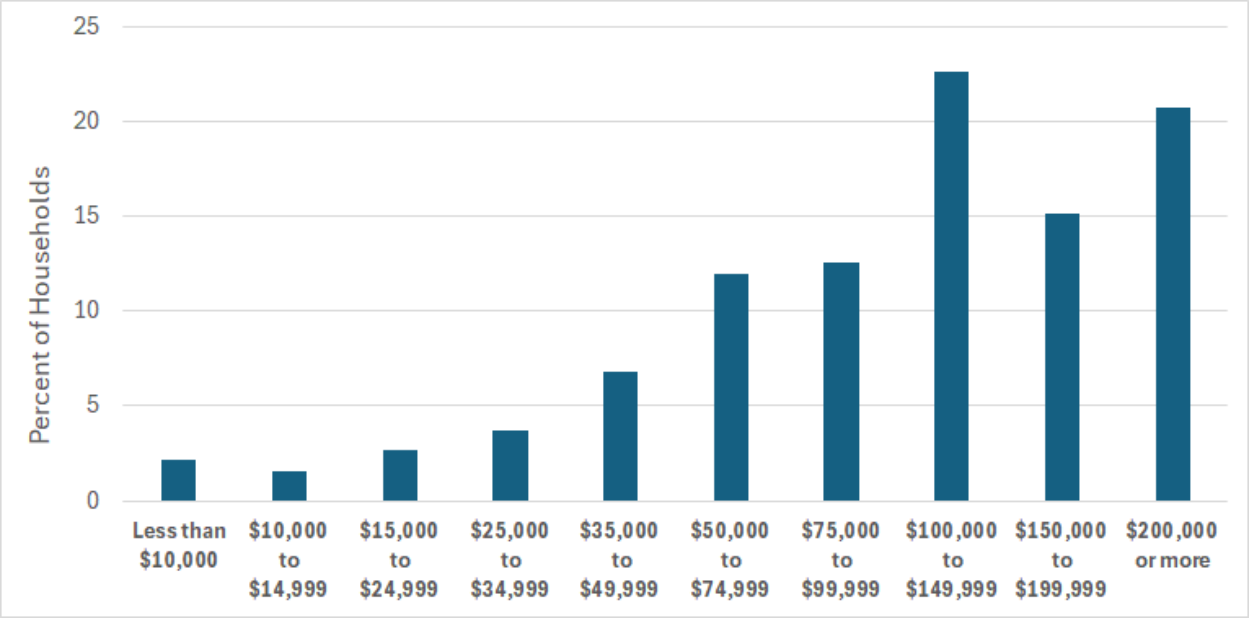
Table 4-3 Change in SLO County Demographic and Social Characteristics, 2018-2023

	2018	2023	PERCENT CHANGE
Population	281,455	281,486	0.0
Median Age	39.1	40.2	2.8
Percent 65 years and over	18.7	21.6	15.5
Percent under 18 years	17.9	17.6	-1.7
Percent with disability	11.5	13	13.0
Percent Speak English less than "Very Well"	6.5	5.8	-10.8
Percent Racial & Ethnic Minority Status, percent	14	28	97.1
Per Capita Income (Inflation-adjusted to 2023 dollars)	$43,480	$49,581	14.0
Median Household Income (Inflation-adjusted to 2023 dollars)	$85,789	$93,398	8.9
Median Home Value Inflation (Inflation-adjusted to 2023 dollars)	$652,707	$777,200	19.1
Percent Unemployment	4.6	5.1	10.9
Below Poverty Level, Percent of Individuals	13	12.8	-3.8
Percent of Population Over 25 with High School Diploma or Equivalent	83	91.8	10.7
Percent of Population Over 25 with Bachelor's Degree or Higher	33	39.2	17.7
Percent with Health Insurance	93	94.2	1.8
Percent of housing units, mobile homes	8.0	7.7	-3.8
Percent of Housing Units with no Vehicles Available	4.3	4.0	-7.0

Source: U.S. Census Bureau American Community Survey www.census.gov/

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Figure 4.3 Income Distribution of Households in San Luis Obispo County



Source: U.S. Census Bureau, 2023 5-year American Community Survey, www.census.gov/
Median household income $116,900.

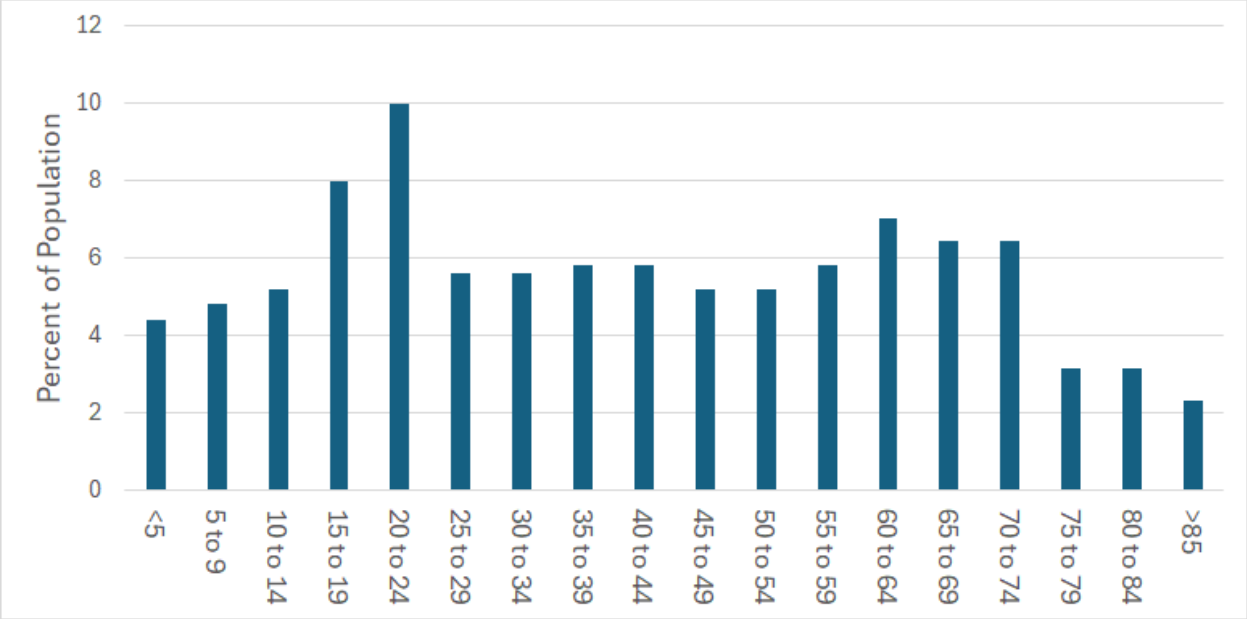
4.3.1.3 Age

Residents of SLO County are somewhat older, relative to what exists in the State of California and the United States (Table 4-2). The average age in SLO County has increased by more than a year from 2018 to 2023 (Table 4-3). The age distribution in SLO County has developed a notable bi-modal character, with retiree-age and especially young adults outnumbering all other age groups (Figure 4.4).

4.3.1.4 Racial Diversity

SLO County is less racially diverse and has a lower proportion of people who speak English less than "very well," relative to what exists for the United States and especially the State of California (Table 4-2). Overall, the proportion of minority population in SLO County is half that in California. By a wide margin, "Hispanic or Latino" is the largest minority group in SLO county (Table 4-4).

Figure 4.4 San Luis Obispo County Percent of Population By Age



Source: U.S. Census Bureau, 2023 5-year American Community Survey www.census.gov/
Note: ACS data for populations by age range are reported in either 5-year or 10-year age ranges. Some age ranges are interpolated to permit display of consistent 5-year age increments in the chart above.

Table 4-4 SLO Demographics, 2023

	POPULATION	PERCENT
Total Population	281,486	
Male	142,085	50
Female	139,401	50
White alone	184,190	65
Hispanic or Latino	68,980	25
Asian alone	9,550	3.4
Black alone	3,086	1.1
Some other race alone	1,735	0.6
Two or more races alone	1,041	0.4
American Indian and Alaska Native alone	505	0.2
Native Hawaiian and Other Pacific Islander alone	462	0.2

Source: U.S. Census Bureau, 2023 American Community Survey www.census.gov/

4.3.1.5 Education

In 2023, nearly 92% of people 25 years and over had at least graduated from high school and slightly more than 39% had a bachelor's degree or higher. These numbers compare favorably to both high school and college education attained in the State of California and the United States (Table 4-2) and indicate a sharp increase over what existed in SLO County in 2018 in both categories (Table 4-3).

4.3.1.6 People with Disabilities

As of 2023, 13% of the SLO County population lives with some form of disability. This is the same proportion reported for the State of California (13.0%) and marginally higher than the U.S. average (11.3%) However, 30% of individuals over age 65 in SLO County live with a disability. This is somewhat lower than the California (33%) and U.S. (33%) averages in the same age range.

4.3.1.7 Housing

Roughly 40% of housing units in SLO County were constructed in the 1970s and 1980s (Figure 4.5). The age of housing indicates not only its condition, but also the building standards used in construction. Housing type also indicates variability in construction quality and durability of housing. The large majority of housing in SLO County is single-unit detached (Table 4-5). Notably, mobile homes account for 8% of the housing units in SLO County. All of these characteristics affect the vulnerability of housing to hazards, and are discussed as appropriate in Chapter 5, Risk Assessment.

Figure 4.5 Decade of construction for housing units in SLO County

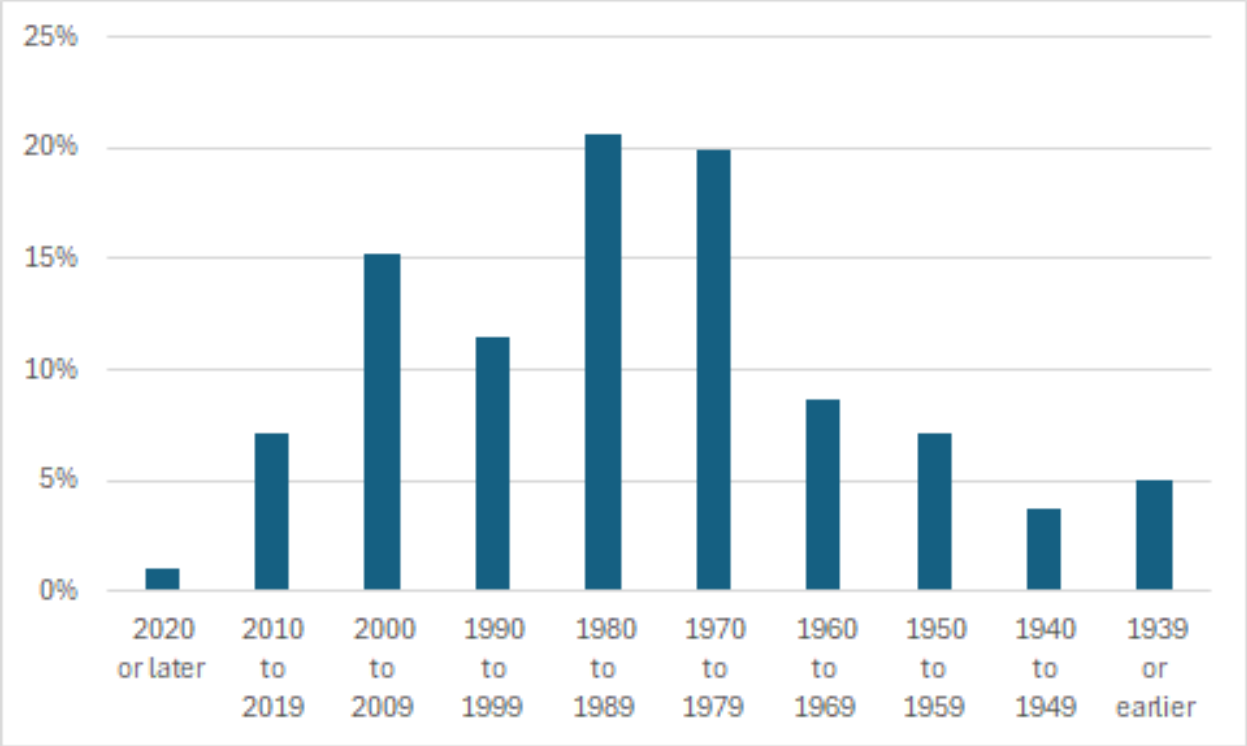


Table 4-5 Types of housing in San Luis Obispo County

	Housing Units	Percentage of All Housing Units
1-unit detached	84,996	68
1-unit attached	7,215	6
2 units	3,881	3
3 or 4 units	6,875	6
5 to 9 units	4,568	4
10 to 19 units	2,877	2
20 or more units	4,710	4

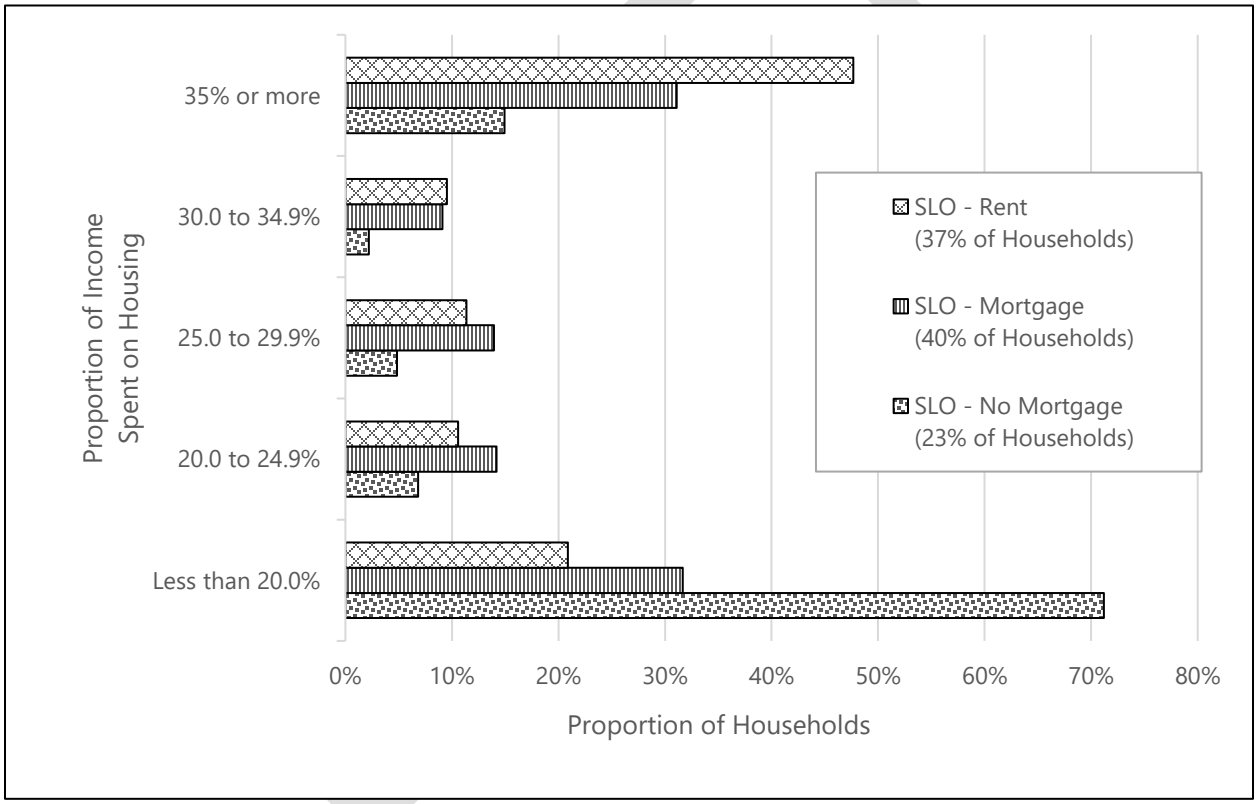
	Housing Units	Percentage of All Housing Units
Mobile home	9,567	8
Boat, RV, van, etc.	182	0.1
Total housing units	124,871	100

Source: U.S. Census Bureau, 2023 5-year American Community Survey www.census.gov/

As is the case with most of California, the cost of housing in SLO County is much higher than the average for the United States (Table 4-2). The median home value in SLO County has also risen over 19% from 2018 to 2023 (Table 4-3).

Renters account for 38% of the occupied housing units and spend a far greater proportion of their income on housing costs than do homeowners (Figure 4.6). Nearly half of renters (48%) spend 35% or more of their income on housing expenses. In comparison, only 31% and 15% of homeowners with and without a mortgage, respectively, spend 35% or more on housing expenses.

Figure 4.6 Proportion of income spent on housing-related expenses in SLO County, 2023



Source: US Census 2025

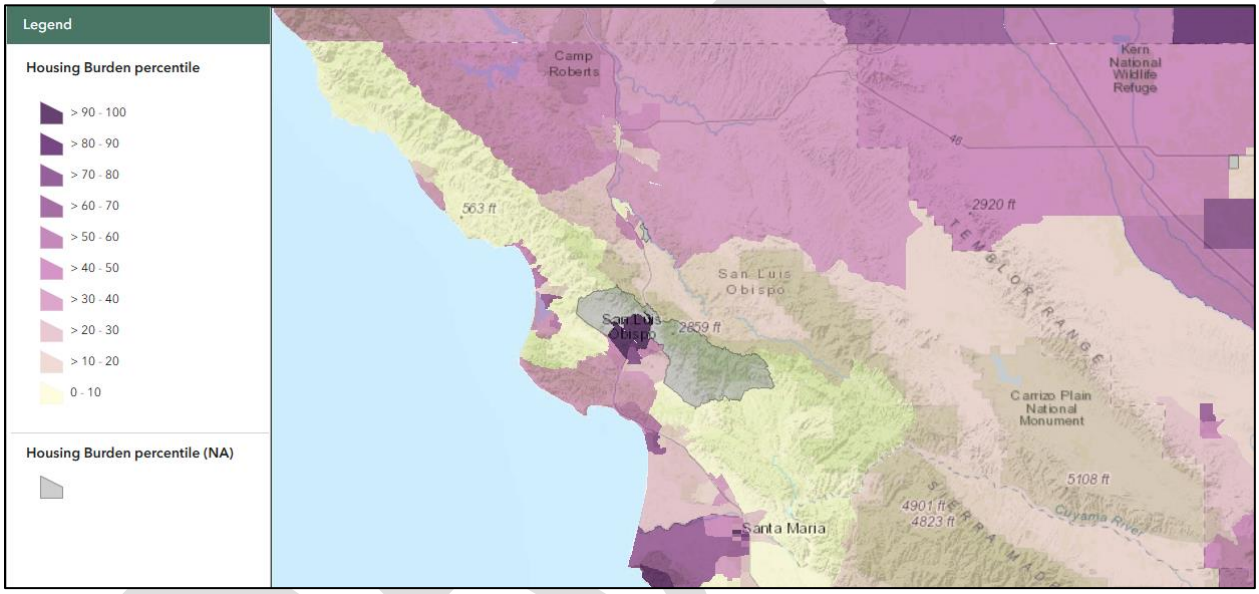
The State of California provides additional tools to measure and map the distribution of people who are likely to be highly burdened by high housing costs, and therefore more vulnerable to natural hazards. CalEnviroScreen's housing burden indicator measures the percentage of households in a census tract that are both low-income (making less than 80% of its County's median family income) and severely burdened by housing costs (paying greater than 50% of their income to housing costs).

California's high housing costs relative to the rest of the country can make it hard for households to afford housing (OEHHA 2022). Households with lower incomes may spend a larger proportion of their income on housing and may suffer from housing-induced poverty

(OEHHA 2022). Housing affordability is an important determinant of health and well-being. Low-income households with high housing costs may suffer adverse health impacts. These households are also more likely to be adversely affected during a hazard event and less likely to recover as quickly as other population groups.

Figure 4.7 illustrates housing burden percentiles across San Luis Obispo County, showing the percentage of income that households allocate to housing costs. The color gradient represents different levels of housing burden, with darker shades of purple indicating areas where a higher percentage of households are severely burdened by housing costs. The City of San Luis Obispo has some of the highest housing burdens (90-100 percentile). Some coastal areas also exhibit high housing cost burdens (70-80 percentile). Rural and inland areas, particularly in Carrizo Plain and parts of the Temblor Range, show lower housing burdens (0-30 percentile).

Figure 4.7 CalEnviroScreen Housing Burden Indicator – San Luis Obispo County



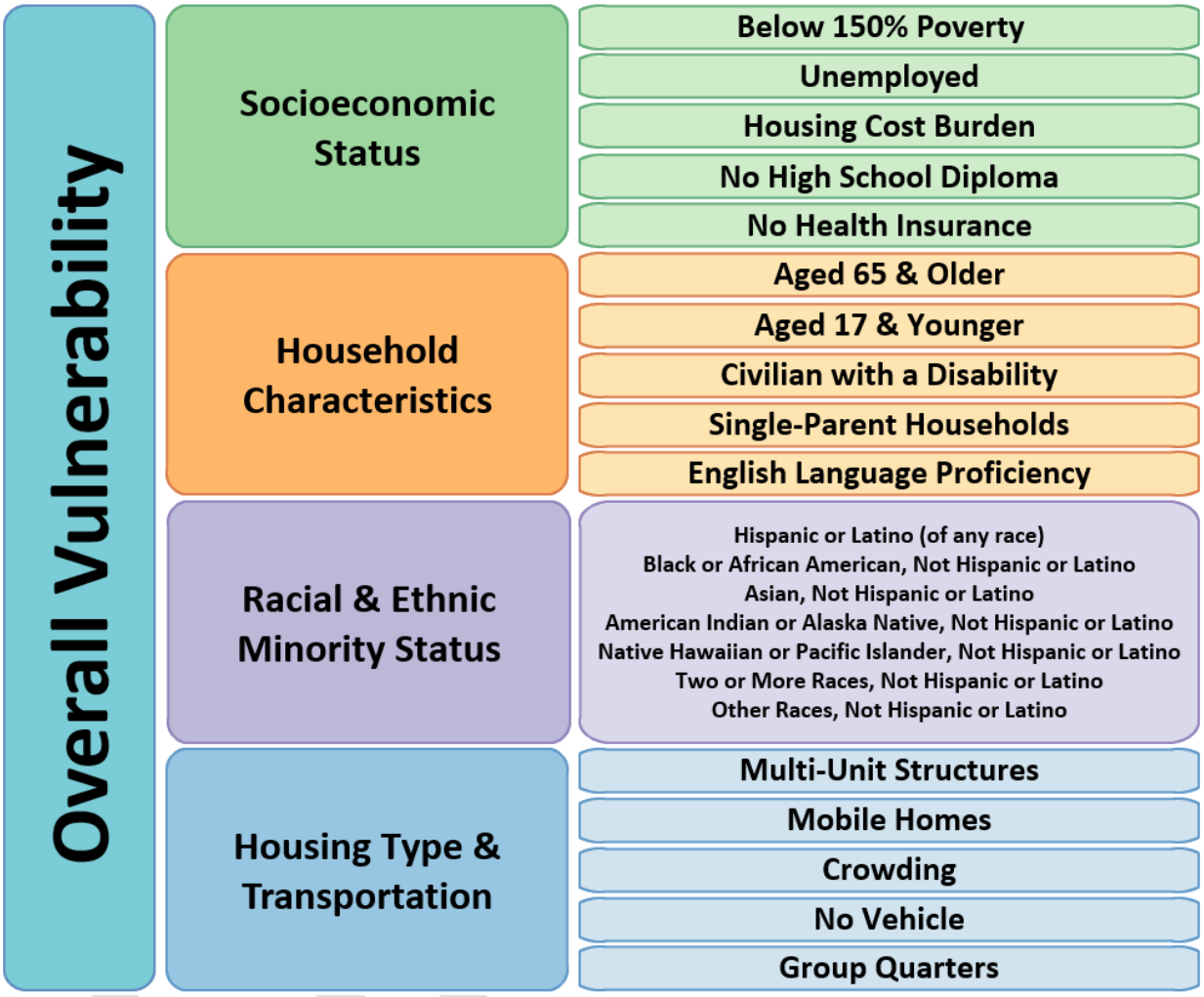
Source: CalEnviroScreen, 2023

4.3.1.8 Social Vulnerability

Social vulnerability is a crucial concern when planning to protect people from natural hazards. To help understand the spatial distribution of socially vulnerable populations, a social vulnerability index (SVI) was developed by the Center for Disease Control's (CDC) Agency for Toxic Substances and Disease Registry (ATSDR). The SVI provides a way to portray communities' capacities to prepare for and respond to natural and man-made disasters. This resource can assist emergency response planners and even public health officials identify communities more likely to require additional support before, during, and after a hazardous event.

The SVI uses US Census data to calculate an index value for each census unit, relative to all other census units. The methods used to calculate SVI are more completely presented in Flanagan et al. (2011). The variables used fall into four main themes of vulnerability: socioeconomic status; household characteristics; racial and minority status; and housing type and transportation. Each of these themes are in turn comprised of variables that are quantified by the US Census. The exact variables have changed slightly since the SVI was first developed and the current variables used to calculate SVI are shown in Figure 4.8.

Figure 4.8 Social Vulnerability Index Variables Grouped by Theme



Source: Image adapted from Social Vulnerability Index | Place and Health – Geospatial Research, Analysis, and Services Program (GRASP) | ATSDR

The CDC's SVI web tool1 creates county- and state-level maps to show spatial variability in SVI between counties and census tracts. This allows users to understand *where* social vulnerability exists. The CDC tool also maps the four variable themes that are used to calculate SVI (Figure 4.8). This allows users to begin to understand *why* social variability is high in any one location. For additional information on the CDC's SVI, refer to their documentation and materials online at https://svi.cdc.gov/.

The SVI for San Luis Obispo County is low relative to surrounding counties (Figure 4.9). Within San Luis Obispo County, SVI is elevated in all the towns and is particularly high in northwestern Paso Robles (Figure 4.10). The four themes used by the CDC to calculate SVI are mapped in Figure 4.11, Figure 4.12, Figure 4.13, and Figure 4.14. In some cases these factors offset one another, such as with housing type and socioeconomic status in and near the city of San Luis Obispo, indicating relatively high and low social vulnerability, respectively. The relatively high

1 SVI Interactive Map | Place and Health – Geospatial Research, Analysis, and Services Program (GRASP) | ATSDR. Accessed 1/2025 at: https://www.atsdr.cdc.gov/place-health/php/svi/svi-interactive-map.html.

SVI in northwestern Paso Robles appears to be driven largely by the household characteristics theme in the SVI calculation (Figure 4.12).

Figure 4.9 Social Vulnerability Index (SVI) of counties in California

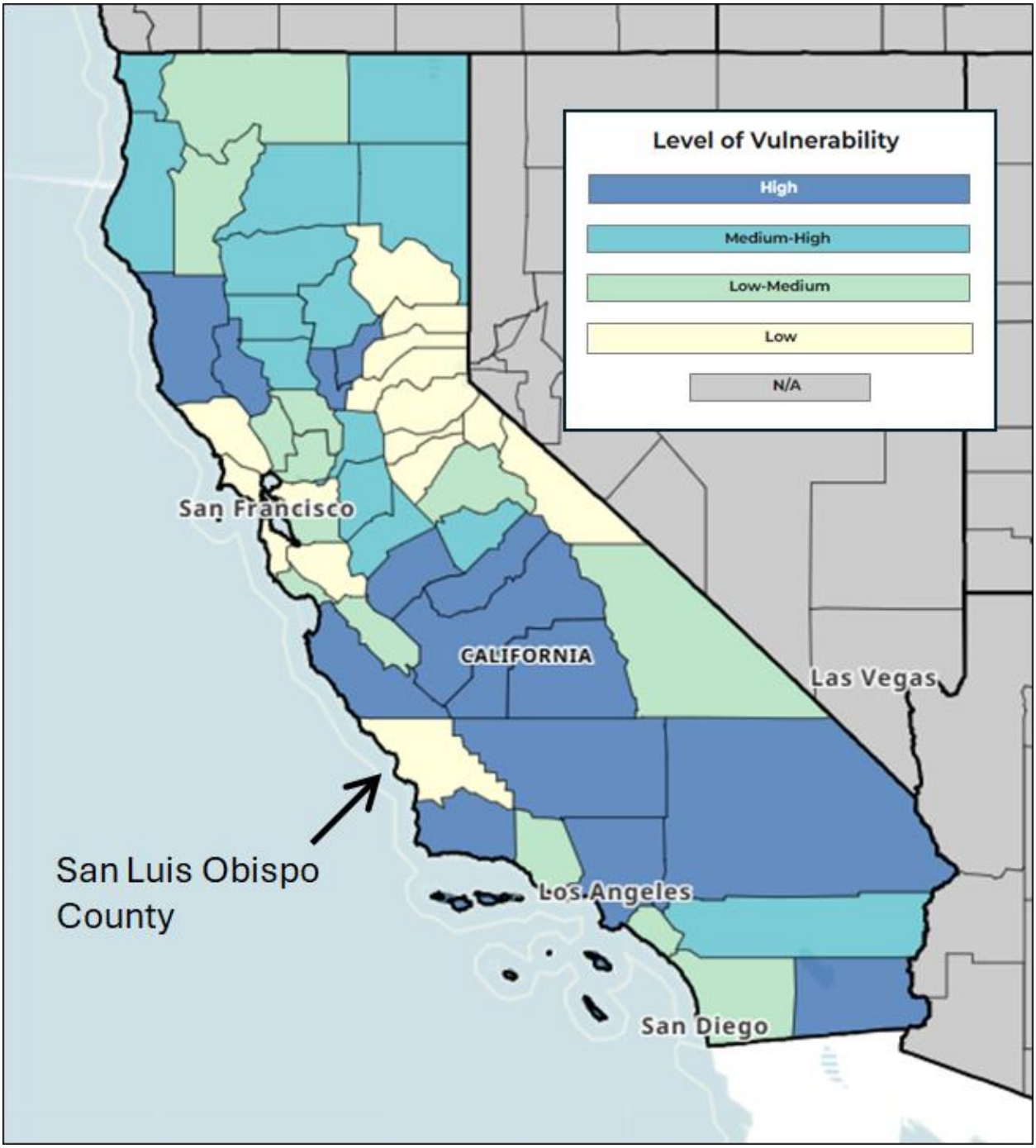


Figure 4.10 Social Vulnerability Index (SVI) of census tracts in San Luis Obispo County

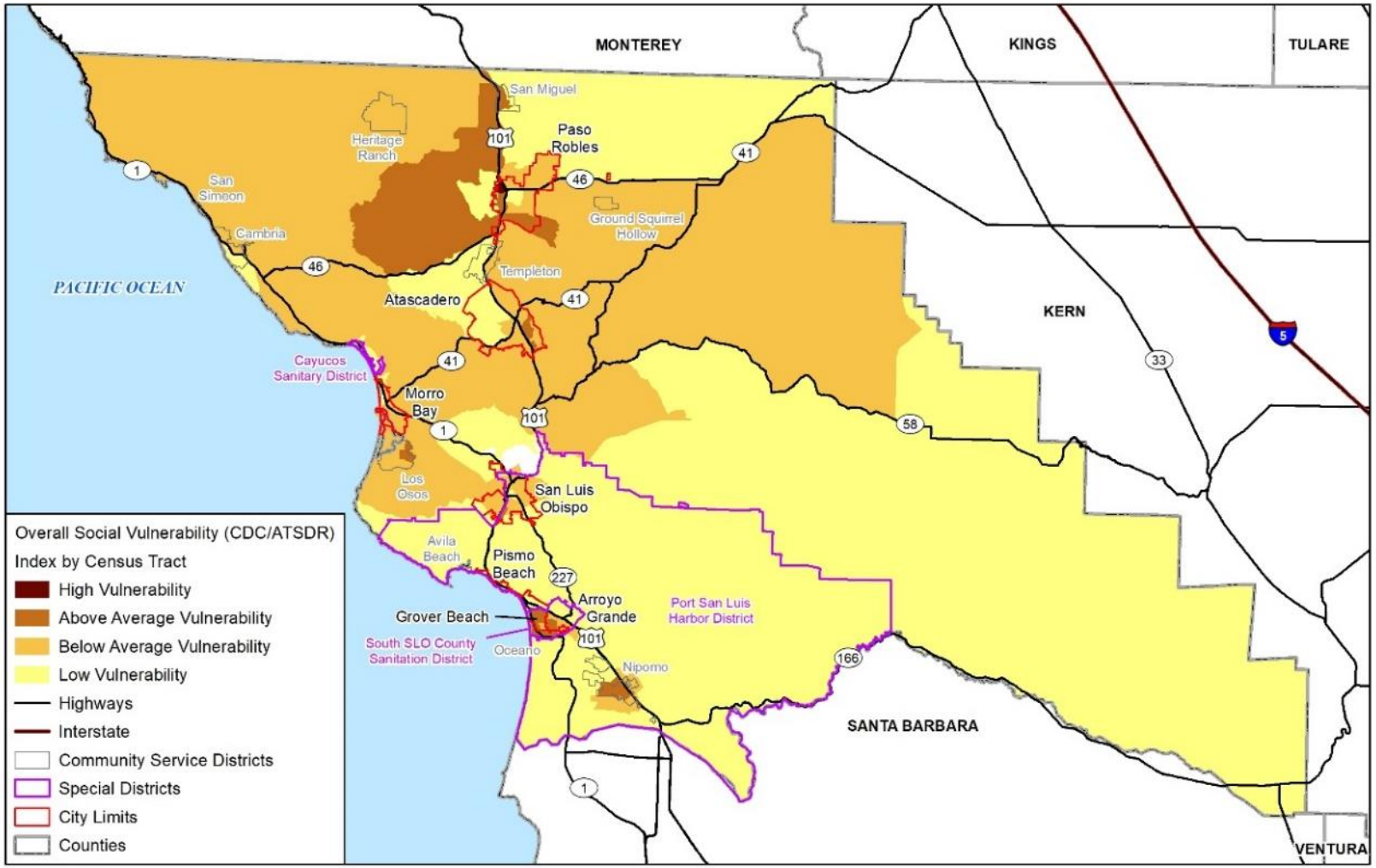


Figure 4.11 Socioeconomic status of census tracts in San Luis Obispo County

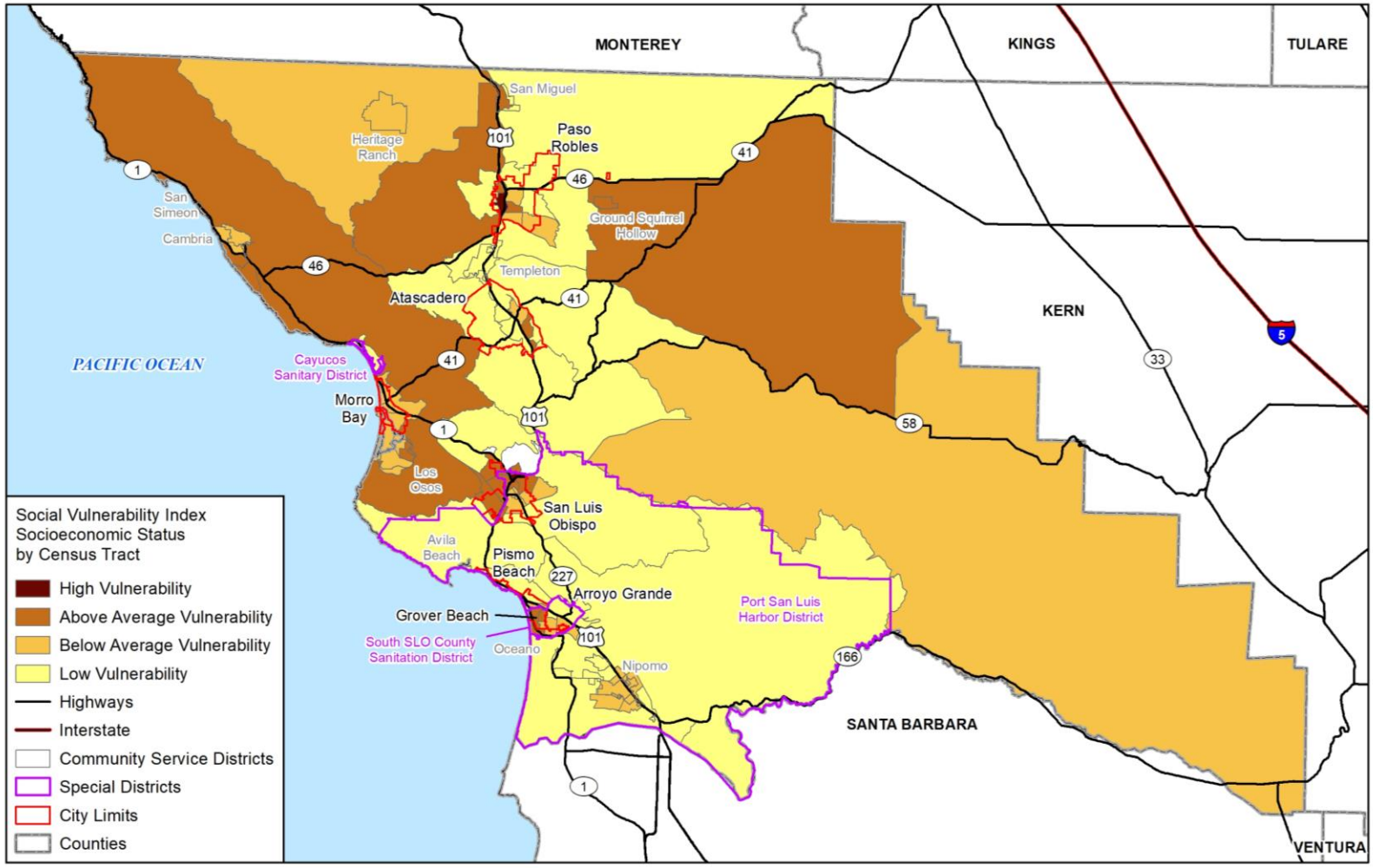


Figure 4.12 Household characteristics of census tracts in San Luis Obispo County

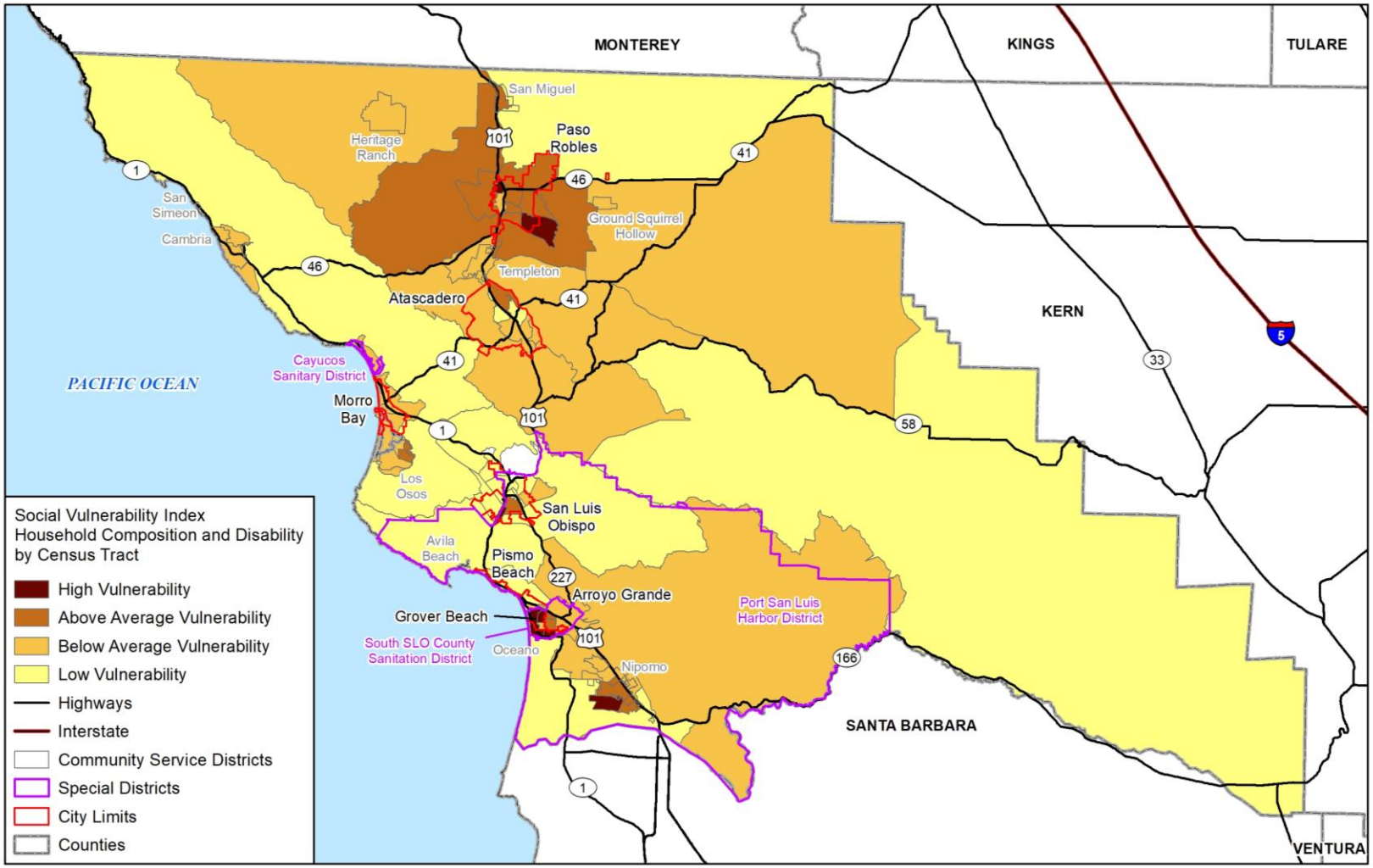


Figure 4.13 Racial and ethnic minority status of census tracts in San Luis Obispo County

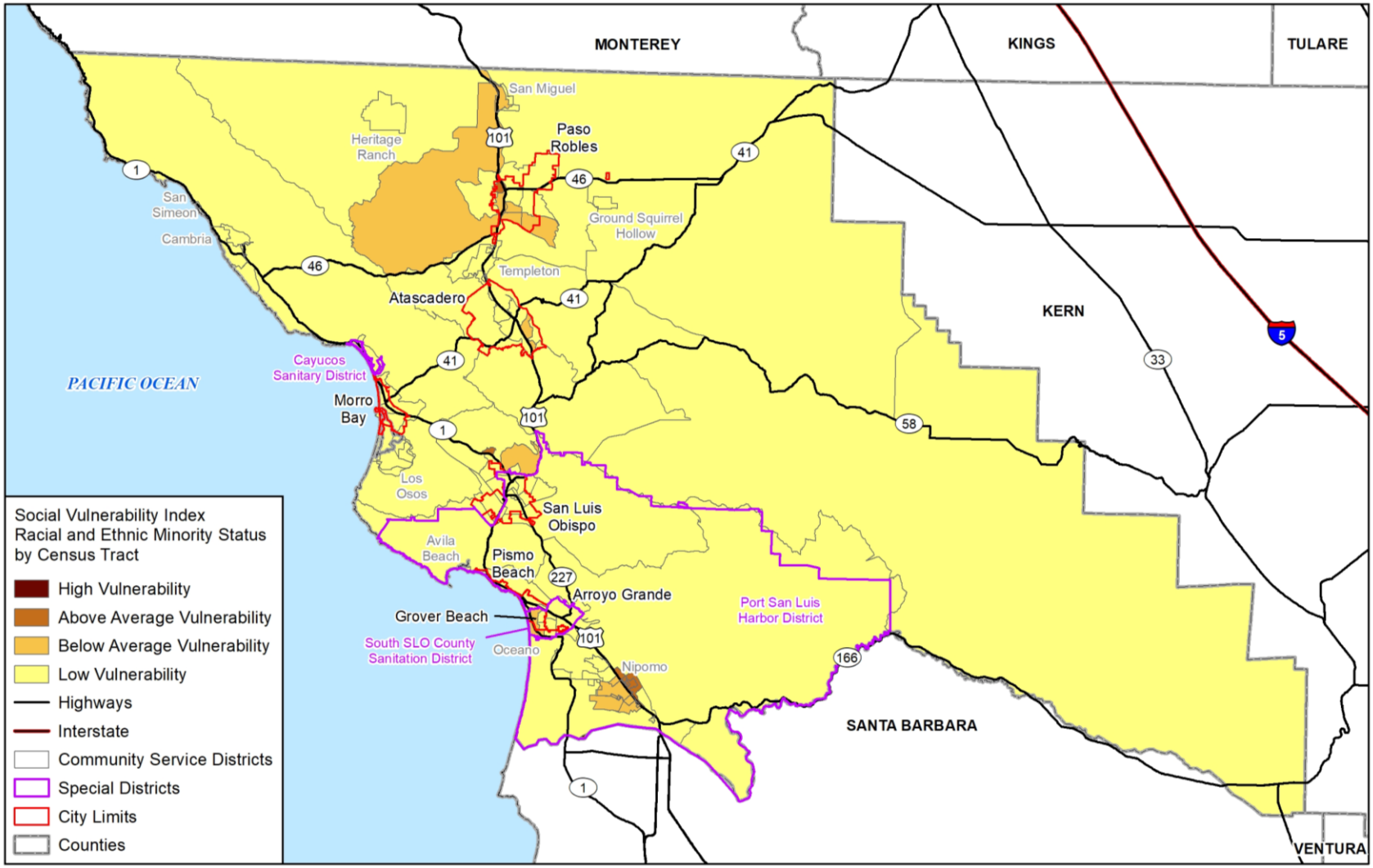
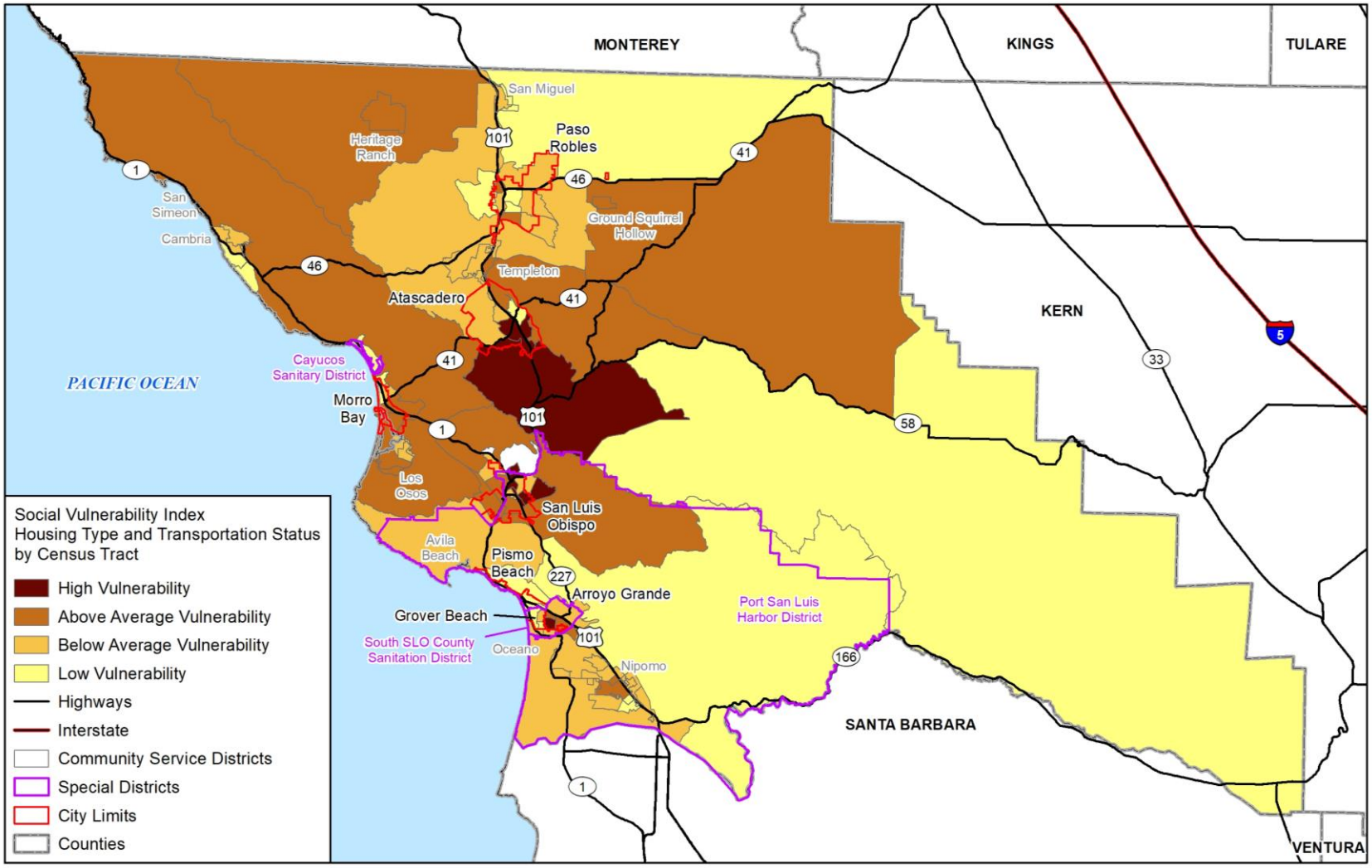


Figure 4.14 Housing type and transportation of census tracts in San Luis Obispo County



The California Office of Environmental Health Hazard Assessment (OEHHA) CalEnviroScreen provides an alternative to SVI-analysis of vulnerable populations, known within the state as disadvantaged communities (DACs). The California Office of Environmental Health Hazard Assessment (OEHHA) CalEnviroScreen ranks census tracts based on 21 indicators to identify communities that may be disproportionately impacted by disasters. Factors used by CalEnviroScreen include pollution exposure (e.g., diesel emissions, toxic cleanup sites) and population characteristics (e.g., poverty, unemployment). Census tracts scoring in the top 25% statewide are classified as DACs. One compelling application of CalEnviroScreen is to provide insight to social vulnerability created by housing affordability issues. This application is described above in the subsection on housing.

4.3.2 Environmental Justice Considerations

SB 1000 REQUIREMENTS §65302(H)(1)
The environmental justice element, or related environmental justice goals, policies, and objectives integrated in other elements, shall do all of the following: *A. Identify objectives and policies to reduce the unique or compounded health risks in disadvantaged communities by means that include, but are not limited to, the reduction of pollution exposure, including the improvement of air quality, and the promotion of public facilities, food access, safe and sanitary homes, and physical activity.* *B. Identify objectives and policies to promote civil engagement in the public decision-making process.* *C. Identify objectives and policies that prioritize improvements and programs that address the needs of disadvantaged communities.*

In 2016 California passed Senate Bill 1000 (SB 1000), the Planning for Healthy Communities Act, requiring cities and counties with disadvantaged communities to include environmental justice (EJ) in their General Plans when they are updating two or more elements of their General Plan concurrently on or after January 1, 2018. Environmental justice is defined by state law as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies" (Gov. Code § 65040.12e). SB 1000 defines disadvantaged environmental justice (EJ) communities as those that either 1) rank in the top 25th percentile of the CalEnviroScreen Index, or 2) are low-income and disproportionately affected by exposure to environmental pollution and other hazards that can lead to negative health effects or environmental degradation. This two-part definition creates a "black and white" baseline and another that allows a city or county to cater to its communities through its broad language. Per the first definition, no areas in San Luis Obispo County contain disadvantaged communities. Per the second definition, local jurisdictions may subjectively interpret how to identify disadvantaged communities based on a regional analysis.

This MJHMP update addresses these considerations to a degree in the social vulnerability assessment for each hazard in Section 5.3 *Hazard Analysis and Risk Assessment* and prioritization criteria for mitigation actions in Section 7. Prioritization criterial includes a 'Social' element which considers applying a higher priority to actions that relate to social equity, benefits disadvantaged communities, or addresses vulnerable populations. In addition, the County of San Luis Obispo adopted Mitigation Action C.1.3 to increase involvement of disadvantaged communities in disaster preparedness activities and prioritize programs that address their needs and incorporated these requirements into the Safety Element of the General Plan during a process parallel to this LHMP update. Other cities and counties may choose to identify disadvantaged communities within their jurisdictions and incorporate the SB 1000 requirements into their planning processes.

4.4 Economy

The 2023 ACA Census data documents the civilian employed population of SLO County aged 16 and over was 131,629 persons (Table 4-6). The largest sector of employment is educational

services, health care, & social assistance, which makes up 23% of jobs in the County. The arts, entertainment, recreation, accommodation, & food services sector ranks second, accounting for 13% employment, while 12% of SLO County employment is in the professional, scientific, and management, and administrative and waste management services sector.

Table 4-6 San Luis Obispo County Employment by Industry (2023)

INDUSTRY	NUMBER EMPLOYED	PERCENTAGE OF LABOR FORCE
Educational services, health care, and social assistance	29,761	23
Arts, entertainment, recreation, and accommodation and food services	16,694	13
Professional, scientific, and management, and administrative and waste management services	15,822	12
Retail trade	14,187	11
Manufacturing	10,481	8
Construction	9,988	8
Public administration	7,421	6
Other services, except public administration	6,476	5
Transportation and warehousing, and utilities	6,318	5
Finance and insurance, and real estate and rental and leasing	5,789	4
Agriculture, forestry, fishing and hunting, and mining	4,406	3
Information	2,278	2
Wholesale trade	2,008	2
Armed Forces	824	1
Total	131,629	100

Source: U.S. Census Bureau American Community Survey 2023 Estimates, www.census.gov/

Employers: Table 4-7 reflects the top employers in San Luis Obispo County as reported by the California Employment Development Department. Top employers include the Atascadero State Hospital, Cal Poly State University, Glenair, Inc, Pacific Gas & Electric, and San Luis Obispo County EMS.

Table 4-7 Top 25 Employers – San Luis Obispo County

COMPANY/ORGANIZATION	LOCATION	INDUSTRY	APPROXIMATE EMPLOYEES
Employer Name	Location	Industry	Employees
Atascadero State Hospital	Atascadero	Hospitals	1,000-4,999
Cal Poly State University	San Luis Obispo	Schools-Universities & Colleges Academic	1,000-4,999
Glenair Inc	Paso Robles	Communications Consultants	1,000-4,999
Pacific Gas & Electric Co	San Luis Obispo	Electric Companies	1,000-4,999
County of San Luis Obispo	San Luis Obispo	Government Offices-County	1,000-4,999
AMI Sierra Vista Radiology	San Luis Obispo	Physicians & Surgeons	500-999
California Mid-State Fair	Paso Robles	Concert Venues	500-999
Cuesta College	Paso Robles	Junior-Community College-Tech Institutes	500-999
Division of Juvenile Justice	Paso Robles	State Govt-Correctional Institutions	500-999
Medi-Cal Eligibility Info	San Luis Obispo	Government Offices-County	500-999

COMPANY/ORGANIZATION	LOCATION	INDUSTRY	APPROXIMATE EMPLOYEES
Mental Marketing	Atascadero	Advertising-Agencies & Counselors	500-999
Sierra Vista Regional Med Ctr	San Luis Obispo	Hospitals	500-999
Trust Rcm	San Luis Obispo	Billing Service	500-999
Arroyo Grande Community Hosp	Arroyo Grande	Hospitals	250-499
Child Abuse-Neglect-Child	San Luis Obispo	Business Management Consultants	250-499
County Office of Education	San Luis Obispo	Schools	250-499
French Hospital Medical Ctr	San Luis Obispo	Hospitals	250-499
Hearst Castle	San Simeon	National Monuments	250-499
Madonna Inn Resort	San Luis Obispo	Resorts	250-499
Morro Bay Art Assn Gallery	Morro Bay	Art Galleries & Dealers	250-499
Ramirez Farm Labor	Shandon	Labor Contractors	250-499

Source: California Employment Development Department

Agriculture: The agriculture industry in San Luis Obispo is a crucial part of the local economy, providing employment and income directly for those in agriculture, as well as driving growth in the tourism industry. Total crop values in 2017 were $925 million. The top 20 leading agriculture crops are listed in Table 5-3 in the Risk Assessment section.

4.5 Climate

The climate and air quality of San Luis Obispo County are directly related to its physical characteristics. The coastal lowlands and plains are bounded on the east by the Santa Lucia Mountains and experience a maritime climate. That climate is somewhat modified locally by elevation and distance from the ocean, as well as the mountains. The north and northeastern portions of the County include the upper end of the Salinas Valley, where the maritime climate is substantially modified by the intervening mountains. The Carrizo Plain in the east and southeastern portion of the County is climatically high desert.

Because the County is located along the California coast, the weather is normally under the influence of a high-pressure system located to the west. As a result, a common weather pattern includes afternoon and evening onshore winds.

San Luis Obispo County has a pleasant, Mediterranean climate year-round, averaging 315 days of sunshine per year.

- Winter: 64˚F / 31˚F - Cool and Sunny
- Spring: 75˚F / 44˚F - Breezy and Cool
- Summer: 94˚F / 54˚F - Warm Coastal Mornings/Sunny Days
- Fall: 77˚F / 43˚F - Warm Days and Cool Nights

The 2010 & 2011 Annual Air Quality Report issued by the San Luis Obispo Air Pollution Control District notes that the County overall had good air quality. However ozone levels exceeding both federal and state standards were measured on numerous days in the rural eastern portion of the County due to transported pollution. Smoke from wildfires can often adversely affect air quality. South County air quality was impacted by dust blown from the dune complex along the coast of the Five Cities area. Only one exceedance of the federal PM10 standard occurred in 2010, but numerous exceedances of the state standard were recorded during this time frame. The County attained both federal and state standards for fine

particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide, hydrogen sulfide, and visibility.

An overview of the effects of climate change on San Luis Obispo County can be found in subsection 5.1.3.

4.6 Transportation Systems

The County contains major transportation arteries including U.S. Highway 101, California State Highways 1, 41, 46, 58, and 166, and the Union Pacific Railroad. The County has a regional airport near the southern portion of the City of San Luis Obispo which offers service to larger commercial airports to the north and south (Los Angeles and San Francisco, as well as flights to Phoenix). In addition to air transportation, the County is also served with scheduled rail service by Amtrak, and motor bus service by companies such as Greyhound and Orange Belt Stages, as well as a number of tour coach operators, and local transit systems.

4.7 Governing Body

The Board of Supervisors serves as the Legislative body of the County of San Luis Obispo for the planning and provision of services related to public needs and the requirements of State and Federal laws. California law provides for five Supervisors to be elected by district. Each Supervisor is elected for a four-year term. Two of the Supervisors' terms are staggered so that all Supervisors are not standing for election at the same time. As the elected representative of the people of San Luis Obispo County, the Board of Supervisors establishes overall County priorities and sets policy.

The County Water Resources Division of Public Works operates the San Luis Obispo County Flood Control and Water Conservation District. The District (Public Works Department) is the designated County agency responsible for managing, planning, and maintaining drainage and flood control facilities in the unincorporated public areas where no other agency has assumed an active role in such activities. The District has a regional role in the County and can work with individual cities or communities when requested. The County Board of Supervisors also serves as the governing body for the Flood Control District.

4.8 Land Use

Existing land use within San Luis Obispo County is varied with respect to types of uses, ownership, character, and intensity. Land uses include:

- Rural residential
- Single family detached
- Single family attached
- High-density residential (apartments)
- Mobile homes
- Recreational open space
- Other open space
- Heavy industrial
- Warehouse
- Vacant
- Agriculture
- Water
- Utilities
- Public facilities
- Schools
- Retail / Office
- Tourist / Commercial recreation
- Light industrial / Business park
- Mineral extraction

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4.9 Development Trends

While the population of San Luis Obispo County is expected to continue growing, there are Land Use policies and elements within the County General Plan to help assure orderly development.

The California Department of Transportation's Office of State Planning prepared the *California County-Level Economic Forecast 2018-2050*. Highlights of the forecast, which is focused on future growth trends, for San Luis Obispo County and as shown in Table 4-8 include:

- From 2018 to 2023, employment growth is expected to average 0.9 percent per year.
- The largest employment gains will be observed in education and healthcare, leisure services, and government. Together, these sectors will account for 61 percent of net job creation during the 2018-2023 period.
- Average salaries are currently below the California average, and will remain so over the foreseeable future. In San Luis Obispo County, inflation-adjusted salaries are expected to rise by an average of 1.8 percent per year between 2018 and 2023, which will be similar to statewide growth.
- Over the forecast period, an average of 970 homes will be authorized per year. Because San Luis Obispo County has large amounts of buildable land, housing production will spread out into single-family communities, rather than be forced up into multi-family skyscrapers.
- The population is expected to increase by 0.4 percent annually through 2023. Net migration will account for almost all population growth. Because the County has an older population base, the number of deaths will be approximately equal to the number of births during the forecast period.

Table 4-8 San Luis Obispo County Economic Forecast, 2017-2050

SAN LUIS OBISPO COUNTY	2018	2050
Population (people)	279,967	298,795
Net Migration (people)	1,326	710
Registered Vehicles (thousands)	315	355
Households (thousands)	105.7	124.9
New Homes Permitted (homes)	1,111	303
Total Taxable Sales (billions)	$5.36	$19.35
Personal Income (billions)	$16.14	$54.75
Real Per Capita Income (dollars)	$56,044	$85,431
Inflation Rate (% change in CPI)	2.7	1.9
Real Farm Crop Value (millions)	967.2	1234.3
Real Industrial Production (millions)	2,493	4,698
Unemployment Rate (percent)	3.3	3.8
Employment (thousands of jobs)		
Total Wage & Salary	123.8	144.5
Farm	5.2	6.4
Construction	7.7	5.5
Manufacturing	7.3	7.9
Transportation & Utilities	4.1	3.9

SAN LUIS OBISPO COUNTY	2018	2050
Wholesale & Retail Trade	17.5	22.3
Financial Activities	4.2	4.4
Professional Services	10.7	13.4
Information	1.4	1.4
Health & Education	15.7	19.7
Leisure	19.3	23.5
Government	24.8	29.5

Source: California County-Level Economic Forecast 2018-2050, California Department of Transportation

Analysis of past development trends in the County based on population growth and recent development since the previous plan update can be found in subsection 5.2. It includes an analysis of the year of construction of structures in the parcel analysis. Additional discussion on development trends can be found in the Future Development section of each hazard profile in the Section 5.

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5 Risk Assessment

DMA REQUIREMENT §201.6(C)(2):
[The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

Risk, for the purposes of this plan and as defined by FEMA, is a combination of hazard, vulnerability, and exposure. It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage.

The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The process allows for a better understanding of a jurisdiction's potential risk to hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

This risk assessment builds upon the methodology described in the 2023 FEMA Local Mitigation Planning Handbook, which recommends a five-step process for conducting a risk assessment:

5. Identify Hazards
6. Describe Hazards
7. Identify Assets
8. Analyze Impacts
9. Summarize Vulnerability

In essence, the risk assessment evaluates potential loss from hazards by assessing the vulnerability of the county's population, build environment, critical facilities, and other assets. Data collected through this process has been incorporated into the following sections of this section:

- Subsection 5.1: Hazard Identification – identifies the hazards that threaten the Planning Area and describes why some hazards have been omitted from further consideration.
- Subsection 5.2: Asset Summary – describes the methodology for inventorying assets as the basis for determining vulnerability of the planning area to the identified hazards.
- Subsection 5.3: Hazard Analysis and Risk Assessment – discusses the threat to the Planning Area and describes previous occurrences of hazard events and the likelihood of future occurrences (2023 FEMA Local Mitigation Planning Handbook). It also includes a vulnerability assessment considering assets at risk, critical facilities, and future development trends (2023 FEMA Local Mitigation Planning Handbook Risk Assessment).

This risk assessment covers the entire geographical area of San Luis Obispo County. Since this plan is a multi-jurisdictional plan, the HMPC was required to evaluate how the hazards and risks vary from jurisdiction to jurisdiction. While these differences are noted in this section, they are expanded upon in the annexes of the participating jurisdictions. If no additional data is provided in an annex, it should be assumed that the risk and potential impacts to the affected jurisdiction are similar to those described here for the entire San Luis Obispo County planning area.

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5.1 Hazard Identification and Rating

DMA REQUIREMENT §201.6(C)(2)(I):
[The risk assessment shall include a] description of the type of all-natural hazards that can affect the jurisdiction.

The San Luis Obispo County HMPC reviewed hazards identified in the 2023 California State HMP and past SLO HMP updates and selected those hazards that present a significant threat to SLO County for further analysis in this HMP update. A summary and rating of hazards considered and selected is provided below.

5.1.1 Hazards Selection

In total, 41 hazards in were considered for inclusion in this HMP update (Table 5-1). This includes 34 natural and human-caused hazards in seven categories listed in the California State HMP. Seven additional hazards that have been included in past SLO HMP updates were considered.

Table 5-1 Hazards Considered and Selected for Inclusion in 2025 HMP Update

HAZARD CATEGORY	HAZARD CONSIDERED	LOCATION/SECTION IN 2025 SLO HMP UPDATE
Geologic Hazards	Earthquake	Earthquakes, Faults, and Liquefaction
	Landslide	Landslides & Debris Flows
	Debris Flows*	Landslides & Debris Flows
	Subsidence	Land Subsidence
	Tsunami & Seiche	Tsunami & Seiche
	Volcano	Not included in plan
Flood Hazards	Dam Failure	Dam Incidents
	Levee Failure	Flooding
	Riverine Flooding	Flooding
	Coastal Flooding & Sea Level Rise	Coastal Storm/Coastal Erosion/Sea Level Rise and Flooding
Fire Hazards	Wildfire	Wildfires
	Urban Structural Fire	Not included in plan
Meteorologic Hazards	Drought	Drought and Water Storage
	Extreme Cold/Freeze	Adverse Weather: Thunderstorm/Heavy Rain/Hail/Lightning/Dense Fog/Freeze
	Extreme Heat	Adverse Weather: Extreme Heat
	Severe Wind, Weather, & Storms	Severe Wind included in Adverse Weather: High Wind/Tornado; Severe Weather & Storms included in Adverse Weather: Thunderstorm/Heavy Rain/Hail/Lightning/Dense Fog/Freeze
	Snow Avalanche	Not included in plan – no hazard present in planning area
	Thunderstorm*	Adverse Weather: Thunderstorm/Heavy Rain/Hail/Lightning/Dense Fog/Freeze

HAZARD CATEGORY	HAZARD CONSIDERED	LOCATION/SECTION IN 2025 SLO HMP UPDATE
	Heavy Rain*	Adverse Weather: Thunderstorm/Heavy Rain/Hail/Lightning/Dense Fog/Freeze
	Hail*	Adverse Weather: Thunderstorm/Heavy Rain/Hail/Lightning/Dense Fog/Freeze
	Lightning*	Adverse Weather: Thunderstorm/Heavy Rain/Hail/Lightning/Dense Fog/Freeze
	Fog*	Adverse Weather: Thunderstorm/Heavy Rain/Hail/Lightning/Dense Fog/Freeze
	High Wind/Tornado*	Adverse Weather: High Wind/Tornado
Biological Hazards	Pandemic/Epidemic	Biological Agents
	Invasive & Nuisance Species	Agricultural Pest Infestation, Plant Disease, Marine Invasive Species and Tree Mortality
	Tree Mortality	Agricultural Pest Infestation, Plant Disease, Marine Invasive Species and Tree Mortality
Other Hazards	Energy Shortage	Not included in plan
	Geomagnetic Storm	Not included in plan
	Long-Term Electrical Outage	Not included in plan – addressed as consequence of other hazards
	Public Safety Power Shutoff	Not included in plan – addressed as consequence of other hazards
Human-Caused Hazards	Air Pollution	Not included in plan
	Civil Disorder	Not included in plan
	Cyber Threats	Not included in plan
	Electromagnetic Pulse Attack	Not included in plan
	Hazardous Materials Release	Hazardous Materials Incidents
	Natural Gas Pipelines	Hazardous Materials Incidents
	Oil Spills	Hazardous Materials Incidents
	Radiological Accidents	Hazardous Materials Incidents
	Terrorism	Not included in plan
	Transportation Accidents	Hazardous Materials Incidents
	Well Stimulation	Not included in plan

* Indicates hazards that are not specifically profiled in the 2023 California State HMP, but have historically been included in SLO HMP updates

5.1.1.1 Hazards Selected for Inclusion

The Central Coast region of California is exposed to many hazards. The HMPC used historical data, catastrophic potential, relevance to the jurisdiction, and the probability and potential magnitude of future occurrences were all used to select hazards that are the most relevant to San Luis Obispo County.

Using existing natural hazards data and input gained through planning meetings during HMP updates since 2014, the HMPC agreed upon a list of hazards that could affect San Luis Obispo County. No new hazards were added to the 2025 plan.

A total of 27 hazards were selected for inclusion (Table 5-1). This includes four man-made hazards related to hazardous materials. Evaluations of these hazards are sometimes divided or often lumped together in the 14 sections of the Hazard Analysis and Risk Assessment (Section 5.3).

In alphabetical order, the hazards identified and investigated for the San Luis Obispo County Multi-Jurisdictional Hazard Mitigation Plan include:

- Adverse Weather
    - Extreme Heat
    - Thunderstorm/Heavy Rain/ Lightning/Freeze/Hail/Dense Fog
    - High Wind/Tornado
- Agricultural Pest Infestation and Plant Disease/Marine Invasive Species
- Biological Agents (naturally occurring)
- Coastal Storm/Coastal Erosion/Sea Level Rise
- Dam Incidents
- Drought and Water Shortage
- Earthquake
- Flood
    - Levee Failure
- Hazardous Materials (human-caused hazard)
    - Fixed Facility
    - Transportation
    - Radiological Accidents
    - Oil Spills
    - Natural Gas Pipeline Rupture & Storage Facilities
- Landslide and Debris Flow
- Subsidence
- Tsunami
- Wildfire

5.1.1.2 Hazards Considered and Not Included in Plan

Only two natural hazards were considered from the 2023 State HMP and not selected for further evaluation: volcano hazards and snow-avalanche hazards. Volcano hazards are considered to be extraordinarily rare in SLO County and have limited impact, to the point that the HMPC does not consider volcano hazards to be a realistic threat to the planning area.

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Similarly, snow is a rare occurrence in SLO County[2] and accumulation is nearly non-existent and certainly insufficient to create an avalanche hazard.

Thirteen of the human-caused hazards in the State HMP are addressed through other planning mechanisms. FEMA does not require including human-caused hazards in hazard mitigation plans, and the focus remains largely on natural hazards with the 2025 plan update.

5.1.2 Hazard Ratings

Hazard ratings in this HMP update are the product of in-depth analysis, discussion among the HMPC, and public input at public meetings and in an online survey. Analyses for 2025 included a significant re-evaluation of each hazard with the latest, best available data. Hazards data from San Luis Obispo County, California Governor's Office of Emergency Services (CA-OES), FEMA, the National Oceanic and Atmospheric Administration, and other sources were examined to assess the significance of these hazards to the planning area. In addition, the 2025 update process included a comprehensive, parcel-level risk analysis where GIS data-availability permitted. Many new maps and tables were added to the plan that capture potential losses and aided rating each hazard.

Table 5-2 provides a summary of county-wide ratings of each hazard considered. Ratings for the geographic area affected, probability of future occurrence, and the magnitude/severity (extent) are all defined in the table. The rating for overall significance is based on a combination of these three aspects of each hazard. The individual ratings are made by the HMPC, with the aid of public input at meetings and in an online survey, and are based on or interpolated from the analysis of the hazards in the sections that follow. Ratings that are revised from previous plan updates are presented in **bold** typeface.

Table 5-2 San Luis Obispo County Hazard Significance

HAZARD	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY (EXTENT)	OVERALL SIGNIFICANCE
Adverse Weather: Thunderstorm/Heavy Rain/Hail/Lighting/Dense Fog/Freeze	Significant	Highly Likely	Negligible	Medium
Adverse Weather: High Wind/Tornado	Significant	Highly Likely	Negligible	Low
Adverse Weather: Extreme Heat	Extensive	Likely	Negligible	Low
Agricultural Pest Infestation and Disease	Limited	Highly Likely	Negligible	Medium
Biological	Extensive	Occasional	Critical	Medium
Dam Incidents	Limited	Unlikely	Critical	Medium
Drought and Water Shortage	Extensive	Likely	Critical	High
Earthquake	Extensive	Occasional	Critical	High
Flood	Significant	Highly Likely	Critical	High
Landslides and Debris Flow	Significant	Likely	Critical	Medium

2 SLO County CA weather history: See pictures, video of snow | San Luis Obispo Tribune. Accessed January 2025 at: https://www.sanluisobispo.com/news/local/article297177514.html.

HAZARD	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY (EXTENT)	OVERALL SIGNIFICANCE
Coastal Storm/Coastal Erosion/Sea Level Rise	Limited	Likely	Limited	Medium
Subsidence	Significant	Likely	Negligible	Medium
Tsunami and Seiche	Significant	Occasional	Limited	Medium
Wildfire	Extensive	Highly Likely	Critical	High
Human Caused: Hazardous Materials	Limited	Highly Likely	Negligible	Low

Geographic Area
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

Magnitude/Severity (Extent)
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

5.1.3 Disaster Declaration History

One method the HMPC used to identify hazards was researching past events that triggered federal and state emergency or disaster declarations in the planning area. Federal and state disaster declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state governments' capacities are exceeded, a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance. In other words, a presidential disaster declaration puts federal recovery programs in place to help disaster victims, business, and public agencies.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), or the Small Business Administration (SBA). FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations. The quantity and types of damage are the determining factors. This section focuses on state and federal disaster and emergency declarations. Details of federal and state disaster declarations were obtained by the HMPC, FEMA, and the California Office of Emergency Services (Cal OES) and are provided in Table 5-3.

San Luis Obispo County received formal state or federal recognition of a disaster for 50 hazard events between 1950 and December 2024. This includes state disaster proclamations for 37

hazard events and federal disaster declarations for 37 hazard events. Some events receive both state and federal recognition. Of the 30 state declarations, 23 were associated with flooding (17 of the flooding events were related to severe winter storms and heavy rains; 1 was associated with coastal flooding; and 3 were flooding and debris flows); 3 were for drought (not including declarations issued by the USDA); 2 were for freeze; 1 was for earthquake; and 2 were for wildfire.

Since 2012, there have been 13 drought declarations issued by the Secretary of Agriculture in San Luis Obispo County, 9 of which were Fast Track Secretarial disaster designations. According to the Secretary of Agriculture, a Fast Track designation is for a severe drought and provides an automatic designation when during the growing season any portion of the county meets the severe drought intensity value for eight consecutive weeks. Refer to the Drought hazard profile for more information of disaster declarations from the Secretary of Agriculture related to drought events.

The frequency of officially recognized state and/or federal disasters in San Luis Obispo County has accelerated over time. The county has received state and/or federal disaster recognition an average of 1.35 times/year over the past 20 years, 1.9 times/year in the past 10 years, and 2.2 times/year the past 5 years (Table 5-3).

Most disaster-related injuries to people and damage to property and crops resulted from severe weather. With the exception of the declarations for earthquake and wildfire, every declaration resulted directly or indirectly from severe weather. Review of these events helps San Luis Obispo County, and its jurisdictions identify risk reduction targets and ways to improve capabilities to avoid large-scale hazard events in the future.

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Table 5-3 San Luis Obispo County's Local, State and Federal Disaster Declarations, 1950-2024

HAZARD TYPE	DISASTER #	YEAR	STATE PROCLAMATION	FEDERAL DECLARATION	LOCATION	DAMAGE*
Floods	OCD 50-01	1950	11/21/50	--	Statewide	9 deaths; $32,183,000
Floods	DR-28	1955	12/22/55	12/23/55	Statewide	74 deaths; $200,000,000
Severe Storms – Flood	--	1958	4/2/58	4/4/58	Statewide	13 deaths; several injuries $24,000,000
Severe Storms – Flood	--	1963	2/14/64	--	Northern California – Boundaries of SLO county and 3 other counties up to the Oregon Border	--
Severe Winter Storms – Flood	DR-223	1967	12/1/1966	1/2/1967	San Luis Obispo (and 7 other counties)	$28,761,041
Flood	DR-253	1969	--	1/26/1969	San Joaquin County (and 39 other counties)	47 deaths; 161 injuries $300,000,000
Offshore Oil Platform Spill	--	1969	--	--	Coastal Areas of Southern California	--
Severe Winter Storms – Coastal Flooding	DR-364	1973	1/30/1973	2/8/1973	San Luis Obispo County (and 5 other counties)	$17,998,250
Drought	--	1976	2/9/76, 2/13/76, 2/24/76, 3/26/76, 7/6/76	--	San Luis Obispo County (and 30 other counties)	$2,664,000,000
Drought	EM-3023	1977	--	1/20/1977	San Luis Obispo County	--
Severe Winter Storms- Flood	DR-547	1978	2/1/1978	2/15/1978	San Luis Obispo County (and 13 other counties)	14 deaths, 21 injuries, $117,802,785
Severe Winter Storms- Flood	DR-677	1982-1983	12/8/1982-3/21/1982	2/9/1983	San Luis Obispo County (and 43 other counties)	$523,617,032
Wildfire – Las Pilitas Fire	DR-739	1985	7/1/1985	7/18/1985	San Luis Obispo County (and 6 other counties)	3 deaths, 470 injuries, $64,845,864 Burned 75,000 acres from Las Pilitas area to SLO. Portions of the City of SLO was evacuated.

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HAZARD TYPE	DISASTER #	YEAR	STATE PROCLAMATION	FEDERAL DECLARATION	LOCATION	DAMAGE*
Train Derailment	--	1986	--	--	Grover Beach	Evacuations, Road closures
Freeze	USDA and SBA declaration	1987	-	-	San Luis Obispo	-
Drought		1988	1/1/1988-12/31/1988	-	Statewide	-
Drought	USDA	1990	1/1990-7/13/1990	-	-	-
Extreme Cold Weather/ Freeze	DR-894	1990	12/19/1990-1/18/1991	2/11/1991	San Luis Obispo County (32 other counties)	$856,329,675
Hwy 41 Fire	GP 94-02	1994	8/24/1994	--	San Luis Obispo County	12 injuries, $6,382,235 Burned 48,531 acres, 42 homes, and 61 other structures
Severe Winter Storms – Flood	DR-1044	1995	1/6/95-3/14/96	1/13/1995	San Luis Obispo County (and 42 other counties)	11 deaths, $221,948,347
Severe Winter Storms – Flood	DR-1046	1995	1/14/1995	1/10/1995	San Luis Obispo County (all counties except Del Norte)	17 deaths, $132,040,111
Highway 58 Fire	Local Proclamation of Emergency	1996	-	-	San Luis Obispo	Burned 106,668 acres
Highway 166/Logan Fire	Local Emergency	1997	-	-	San Luis Obispo	Burned 50,000 acres
Severe Winter Storm- Flood	DR-1155	1997	1/2/1997-1/31/1997	1/4/1997	San Luis Obispo County (and 47 other counties	8 deaths, $194,352,509
Severe Winter Storms- Flood	DR-1203	1998	Proclaimed	2/9/1998	San Luis Obispo County (42 other counties)	17 deaths, $385,141,192
Severe Storms- Flood	DC 2001-01	2001	3/1/2001	-	San Luis Obispo County (and 2 counties)	$2,248,000 estimated in damages throughout county. Arroyo Grande levee breached on south side.
Earthquake – San Simeon Earthquake	DR-1505	2003	12/23/2003	1/13/2004	San Luis Obispo County (and Santa Barbara County)	2 deaths estimated $239,000,000 in damages, response and recovery costs

HAZARD TYPE	DISASTER #	YEAR	STATE PROCLAMATION	FEDERAL DECLARATION	LOCATION	DAMAGE*
Parkfield Earthquake	-	-	9/2004	-	San Luis Obispo	Minor damages
Hurricane Katrina – Economic	EM-3248	2005	--	9/13/2005	Statewide	$763,576
Winter Storms – Flood	DR-1628	2005-2006	--	2/3/2006	San Luis Obispo County (and 29 counties + statewide HM)	1 death; $203,050,747
Freeze	DR-1689	2007	--	3/13/2007	San Luis Obispo County (and 12 other counties)	$2,700,400
Winter Storms – Flood	DR-1952	2010-2011	12/1/2010	1/26/20/11	San Luis Obispo County (and 12 counties)	Most severe damages in areas of South County, particularly Oceano area. $66,318,201
Tsunami	DR-1968	2011	3/11/2011	4/18/2011	Statewide	-
Freezing Temperature, High Winds, Excessive Rain	S3255	2012	3/1/2012 – 4/30/2012 (begin to end date)	6/9/2012 (Sec. Ag Approval date)	San Luis Obispo County	--
Hail Storm, Rain, cold temperatures	S3320	2012	4/11/2012-4/13/2012 (begin to end dates)	8/3/2012 (Sec. of Ag approval date)	San Luis Obispo County	--
Drought	Local Emergency	2014-2017	--	--	San Luis Obispo County	
Drought		2014	January 17, 2014 – April 7, 2017	--	Statewide	--
Intense Thunderstorms	Local Emergency	2015	-	-	Paso Robles	3.6” of rain in 8 hours, causing water and mud damage to 20-30 homes
Cuesta Fire	Local Emergency	2015	-	-	Santa Margarita	A portion of the community of Santa Margarita was evacuated
Rain and Wind	S4003	2016	4/8/2016 – 5/6/2016 (begin to end dates)	7/27/2016 (Sec. of Ag. approval date)	San Luis Obispo County	--

HAZARD TYPE	DISASTER #	YEAR	STATE PROCLAMATION	FEDERAL DECLARATION	LOCATION	DAMAGE*
Severe Weather including excessive rainfall and high winds	S4164	2016	3/3/2016-6/1/2016 (begin to end dates)	3/31/2017 (Sec. of Ag approval date)	San Luis Obispo County	--
Excessive rain, high winds, cold temperatures, and hail	S4170	2016	3/1/2016-5/7/2016 (begin to end dates)	4/28/2017 (Sec. of Ag approval date)	San Luis Obispo County	--
Chimney Fire	FM-5146	2016	8/15/2016	-	Nacimiento Lake area	46,344 acres burned, 49 residential type structures destroyed, 21 other structures destroyed, 8 damaged. Hearst Castle was closed for some time.
Severe Storms-Flooding and Mudslides	DR-4301	2017	-	2/14/2017	San Luis Obispo County (and 33 other counties)	$39,956,354
Severe Storms – Flooding and Mudslides	DR-4305	2017	2/10/2017	3/16/2017	San Luis Obispo County (and 21 other counties)	$14,320,716
Severe Storms – Flooding and Mudslides	DR-4308, GP 2017-03	2017	3/7/2017	4/1/2017	San Luis Obispo County (and 41 counties and 1 tribe)	8 deaths; $119,834,925 (DR) $331,137 (GP)
Freeze	S4350	2018	2/20/2018	7/18/2018 (Sec. of Ag approval date)	San Luis Obispo County	--
Biological (COVID-19)	EM-3428	2020		3/13/2020	Statewide	
Biological (COVID-19)	DR-4482	2020		3/22/2020	Statewide	
Winter Storms	CA22-3	2021	1/29/2021	December 2021	San Luis Obispo (and 19 other counties)	
Winter Storms	CA23-1	2023	1/4/2023		Statewide	

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HAZARD TYPE	DISASTER #	YEAR	STATE PROCLAMATION	FEDERAL DECLARATION	LOCATION	DAMAGE*
Severe Winter Storm – Flooding and Mudslides	DR-3591	2023		1/09/2023	San Luis Obispo County	
Severe Winter Storm – Flooding, Landslide, and Mudslides	DR-4683	2023		1/14/2023	San Luis Obispo County	1 death
Winter Storms	CA23-3	2023	3/1/2023		San Luis Obispo County (and 52 other counties)	
Severe Winter Storm – Flooding, Landslide, and Mud Flows	DR-3592	2023		3/10/2023	San Luis Obispo County	
Severe Winter Storms – Straight-line Winds, Flooding, Landslides, and Mudslides	DR-4699	2023		4/03/2023	San Luis Obispo County	
Atmospheric River	CA24-3	2024	2/4/2024		San Luis Obispo (and 24 other counties)	
Severe Winter Storm – Tornadoes, Flooding, Landslides, and Mudslides	DR-4769	2024		4/13/2024	San Luis Obispo County	

Source: 2023 California State Hazard Mitigation Plan, FEMA, USDA
*Damage amount, deaths and injuries reflect totals for all impacted counties

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5.1.4 Datasets Used

Data used to support evaluation of hazards throughout Section 5 *Risk Assessment* includes the following:

- County GIS data (hazards, base layers, and assessor's data);
- Statewide GIS datasets to support mitigation planning;
- State of California Hazard Mitigation Plan 2023;
- San Luis Obispo County Hazard Mitigation 2019;
- Santa Barbara County Hazard Mitigation Plan;
- Cal FIRE datasets;
- California's Fourth Climate Change Assessment: Central Coast Region Report;
- US Forest Service GIS datasets;
- HIFLD GIS-based critical facility inventory data;
- Written descriptions of inventory and risks provided by jurisdictions;
- Online data sources (cited where applicable);
- Data and information from existing plans and studies; and
- Input from planning team members and staff from the County and local, state, and federal agencies.

5.2 Asset Summary

5.2.1 Assets Exposure

As a starting point for analyzing the Planning Area's vulnerability to identified hazards, the HMPC used a variety of data to define a baseline against which disaster impacts could be compared. If a catastrophic disaster were to occur in the Planning Area, this section describes significant assets exposed or at risk in the Planning Area.

Data used in this baseline assessment included:

- Total assets at risk;
- Critical facility and lifeline inventory;
- Cultural, historical, and natural resources; and
- Population growth and land use/development trends.

5.2.2 Structure Exposure

Parcel and assessor's data from the San Luis Obispo County Assessor's Office provide the foundation for an inventory of developed properties. Structure counts and valuations are based on data from the County Assessor's Office and include only parcels with improved values greater than zero. However, some government or tax-exempt properties lack recorded improvement values, leading to a potential underestimation of total property value. For GIS mapping and analysis, developed parcel polygons were converted to centroid points to

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approximate building locations. This provided the basis for an inventory of structures located in hazard areas and how recent development has influenced risk exposure.

Building contents are also considered when estimating losses from hazards. Contents values were estimated according to the following FEMA/Hazus guidelines based on property type:

- Residential structures (mobile or manufactured, multi-family, and single family) are assumed to be 50% of the structure value.
- Agricultural, Commercial, Exempt, and Mixed Use structures are assumed to be 100% of the structure value.
- Industrial and mining structures are assumed to be 150% of the structure value
- Vacant structures are assumed to have no content value.

Table 5-4 presents the structure count, improved value, and estimated content value for all exposed structures in San Luis Obispo County. Table 5-5 provides the same information broken out by property type. Table 5-6 provides the structure count, improved value, and content value of all properties within the unincorporated County.

Table 5-4 San Luis Obispo County Total Structure and Content Exposure by Jurisdiction

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE
Arroyo Grande	6,619	$2,118,305,207	$1,272,467,484	$3,390,772,691
Atascadero	10,232	$3,162,290,650	$1,850,812,820	$5,013,103,470
Grover Beach	4,670	$1,148,900,821	$734,490,528	$1,883,391,349
Morro Bay	5,251	$1,481,981,739	$864,400,556	$2,346,382,295
Paso Robles	10,678	$3,953,077,142	$2,540,301,037	$6,493,378,179
Pismo Beach	4,757	$1,981,081,669	$1,211,380,256	$3,192,461,925
San Luis Obispo City	15,448	$6,555,341,772	$4,520,367,191	$11,075,708,963
Unincorporated	44,646	$16,473,563,125	$8,916,024,601	$25,389,587,726
Total	**102,301**	**$36,874,542,125**	**$21,910,244,472**	$58,784,786,597

Source: San Luis Obispo County Assessor Data November 15, 2024, WSP GIS Analysis

Table 5-5 San Luis Obispo County Total Structure Exposure by Property Type

PROPERTY TYPE	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE
Agricultural	505	$549,521,949	$549,521,949	$1,099,043,898
Commercial	4,706	$4,274,562,024	$4,274,562,024	$8,549,124,048
Exempt	458	$243,736,901	$243,736,901	$487,473,802
Industrial	616	$702,401,298	$1,053,601,947	$1,756,003,245
Mining	9	$27,219,352	$27,219,352	$54,438,704
Mixed Use	4,395	$1,209,706,267	$1,209,706,267	$2,419,412,534
Mobile/Manufactured Homes	3,857	$672,212,565	$336,106,283	$1,008,318,848
Multi-Family Residential	3,951	$2,283,231,604	$1,141,615,802	$3,424,847,406
Residential	81,792	$26,148,347,894	$13,074,173,947	$39,222,521,841
Vacant Improved	2,012	$763,602,271	-	$763,602,271
Total	**102,301**	**$36,874,542,125**	**$21,910,244,472**	**$58,784,786,597**

Source: San Luis Obispo County Assessor Data November 15, 2024, WSP GIS Analysis

Table 5-6 Total Exposure by Property Type in Unincorporated San Luis Obispo County

PROPERTY TYPE	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE
Agricultural	472	$484,170,497	$484,170,497	$968,340,994
Commercial	1,070	$725,033,141	$725,033,141	$1,450,066,282
Exempt	181	$65,792,191	$65,792,191	$131,584,382
Industrial	153	$179,893,956	$269,840,934	$449,734,890
Mining	7	$26,374,693	$26,374,693	$52,749,386
Mixed Use	1,071	$260,315,671	$260,315,671	$520,631,342
Mobile/Manufactured Homes	3,157	$515,118,644	$257,559,322	$772,677,966
Multi-Family Residential	817	$364,186,809	$182,093,405	$546,280,214
Residential	36,205	$13,289,689,495	$6,644,844,748	$19,934,534,243
Vacant Improved	1,513	$562,988,028	-	$562,988,028
Total	**44,646**	**$16,473,563,125**	**$8,916,024,601**	**$25,389,587,726**

Source: San Luis Obispo County Assessor Data November 15, 2024, WSP GIS Analysis

5.2.2.1 Assets Inventory

Many types of assets are considered in this HMP update (Table 5-7). These assets are acknowledged here, and were included in the analyses used throughout the plan update process in maps, tables, and descriptions. A more detailed inventory of many of these assets, especially within the context of critical facilities and lifelines, is presented below along with the source of information. Appendix E Critical Facilities is an electronic spreadsheet that contains the results of GIS analysis that includes hazard exposure (where applicable) and more details on the assets such as name and address.

Table 5-7 Asset Types Considered in the 2025 HMP Update

TYPE OF ASSET	SOURCE OF DATA/INFORMATION	COMMENTS
Major employers	California Employment Development Department	See Table 4-7 and surrounding discussion
Manufacturing and Industrial	SLO Assessor	Included within the Parcel Analysis
Commercial districts and areas	SLO County Website	This information was incorporated into discussions of economic drivers, employers, and individual jurisdictions. Relevant GIS data for commercial districts is limited.
Economic Drivers	California County-Level Economic Forecast 2018-2050, California Department of Transportation	See Table 4-8 and surrounding discussion
Financial facilities	SLO County Website	Incorporated into the critical facility analysis
Public Buildings / Schools	HIFLD	Incorporated into the critical facility analysis
Community facilities	List of facilities from SLO County included in the Facility Analysis	Incorporated into the critical facility analysis
Housing	SLO County Website	Incorporated into the parcel analysis

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TYPE OF ASSET	SOURCE OF DATA/INFORMATION	COMMENTS
Cultural resources	SLO County Website	Incorporated into the critical facility analysis
Future Growth/Dev areas	SLO County Website	Sphere of influence areas were designated on city maps. Proposed new government buildings designated in the SLO County General Plan are discussed in Section 5.2.2
Bike/Pedestrian infrastructure	SLO County Website	Existing and proposed trails are incorporated on map below.
Hazardous facilities	HIFLD, Cal Arp	Incorporated into the critical facility analysis and Section 5.3.16
Natural infrastructure	National and SLO-County Datasets	Waterways are incorporated into figures throughout plan, wetlands are in map below.
Forest / woodlands	National and SLO-County Datasets	In the base map (4-1). Parks too.
Lakes, Reservoirs, rivers, wetlands	National and SLO-County Datasets	Waterways on base map and many figures.
Wildlife/Habitat areas	US Fish and Wildlife Service – Environmental Conservation Online System, 2025	Incorporated into discussion of special status species
Parks/Rec areas	National and SLO-County Datasets	Incorporated into the SLO base map (Figure 4-1)
Utility infrastructures	HIFLD; Well data augmented by subcontractor research	Incorporated into critical facilities analysis, new maps
Communications infrastructure	SLO County Website	Incorporated into critical facilities analysis
EMS facilities	HIFLD	Incorporated into critical facilities analysis
Public health facilities	HIFLD	Incorporated into critical facilities analysis
Shelters	GIS layer *EmergencyShelters_ARC_SLOCO* provided by SLO County	Incorporated into critical facilities analysis
Transportation facilities	HIFLD, NBI, SLO County Website	Incorporated into critical facilities analysis

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Figure 5-1 San Luis Obispo County existing and proposed bike and pedestrian trails

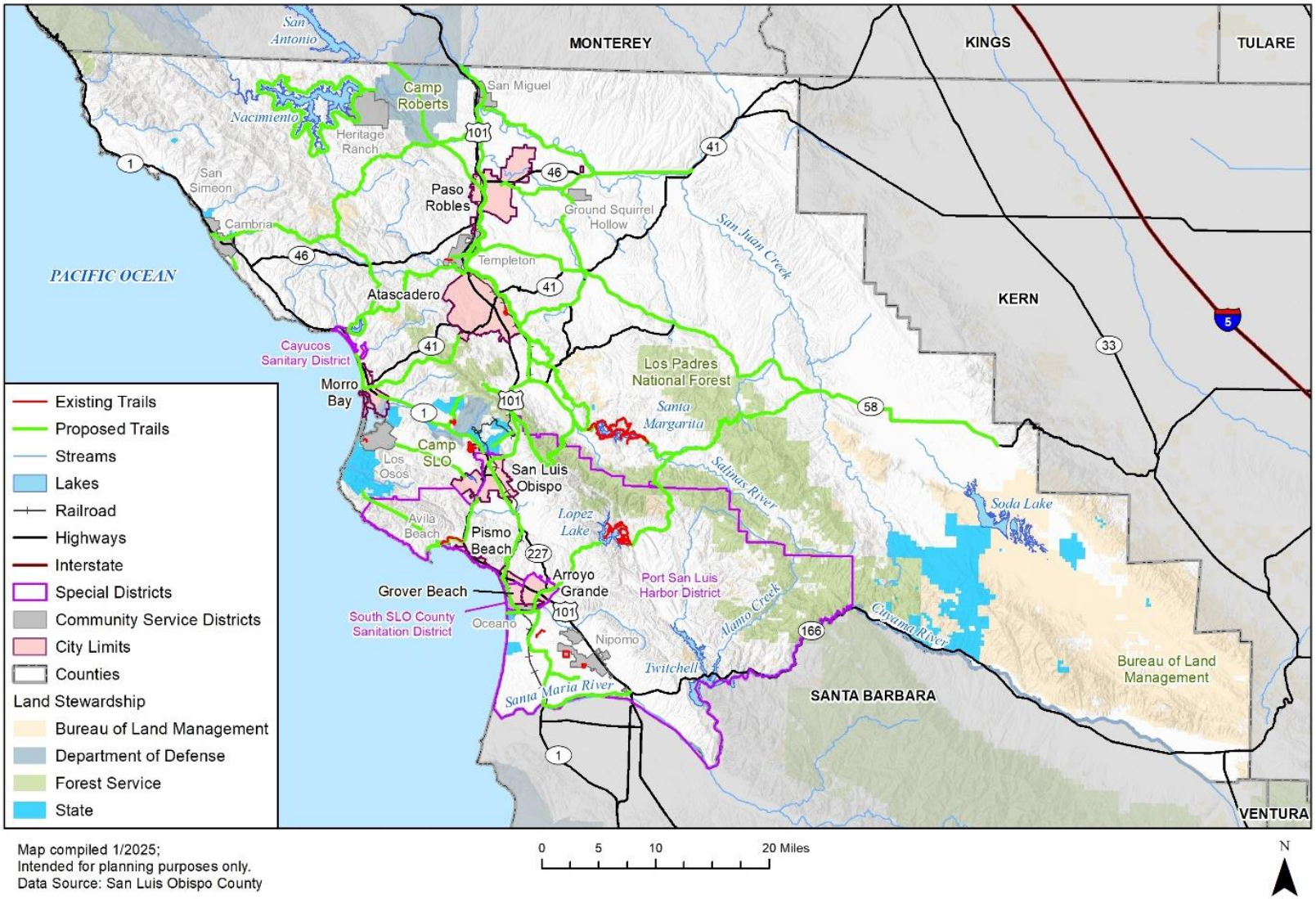
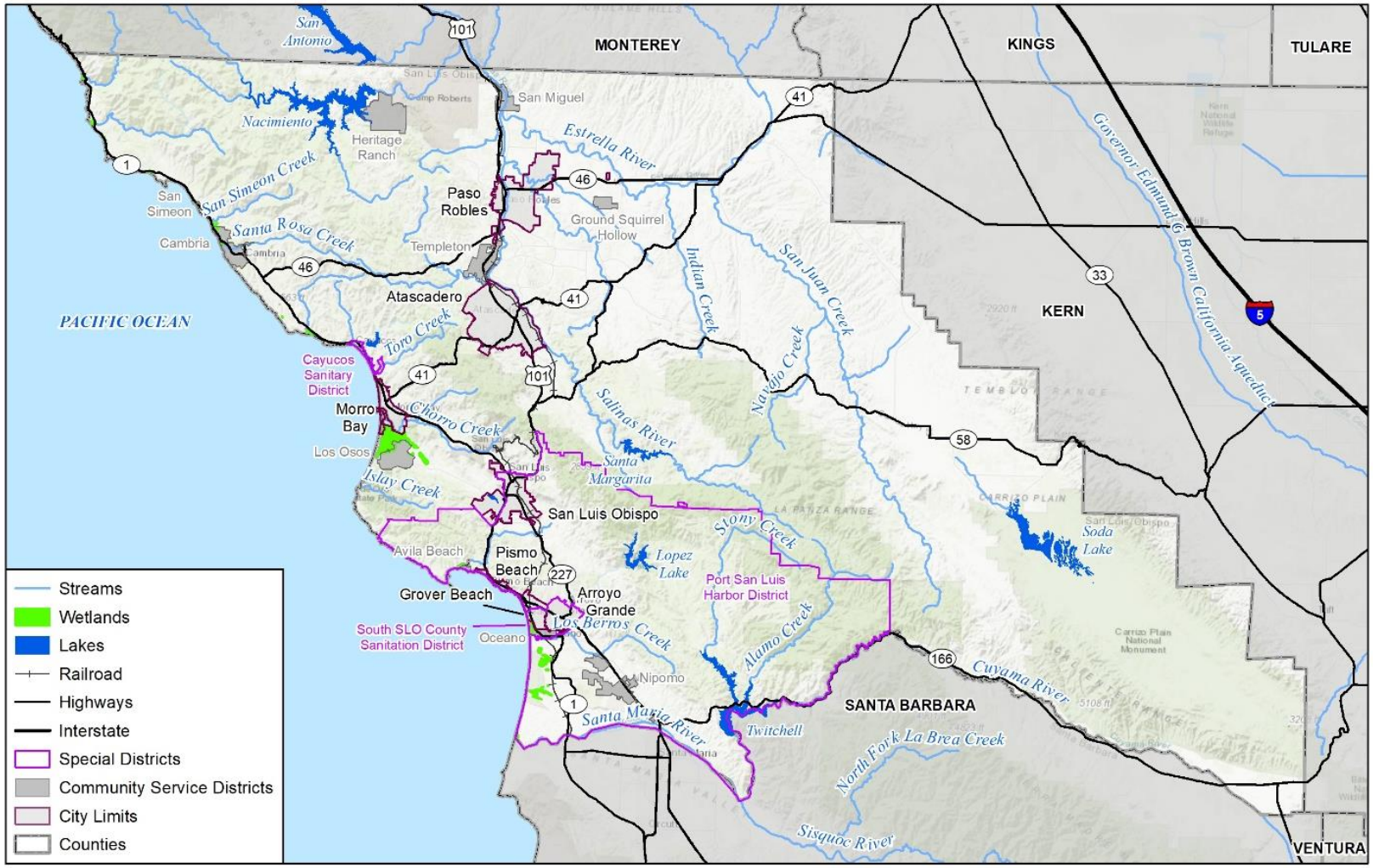


Figure 5-2 Wetland and Waterway inventory



Map compiled 1/2025;
Intended for planning purposes only.
Data Source: San Luis Obispo County,
Environmentally Sensitive Habitat Combining Designation - Wetland Habitat

Critical Facilities and Lifelines

A significant aspect of the risk assessment update was aligning critical facilities, defined as any facility essential for providing utilities, services, or operational support during emergency response or disaster recovery, with FEMA's Community Lifelines framework. According to FEMA, lifelines are essential systems that support critical government and business functions and are vital to public health, safety, and economic security. Examples include water and wastewater infrastructure, medical services, and electricity services. FEMA categorizes critical facilities into eight lifeline sectors, as shown in Figure 5-3.

Figure 5-3 FEMA Lifeline Categories



Source: FEMA Version 2.1 2023

These lifeline categories standardize the classification of Critical Facilities and Lifelines that provide indispensable service, operation, or function to a community. These categorizations are particularly useful as they:

- Enable effort consolidations between government and other organizations (e.g., infrastructure owners and operators).
- Enable integration of preparedness efforts among plans, easier identification of unmet critical facility needs.
- Refine sources and products to enhance awareness, capability gaps, and progress towards stabilization.
- Enhance communication amongst critical entities, while enabling complex interdependencies between government assets.

- Highlight lifeline related priority areas regarding general operations as well as response efforts.

Table 5-8 and Table 5-9 shows a summary of the total critical facilities inventory grouped by jurisdiction and community service district and lifeline. Figure 5-4 illustrates the location of critical facilities in the County.

Table 5-8 Summary of Critical Facilities by Jurisdiction and Lifeline

JURISDICTION	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Arroyo Grande	7	-	2	-	8	14	14	-	**45**
Atascadero	6	1	3	-	12	20	35	1	**78**
Grover Beach	2	-	1	1	1	6	1	4	**16**
Morro Bay	4	2	1	-	4	8	12	3	**34**
Paso Robles	10	2	3	9	4	26	20	1	**75**
Pismo Beach	3	-	1	-	3	8	15	1	**31**
San Luis Obispo City	19	-	4	4	18	36	54	1	**136**
Unincorporated	286	38	10	22	33	180	291	48	**908**
Total	**337**	**43**	**25**	**36**	**83**	**298**	**442**	**59**	**1,323**

Sources: San Luis Obispo County, CalARP, HIFLD, National Bridge Inventory, National Inventory of Dams, FCWCD, WSP Analysis

Table 5-9 Summary of Critical Facilities by Community Service District and Lifeline

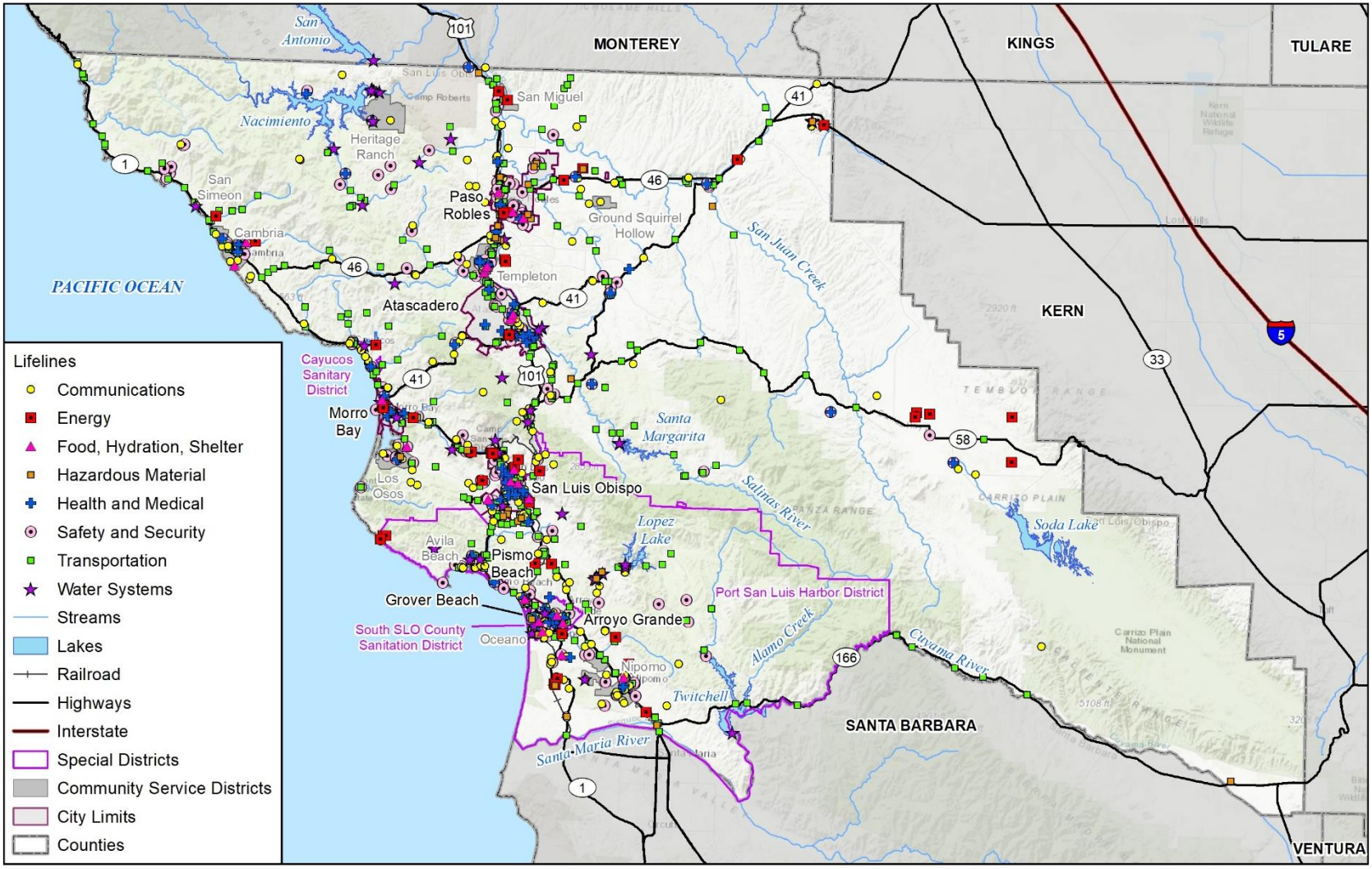
COMMUNITY SERVICE DISTRICT	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Avila Beach	3	-	-	-	-	1	-	-	**4**
Cambria	15	-	2	-	3	30	6	-	**56**
Ground Squirrel Hollow	1	-	-	-	-	-	-	-	**1**
Heritage Ranch	1	-	-	-	1	1	-	2	**5**
Los Osos	7	-	1	1	1	8	-	-	**18**
Nipomo	10	-	1	-	2	11	5	1	**30**
Oceano	6	-	1	2	1	7	6	1	**24**
San Miguel	4	2	-	-	-	6	8	-	**20**
San Simeon	1	-	-	-	-	-	-	1	**2**

COMMUNITY SERVICE DISTRICT	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Templeton	12	-	3	1	3	17	10	-	**46**
Total	**60**	**2**	**8**	**4**	**11**	**81**	**35**	**5**	**206**

Sources: San Luis Obispo County, CalARP, HIFLD, National Bridge Inventory, National Inventory of Dams, FCWCD, WSP Analysis

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Figure 5-4 San Luis Obispo County Critical Facilities



Map compiled 2/2025;
Intended for planning purposes only.
Data Source: San Luis Obispo County, CalARP, HIFLD, National Bridge Inventory, National Inventory of Dams, FCWCD

Cultural, Historical, and Natural Resources

Assessing the County of San Luis Obispo's vulnerability to disaster also involves inventorying the natural, historical, and cultural assets of the area. This step is important for the following reasons:

- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- In the event of a disaster, an accurate inventory of natural, historical and cultural resources allows for more prudent care in the disaster's immediate aftermath when the potential for additional impacts is higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, for example, wetlands and riparian habitat which help absorb and attenuate floodwaters and thus support overall mitigation objectives.

Cultural and Historic Resources

Historic resources include buildings, structures, objects, places, and sites eligible for listing in the National Register of Historic Places (NRHP), the California Register of Historic Resources (CRHR), or the County's List of Historic Resources. These resources are significant due to their association with important historical events, cultural heritage, or unique architectural styles. The California Environmental Quality Act (CEQA) defines cultural resources as including prehistoric and historic archaeological sites, buildings, structures, areas, and artifacts. These archaeological remains range from Native American sites to early 20th-century settlements and may be discovered in residential and special-use areas.

San Luis Obispo County has a rich history, including sites linked to Native American Tribes (Chumash, Salian, Yokut), Spanish missionaries, immigrant settlers, and US military. Native American groups have lived in the region for over 10,000 years, with European influence beginning in 1595 when the Spanish arrived. In 1769, Gaspar de Portolà and Father Junipero Serra passed through leading to the founding of the Mission San Luis Obispo de Tolosa along San Luis Obispo Creek. The region later transition from Spanish to Mexican Territory in 1822, with mission lands becoming private ranchos. By the late 1830s, San Luis Obispo County evolved from a remote outpost into a thriving agricultural and commercial hub.

For federal purposes, a qualified historic resource is property listed in or eligible for the NRHP before a disaster occurs. The NRHP, administered by the National Park Service, identifies properties significant in American History, architecture, archaeology, engineering, and culture. Under the National Environmental Policy Act (NEPA), any property over 50 years old is considered a historic resource and must be evaluated before alteration. Structural mitigation projects are also considered alterations under this regulation. The California Office of Historic Preservation provides technical support for rehabilitation and preservation, with mitigation strategies such fire protection zones, seismic retrofitting, and structural reinforcement. Local and state agencies may consider a broader definition of historic properties when assessing disaster damage.

Designated historic sites in San Luis Obispo County are listed in several federal, state and local registers, including:

- The California Register of Historical Resources
- The California Historical Landmarks

- The California Inventory of Historical Resources
- The California Points of Historical Interest
- The City of San Luis Obispo Cultural Heritage Committee
- The History Center of San Luis Obispo's Historic Buildings Inventory

Local cultural and historic resources are detailed in Table 5-10. Many of these resources in the County are vulnerable to earthquakes, wildfires, coastal storms, and severe weather due to their age materials, and locations. Where feasible, vulnerability assessments for specific historic structures were analyzed with a GIS overlay analysis, with results discussed in subsection 5.3 of each hazard.

Table 5-10 San Luis Obispo County Historic Resources

SOURCE	HISTORICAL RESOURCE
Adelaida Area Plan	Adelaida Cemetery
	Adelaida School
	J.F. MacGillivray Residence
	Rotta Winery
	San Marcos Cemetery
	Willow Creek Cemetery
	York Mountain Winery
El Pomar-Estrella Area Plan	Chandler House (Webster)
	Creston Cemetery
	Creston Community Church
	Estrella Adobe Church
	Geneseo School
	Linne School
	Rinconada School
Estero Area Plan	Canet Adobe
	Captain James Cass House
	Captain James Cass House & Adjacent Buildings
	Cayucos Pier
	Los Osos School House
	Morro Rock
	Spooner Residence
Huasna-Lopez Area Plan	Huasna School
	Porter Ranch House
	Rancho Huasna Sparks Adobe
	Tar Springs Ranch
Las Pilitas Area Plan	Pozo Saloon
NHRP	Administration Building, Atascadero Colony
	Ah Louis Store
	Angel, Myron, House
	Archeological Site 4 SLO 834
	Arroyo Grande IOOF Hall
	Atascadero Printery
	Bank of Italy
	Brewster-Dutra House
	Caledonia Adobe
	Call-Booth House

SOURCE	HISTORICAL RESOURCE
	Carrizo Plain Rock Art Discontiguous District
	Corral de Piedra
	Dana Adobe
	Eight Mile House
	Guthrie House
	Halcyon Historic District
	Hearst San Simeon Estate
	Jack, Robert, House
	Lincoln School
	Mission San Miguel Arcangel
	Monday Club of San Luis Obispo
	Montebello (shipwreck and remains)
	Morro Bay State Park Trailer and Tent Campground
	Old Santa Rosa Catholic Church and Cemetery
	Pacific Coast Railway Company Grain Warehouse
	Paso Robles Almond Growers Association Warehouse
	Pereira Octagon Barn
	Piedras Blancas Light Station
	Port San Luis Site
	Powerhouse, The
	Price, John, House
	Rancho Canada de los Osos y Pecho y Islay
	Robles, Paso, Carnegie Library
	San Luis Obispo Carnegie Library
	San Luis Obispo Light Station
	Tribune-Republic Building
	William Shipsey House
North Coast Area Plan	Arthur Beale House
	Bianchini House
	Camozzi's
	Carroll's Blacksmith Shop
	Hearst Castle
	Hearst Ranch Headquarters
	Heart's Ease
	Ian's Restaurant
	Louis Maggetti's House
	Rigdon Hall Restaurant
	Robin's Restaurant
	Soto's Market
	The Bank of Cambria
	The Bianchini House
	The Bluebird Motel
	The Brambles Restaurant
	The Bucket of Blood Saloon
	The First Presbyterian Church
	The Leffingwell House
	The Lull House
	The Olallieberry Inn
	The Old Santa Rosa Chapel

SOURCE	HISTORICAL RESOURCE
	The Paul Squibb House
	The Red House
	The Sebastian Store
	The Squibb House
	The Thorndyke House
	Van Gordon Archaeological Site
Salinas River Area Plan	Eight-Mile House
	Admin\Veterans memorial bldg.
	Bethel Lutheran Church
	C.H. Phillips House
	Mission San Miguel Archangel
	Rios Caledonia Adobe
	Santa Margarita Asistencia
	Santa Margarita de Cortona
San Luis Bay Area Plan-Coastal	Coffee T. Rice House
San Luis Bay Area Plan-Inland	Avila Valley Historic Site 1
	Avila Valley Historic Site 2
	Marre House
	Ortega-Price Adobes
	Price Adobe
	Temple of The People, Halcyon
San Luis Bay Coastal Area Plan	Port San Luis Lighthouse
San Luis Obispo Area Plan	Banning School
	Dallidet Adobe
	Hansen Barn
	Independence School
	Lyman House
	Mission SLO De Tolosa
	Octagon Barn
	Tognazzini General Store
	Vasquez-Hollister Adobe
South County Inland Area Plan	Dana House
	Los Berros Adobe Barn
	Los Berros Schoolhouse
	Old St. Joseph's Church
	Pacific Coast Railroad Depot
	Runels Home – Dana Street

Source: County of San Luis Obispo Office of Planning and Building, National Resource of Historic Places

Tribal Cultural Resources

Tribal cultural resources include sites, features, places, cultural landscapes, scared spaces and objects of cultural significance to a California Native American tribe. These resources are geographically defined and may include sanctified cemeteries, places of worship, religious or ceremonial sites, sacred shrines, historic ruins, burial grounds, and archaeological sites.

Several State laws and policies regulate potential impacts and encourage consultation and preservation:

- **Assembly Bill 52** (Public Resources Code [PRC] Section 21080.3.1) requires early tribal consultation during CEQA review to assess project impacts on tribal resources and develop mitigation strategies.
- **Senate Bill 18** (Government Code 655352.3) mandates tribal consultation during broad land use planning to encourage preservation of tribal cultural places which may be incorporated into designated open spaces.
- **State Executive Order B-10-11 (2011)** established the Governor's Tribal Advisor position and set a policy for State agencies to communicate and consult with tribes regarding tribal cultural resources.

Natural Resources

San Luis Obispo County has a diverse range of natural resources, including coastal dunes, cliffs, oak woodlands, extensive mountainous landscapes, and grasslands in the Carrizo Plain National Monument. Its creek and river flow from inland mountains to the Pacific Ocean, creating ecologically rich environments. The County also includes several protected areas, such as the State Marine Conservation Areas (SMCA), State Marine Reserves (SMR), State parks, game refuges, and critical habitats for migratory bird species.

Natural resources play an important role in mitigation planning by enhancing public safety, flood control, and conservation efforts. For example, protecting wetlands supports sensitive habitat while improving floodwater conveyance and storage. Natural resource maps can be found in the Planning & Building section of the County of San Luis Obispo website (County of San Luis Obispo 2019b).

Natural resources vary in resilience to anthropogenic impacts, climate change, and natural hazards such as flooding, drought, coastal storms or wildfire. Climate change is one of the most substantial threats to conserving biodiversity and ecological habitats (OPR 2019). Habitat resiliency is exemplified in coastal habitat migration to inland areas as a result to sea level rise, and recovery of burn areas following a wildfire.

The County's floodplains, wetlands, and coastal areas provide essential natural functions, including:

Flood Control 	Wetlands absorb and slowly release water, reducing flood heights and erosion.
Water quality & Groundwater Recharge 	Wetlands help filter pollutants and support water retention.
Erosion protection 	Coastal features like beaches, dunes, and tidal flats help shield inland areas from storm damage.
Recreation and tourism 	Parks, campgrounds, and water-based activities like boating, swimming, and fishing rely on healthy natural environments.
Wildlife and habitat preservation 	Floodplains and coastal areas are vital to marine fisheries, aquatic species, and timber resources.

Special Status Species

To further understand natural resources that may be particularly vulnerable to a hazard event, as well as those that need consideration when implementing

mitigation activities, it is important to identify at-risk species (endangered and threatened species) in the Planning Area. The US Fish and Wildlife Service maintains a list of federally listed threatened and endangered species for the country, which can be queried at the state or even county levels. The California Department of Fish and Wildlife also maintains species lists and accounts for threatened and endangered species. State and federal laws protect the habitat of these species through the environmental review process. Species of special concern may additionally include species that meets the State definition of threatened or endangered but has not been formally listed, experiences seriously population declines or habitat decline, or has naturally small populations exhibiting high susceptibility to population decline (Department of Fish and Wildlife 2019).

Table 5-11 summarizes San Luis Obispo County's special status animal species as indicated in the Fish and Wildlife Service database, within the Environmental Conservation Online System.

Table 5-11 Threatened and Endangered Species in San Luis Obispo County

GROUP	FEDERAL STATUS	STATE STATUS	SCIENTIFIC NAME	COMMON NAME
Amphibians	Endangered	None	*Anaxyrus californicus*	Arroyo (=arroyo southwestern) toad
	Threatened	None	*Rana draytonii*	California red-legged frog
	Threatened	Threatened	*Ambystoma californiense*	California tiger salamander
Birds	Endangered	Endangered	*Empidonax traillii extimus*	Southwestern willow flycatcher
			Gymnogyps californianus	California condor
			Rallus obsoletus	California ridgeway's rail
			Sterna antillarum browni	California least tern
			Vireo bellii pusillus	Least Bell's vireo
		Threatened	*Buteo swainsoni*	Swainson's hawk
	Threatened	Endangered	*Coccyzus americanus*	Yellow-billed Cuckoo
		None	*Charadrius nivosus*	Western snowy plover
			Brachyramphus marmoratus	Marbled murrelet
		Threatened	*Laterallus jamaicensis coturniculus*	California black rail
Crustaceans	Endangered	Endangered	*Branchinecta conservatio*	Conservancy fairy shrimp
			Branchinecta longiantenna	Longhorn fairy shrimp
		Threatened Threatened	*Branchinecta lynchi*	Vernal pool fairy shrimp
Fishes	Endangered	Endangered	*Eucyclogobius newberryi*	Tidewater goby

GROUP	FEDERAL STATUS	STATE STATUS		SCIENTIFIC NAME	COMMON NAME
		Endangered	None	*Oncorhynchus mykiss irideus*	Steelhead – southern California coast DPS
	Threatened	Endangered		*Hypomesus transpacificus*	Delta smelt
		None		*Oncorhynchus mykiss irideus*	Steelhead – south-central California coast DPS
Flowering Plants	Endangered	Endangered		*Arctostaphylos hookeri ssp. hearstiorum*	Hearst's manzanita
				Arenaria paludicola	Marsh Sandwort
				Caulanthus californicus	California jewelflower
				Cirsium fontinale var. obispoense	Chorro Creek bog thistle
				Cirsium fontinale var. obispoense	San Luis Obispo fountain thistle
				Cirsium loncholepis	La Graciosa thistle
				Clarkia speciosa ssp. immaculata	Pismo clarkia
				Cordylanthus maritimus ssp. maritimus	Salt marsh bird's-beak
				Deinandra increscens ssp. villosa	Gaviota Tarplant
				Dithyrea maritima	Beach spectaclepod
				Eremalche kernensis	Kern mallow
				Eriodictyon altissimum	Indian Knob mountainbalm
				Lupinus nipomensis	Nipomo Mesa lupine
				Monolopia (=Lembertia) congdonii	San Joaquin wooly-threads
				Suaeda californica	California seablite
		Threatened		*Cirsium rhothophilum*	Surf thistle
				Rorippa gambellii	Gambel's watercress
	Threatened	Rare		*Chlorogalum purpureum var. reductum*	Camatta canyon amole
		Threatened		*Arctostaphylos morroensis*	Morro manzanita

GROUP	FEDERAL STATUS	STATE STATUS	SCIENTIFIC NAME	COMMON NAME
			Chlorogalum purpureum var. purpureum	Purple amole
			Navarretia fossalis	Spreading navarretia
			Chorizanthe pungens var. pungens	Monterey spineflower
Insects	Endangered	Endangered	*Euphilotes battoides allyni*	El Segundo blue butterfly
			Euphilotes enoptes smithi	Smith's blue butterfly
	Threatened	None	*Euproserpinus euterpe*	Kern primrose sphinx moth
Mammals	Endangered	Endangered	*Ammospermophilus nelsoni*	Nelson's antelope ground squirrel
			Dipodomys heermanni morroensis	Morro Bay kangaroo rat
			Dipodomys ingens	Giant kangaroo rat
			Dipodomys nitratoides	Tipton kangaroo rat
		None	*Sorex ornatus relictus*	Buena Vista Lake ornate shrew
		Threatened	*Vulpes macrotis mutica*	San Joaquin kit fox
		Threatened / Endangered	*Enhydra lutris nereis*	Southern sea otter
Reptiles	Endangered	Endangered	*Dermochelys coriacea*	Leatherback sea turtle
			Gambelia silus	Blunt-nosed leopard lizard
	Threatened	Endangered	*Lepidochelys olivacea*	Olive ridley sea turtle
		Threatened	*Thamnophis gigas*	Giant garter snake
Snails	Endangered	Threatened	*Helminthoglypta walkeriana*	Morro shoulderband (=Banded dune) snail

Source: US Fish and Wildlife Service – Environmental Conservation Online System, 2025

Additionally, the County's Conservation and Open State Element defines natural and cultural resources as follows:

- **Major ecosystems** – Includes creeks, rivers, lakes, coastal features and interconnected public and private lands that support native ecosystems.

  Examples include Chorro Creek, Los Osos Creek, and the Morro Bay National Estuary.
- **Native trees and vegetation** – Key woodland and forested areas that contribute to biodiversity and habitat conservation.

Examples include Blue Oak and Coast Live Oak woodlands, as well as Monterey pines.

- **Fisheries and marine resources** – Includes both freshwater and saltwater fisheries, along with marine ecosystems protected under the Local Coastal Program.

  Examples include the Monterey Bay National Marine Sanctuary and steelhead trout habitat.

- **Archaeological sites**,– Particularly those significant to Native American heritage.

  Examples includes Chumash archaeological sites, including rock art locations, shell middens, and burial grounds.

- **Sites of historical events and traditional cultural places** – Locations of historical significance from various time periods.

  Examples include the Camino Real, a historic roadway significant during the Spanish and Mexican periods, and various Native American sacred sites.

- **Paleontological resources** – Fossil-rich areas preserving prehistoric life.

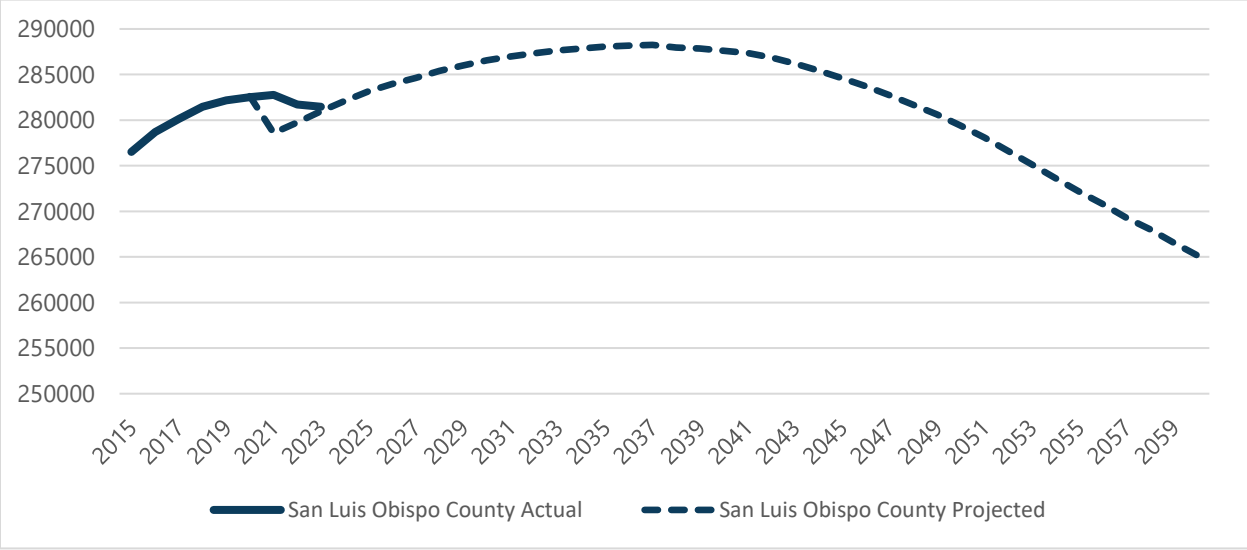
  Examples include dinosaur and prehistoric mammal remains, along with fossil-rich deposits in the Monterey Formation.

5.2.3 Population, Growth and Development Trends

As of 2023, San Luis Obispo County had an estimated population of 281,486 people (ACS 5-Year Survey, 2023), reflecting a slight 0.01% increase from 281,455 in 2018. Populations levels in incorporated cities remained relatively stable, while unincorporated areas experienced more variability. For example, Los Osos saw a decline of 1,244 residents (a 7.6% decrease); while the Census-designated place (CDP) of Callendar experienced significant growth, gaining 1,181 residents (74.6% increase).

According to the California Department of Finance (DOF), the County's population will continue to grow modestly, reaching a peak in about 288,256 around 2037. After this, a gradual decline is expected, with the population projected to decrease to 265,2060. This long-term downward, illustrated in Figure 5-5 below, trend suggests potential shifts in demographics, which may affect housing, infrastructure planning, and service demands in the County.

Figure 5-5 San Luis Obispo County Actual and Projected Population



Source: ACS 5-Year Estimates, 2023; DOF Population Projections 2023

Based on an analysis of parcels with improvements made between 2019 and 2024 a total of 3,853 new properties were built across San Luis Obispo County, with a combined improved value of approximately $2.98 billion, see Table 5-12 and Figure 5-6. The City of San Luis Obispo experienced the most significant growth, adding 1,491 structures valued at $973.6 million. Unincorporated areas also saw substantial development, with 1,402 new structures added and the highest total improved value at $1.085 billion.

Moderate growth was observed in Paso Robles and Atascadero, where 245 and 290 new structures were built, respectively, with total improved values of $311.5 million and $170.1 million. Smaller coastal cities such as Pismo Beach, Morro Bay, and Grover Beach saw more limited development, with 77 to 108 new structures built over this time frame.

These figures suggest that urban centers and unincorporated areas are driving development in the County, while coastal cities have experienced more constrained growth. Later sections will identify what growth, if any, occurred in hazard areas.

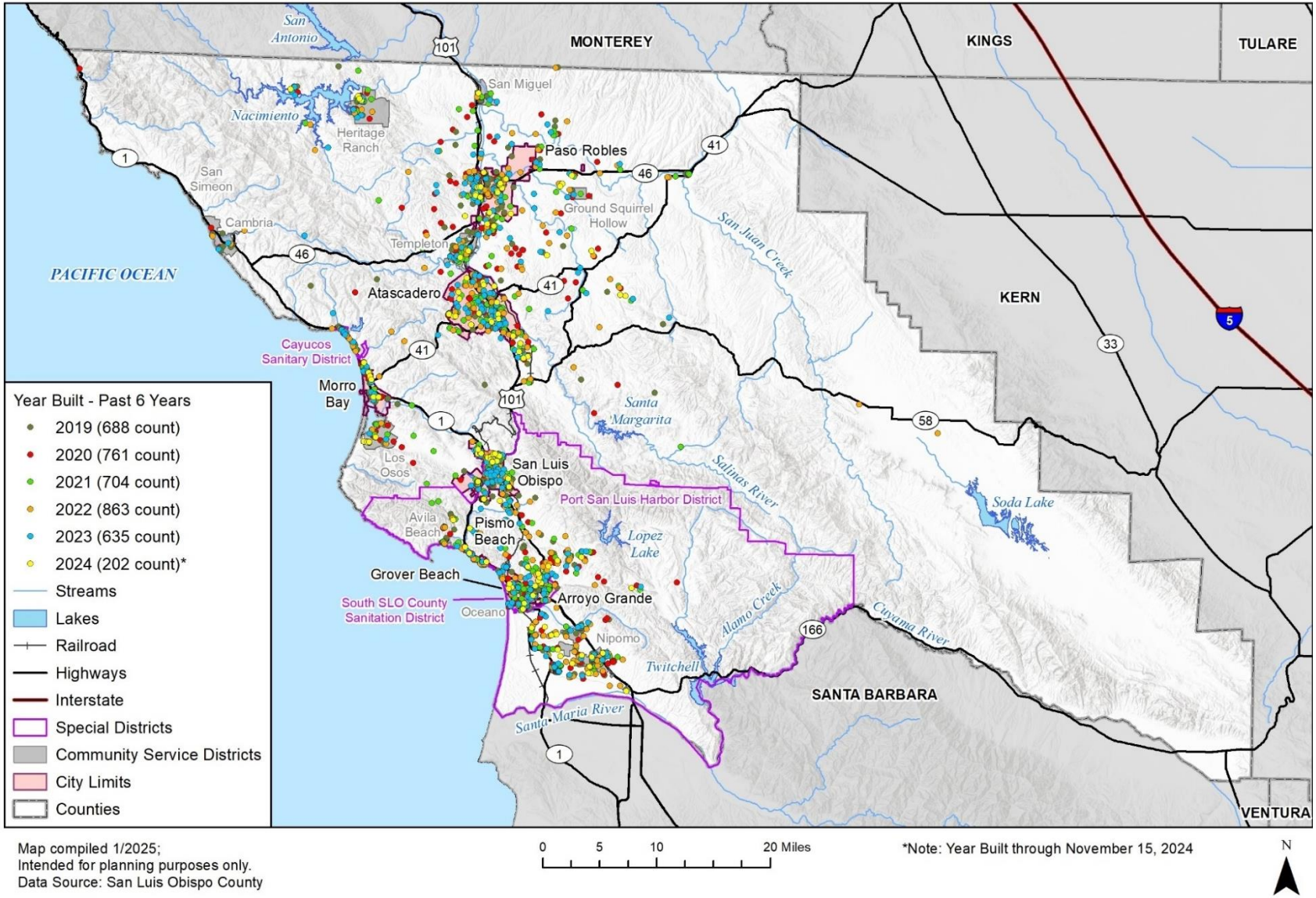
Table 5-12 Total Properties Built Between 2019 and 2024

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE
Arroyo Grande	144	$114,165,251
Atascadero	290	$170,073,891
Grover Beach	77	$44,952,284
Morro Bay	96	$45,549,614
Paso Robles	245	$311,541,879
Pismo Beach	108	$146,416,506
San Luis Obispo City	1,491	$973,576,517
Unincorporated	1,402	$1,085,102,452
Total	**3,853**	**$2,891,378,394**

Source: San Luis Obispo County Assessor Data November 15, 2024, WSP GIS Analysis

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Figure 5-6 Parcels with Improvements Added in San Luis Obispo County from 2019 through November 2024



5.2.3.1 Proposed Government Facilities

As another aspect of growth and development is evaluating areas for potential government facilities against possible hazards. Proposed government facilities were identified using a GIS layer associated with the SLO County General Plan. The General Plan provides information on the location of proposed facilities, which was used to identify their potential siting within defined hazard exposure areas (Table 5-13). Many proposed facilities exist within Community Service Districts (CSD), and only one within a municipality. The information in the GIS layer does not identify specific facilities by name or the jurisdictional ownership. each potential site exists within. In addition, the exposure analysis is limited to available GIS hazard data. Some designated high-hazard-potential areas exist across the entire county, especially weather-related hazards and earthquake. Every new facility will be exposed to these 'all county' hazards, regardless of location. Proposed government facilities may not be vulnerable to direct damage from some hazards such as agricultural pests, biological agents, or drought. None of the proposed facilities fell within designated high-hazard potential areas for dam inundation, sea level rise with or without flooding, or tsunami. Finally, the table is best interpreted with the hazard analyses presented in Section 5.3.

Table 5-13 Exposure analysis of proposed government facilities

FACILITY TYPE	MUNICIPALITY	COMMUNITY SERVICE DISTRICT	FLOOD	LANDSLIDE	LIQUEFACTION	TREE MORTALITY	WILDFIRE THREAT
Proposed Elementary School	-	Cambria	-	High	Low	At Risk	-
Proposed Elementary School	-	Los Osos	-	Low	Low	-	-
Proposed Elementary School	-	Los Osos	-	Low	Low	-	High
Proposed Elementary School	-	Los Osos	-	Low	Moderate	-	-
Proposed Elementary School	-	-	-	Moderate	Low	-	High
Proposed Elementary School	-	Heritage Ranch	-	High	Low	At Risk	Very High
Proposed Elementary School	-	Oceano	-	Low	Moderate	-	-
Proposed Elementary School	-	-	-	Low	Moderate	-	Low
Proposed Elementary School	-	Nipomo	-	Low	Moderate	At Risk	Moderate
Proposed Elementary School	-	Nipomo	-	Low	Moderate	-	-
Proposed Government Facility	-	Los Osos	-	Low	Low	-	-
Proposed Government Facility	-	Heritage Ranch	-	Moderate	Low	At Risk	Very High
Proposed Government Facility	-	-	-	Moderate	Low	-	High
Proposed High School	-	Los Osos	-	Low	Moderate	-	High
Proposed High School	-	-	-	Low	Moderate	At Risk	-

FACILITY TYPE	MUNICIPALITY	COMMUNITY SERVICE DISTRICT	FLOOD	LANDSLIDE	LIQUEFACTION	TREE MORTALITY	WILDFIRE THREAT
Proposed Library	-	Los Osos	-	Low	Low	-	Moderate
Proposed Library	-	Cambria	1% Annual Chance	Low	Moderate	At Risk	-
Proposed Police Station	-	Los Osos	-	Low	Low	-	-
Proposed Police Station	-	Nipomo	-	Low	Moderate	-	-
Proposed Sewage Treatment Facility	-	-	-	Moderate	Low	At Risk	High
Proposed Sewage Treatment Facility	-	-	-	Low	Moderate	-	Moderate
Proposed Solid Waste Facility	Paso Robles	-	-	Moderate	Low	-	Very High
Proposed Solid Waste Facility	-	-	-	Moderate	Low	-	Very High
Proposed Solid Waste Facility	-	-	-	High	Low	-	High
Proposed Water Treatment Facility	-	-	-	Moderate	Low	-	High
Proposed Water Treatment Facility	-	-	-	High	Low	-	High
Proposed Water Treatment Facility	-	-	-	Low	Moderate	-	-

Source: San Luis Obispo County, California Geological Survey; Dept. of Conservation; Division of Safety of Dams; Department of Water Resources; DWR; FEMA; USGS CoSMoS v3.1; CAL FIRE; FRAP; TMTF October 2022; WSP Analysis

Proposed Government Facilities as designated by the San Luis Obispo County General Plan.
https://opendata.slocounty.ca.gov/datasets/SLOCounty::proposed-government-facilities/about

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5.3 Hazard Analysis and Risk Assessment

Each hazard profiled includes the following subsections that are aligned with FEMA planning guidance:

- **Hazard/Problem Definition**—This section gives a description of the hazard and associated issues followed by details on the hazard specific to the San Luis Obispo County planning area.
- **Geographic Area** – This section gives a spatial description of the potential location or areas of San Luis Obispo County where the hazard expected to impact.
- **Extent (Magnitude/Severity)**– This section gives a description of the potential strength or magnitude of the hazard as it pertains to San Luis Obispo County.
- **Previous Occurrences**—This section contains information on historical incidents, including impacts where known. Historical incident worksheets were used to capture information from participating jurisdictions on past occurrences.
- **Probability of Future Occurrence**—The frequency of past events is used in this section to gauge the likelihood of future occurrences. Where possible, frequency was calculated based on existing data. It was determined by dividing the number of events observed by the number of years on record and multiplying by 100. This gives the percent chance of an event happening in any given year (e.g., three droughts over a 30-year period equates to a 10 percent chance of a drought in any given year). The likelihood of future occurrences is categorized into one of the following classifications:

  Highly Likely — Near 100 percent chance of occurrence in next year or happens every year.

  Likely — Between 10 and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less.

  Occasional — Between 1 and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.

  Unlikely — Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.
- **Climate Change Considerations** – This describes the potential for climate change to affect the frequency and intensity of the hazard in the future
- **Vulnerability –** Following the hazard profiles is a vulnerability assessment for each identified hazard. The assessment was conducted through the study of potential impacts to the following specific sectors:

  Structures

  People

  Critical Facilities and Lifelines

  Economy and Community Values

  Historic, Cultural, and Natural Resources

  Development Trends – Analyzes trends in development 2019-2024 since the last plan update to determine if any changes in hazard vulnerability. Jurisdictional significance is noted where and if applicable.

  Risk Summary – Each vulnerability assessment includes a risk summary of the key issues/problems based on threat, vulnerability and consequence to the planning area and jurisdictions from the specific hazard.

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5.3.1 Adverse Weather: General

Adverse weather is generally any destructive weather event, but usually occurs in the San Luis Obispo County as localized thunderstorms that bring heavy rain and strong winds that occur most often during the winter and spring months.

For this plan, adverse weather is considered as follows:

- Thunderstorm/Heavy Rain/Hail/Lighting/Dense Fog/Freeze (5.3.1)
- High Wind/Tornado (5.3.2)
- Extreme Heat (5.3.3)

The proximity to the Pacific Ocean both moderates and exaggerates certain types of adverse weather. Winter storms impacting coastal portions of the County tend to be more extreme than in the inland portions. The ocean's influence is also a significant factor in moderating extreme hot and cold temperatures, hailstorms and other cold weather events. These events are rare and short lived, causing little if any life-threatening situations and only occasional significant damage to property or agricultural concerns.

The HMPC determined that extreme heat should also be profiled and analyzed within adverse weather for this 2025 Plan Update. Extreme heat events are projected to increase throughout the state which will have impacts on people's health, as well as indirect impacts effects such as increased vulnerability and risk to wildfires and drought.

The National Oceanic and Atmospheric Administration's National Center for Environmental Information (NCEI) has been tracking adverse weather since 1950. The Storm Events Database contains data on the following: all weather events from 1993 to 2023 (except from 6/1993-7/1993); and additional data from the Storm Prediction Center, which includes tornadoes (1950-1992), thunderstorm winds (1955-1992), and hail (1955-1992). This database contains 136 storm events that occurred in San Luis Obispo County between January 1, 1950, and December 31, 2023. The table below summarizes these events.

Table 5-14 NCEI Hazard Event Reports for San Luis Obispo County, 1950-2023*

TYPE	# OF EVENTS	PROPERTY LOSS ($)	CROP LOSS ($)	DEATHS	INJURIES
Excessive Heat/Heat	3	0	0	0	0
Flash Floods	8	0	0	2	1
Floods	11	0	0	0	0
Frost/Freeze	2	0	$30,400,000	0	0
Hail	4	0	0	0	0
Heavy Rain	9	$5,000,000	0	1	0
High Winds/Thunderstorm Winds	40	$4,050,000	0	0	0
Tornado/Funnel Cloud	4	0	0	0	0
High Surf	39	0	0	3	5
Waterspout	2	0	0	0	0
Wildfire	6	$290,000	0	0	1
Winter Weather/Winter Storm	8	0	0	1	2
Totals	136	$ 9,340,000	$30,400,000	7	9

Source: National Center for Environmental Information Storm Events Database, www.ncdc.noaa.gov/stormevents/
*Hazards with wide extents have losses which reflect larger zones that extend beyond San Luis Obispo County

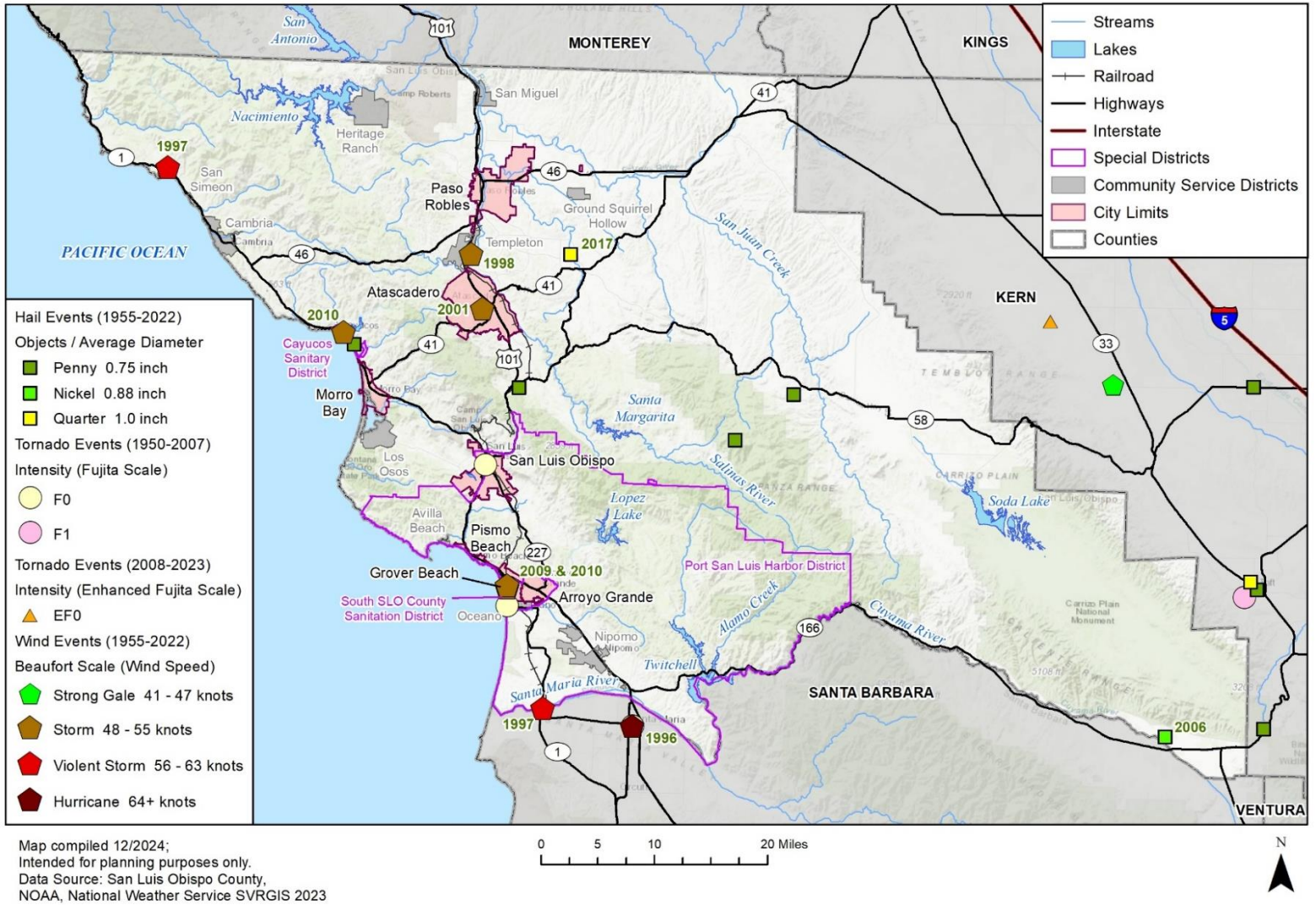
The NCEI table above provides a summary of adverse weather events that have impacted San Luis Obispo County from 1950 to 2023. While only a small number of these events led to state or federal disaster declarations, the data highlights an important trend: different sources often record varying events or provide differing details for the same occurrences. Despite these inconsistencies, the HMPC recognizes the importance of this information in capturing the County's overall hazard landscape. Figure 5-7 below shows the adverse weather events that have taken place in San Luis Obispo County.

Due to the size of the county and changes in elevation and climate, weather conditions can vary greatly. The National Weather Service provides forecasts for three zones within the county: central coast, interior valley, and mountains and the County Public Works Department has stream and rain gauges in four areas of the county; North County Coastal Area, North County Inland Area, City of San Luis Obispo Area, and South County Area.

To give a holistic picture of the various weather conditions the hazard profiles that follow provide information, where possible, from four weather stations: San Luis Obispo Poly Tech (San Luis Obispo Area, elevation: 330 feet), Morro Bay Fire Department (North County Coastal Area, elevation: 115 feet), Paso Robles (North County Inland Area, elevation: 700 feet) and Pismo Beach (South County Area, elevation: 39 feet).

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Figure 5-7 San Luis Obispo County Weather Events (Hail, Tornado, Wind)



5.3.2 Adverse Weather: Thunderstorm/Heavy Rain/Dense Fog/Freeze

5.3.2.1 Hazard/Problem Definition

A majority of adverse weather experienced in San Luis Obispo takes place in the winter months as heavy rain and thunderstorm events sometimes accompanied by high winds, dense fog, hail and freeze events. High winds and tornado events are profiled in 5.3.3. According to National Weather Service (NWS), approximately 10 percent of the thunderstorms that occur each year in the United States are classified as severe. A thunderstorm is classified as severe when it contains one or more of the following phenomena: hail that is three-quarters of an inch or greater, winds in excess of 50 knots (57.5 mph), or a tornado.

San Luis Obispo's weather is influenced by the Pacific Ocean and routine climate patterns such as El Niño. El Niño is the warm phase of the El Niño-Southern Oscillation, a pattern found in the tropical Pacific when there are fluctuations in temperatures between the ocean and atmosphere. During El Niño, the surface winds across the entire tropical Pacific are weaker than normal and the ocean surface is at above-average temperatures in the central and eastern tropical Pacific Ocean (L'Heureux 2014). El Niño typically develops over North America during the winter season causing the severe winter storms the County often experiences. This climate pattern occurs every few years and brings with it above-average rain and snow across the southern region of United States, especially in California.

Atmospheric rivers, another climate pattern that leads to adverse weather in the County, are responsible for up to 50 percent of California's precipitation annually and 65 percent seasonally (Arcuni, 2019). An atmospheric river (AR) is a long, narrow region of the atmosphere, like a river in the sky, that transports most of the water vapor outside of the tropics. NOAA notes that ARs can be 300 miles wide, a mile deep and more than 1,000 miles long and carry an amount of water vapor roughly the same as the average flow of water at the mouth of Mississippi River (NOAA, 2015). Warm water storms over the Pacific Ocean leads to evaporation and create a high concentration of moisture in the air. While prevailing winds create the distinctive river shape, which is often compared "to a fire hose pointed at California" (Arcuni, 2019). When an atmospheric river reaches land, it releases the water vapor in the form of rain or snow. Atmospheric rivers play an important role in the global water cycle and are closely tied to both water supply and flooding risk. When an atmospheric river forms in the tropical regions of the Pacific Ocean near Hawaii it is known as a "Pineapple Express". This type of atmospheric river can produce as much as five inches of precipitation in one day (NOAA, 2018).

Hail forms when water droplets freeze and refreeze as they are repeatedly hurled into the upper atmosphere by the intense forces within thunderstorms. In the San Luis Obispo County planning area, hail is occasionally lined to severe storms. Hailstones typically measure less than two inches in diameter but can reach speeds of up to 120 miles per hour. Severe hailstorms can cause significant damage, impacting roofs, structures, vehicles, vegetation, and crops.

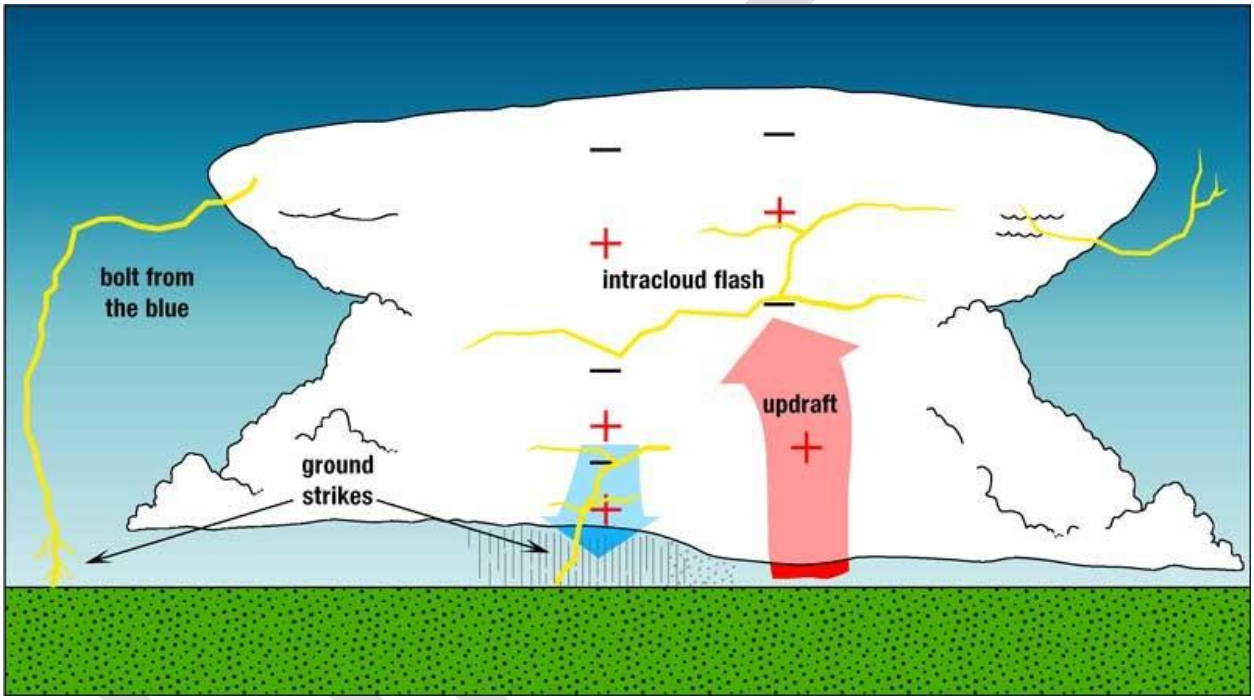
Lightning refers to any visible electrical discharge produced by thunderstorms. San Luis Obispo County experiences mild, wet winters and dry summers, typically resulting in fewer thunderstorms. While thunderstorms and lightning are often (but not always) accompanied by rain, severe lightning events are uncommon in San Luis Obispo County, though they do occur occasionally particularly during transitional seasons like late fall or early spring. For details on a 2024 adverse weather event, see the Previous Occurrences section below.

Intra-cloud lightning is the most common type of discharge. This occurs between oppositely charged centers within the same cloud. Usually it takes place inside the cloud and looks from the outside o. he cloud like a diffuse brightening that flickers. However, the flash may exit the boundary of the cloud, and a bright channel, similar to a cloud-to-ground flash, can be visible for many miles.

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Cloud-to-ground lightning is the most damaging and dangerous type of lightning, though it is also less common. Most flashes originate near the lower-negative charge center and deliver negative charge to earth. However, a large minority of flashes carry positive charge to earth. These positive flashes often occur during the dissipating stage of a thunderstorm's life. Positive flashes are also more common as a percentage of total ground strikes during the winter months. This type of lightning is particularly dangerous for several reasons. It frequently strikes away from the rain core, either ahead or behind the thunderstorm. It can strike as far as 5 or 10 miles from the storm in areas that most people do not consider to be a threat (see Figure 5-8). Positive lightning also has a longer duration, so fires are more easily ignited. And, when positive lightning strikes, it usually carries a high peak electrical current, potentially resulting in greater damage.

Figure 5-8 Cloud to Ground Lighting



Source: National Weather Service Pueblo Office

San Luis Obispo's climate is described as a mild Mediterranean climate; a freeze refers to a particularly cold spell of weather where the temperature drops below 32 degrees, most typically in the early morning hours. Usually, these cold spells will last only two or three days when the ocean influence will overcome the cold front and the early morning temperatures will return to the normal 45 to 55-degree range. Rainfall during these periods may result in snowfall in the higher elevations of the county.

Dense fog advisories are relatively common in San Luis Obispo County, especially during the fall and winter months. Areas near the coast, such as Morro Bay, Pismo Beach, and City of San Luis Obispo frequently experience dense fog due to the cooler ocean air meeting warmer inland temperature. Dense Fog events can reduce visibility making driving more dangerous. The National Weather Service issues dense fog advisories when appropriate and suggests slowing down on the road, using headlights at all times, and leaving plenty of distance from other vehicles.

5.3.2.2 Geographic Area

Thunderstorms are typically expansive weather systems that can cover large geographic areas. Due to their size and intensity, the entire San Luis Obispo is vulnerable to the impacts of severe thunderstorms, including heavy rainfall, hail, strong winds, lightning and even localized flooding.

San Luis Obispo County's geography plays a significant role in how thunderstorms develop and impact the region. The County's proximity to the Pacific Ocean influences local weather patterns by moderating temperatures and adding moisture to the atmosphere. This oceanic influence can either stabilize conditions, reducing the likelihood of severe storms, or enhance storm development by providing additional moisture and energy.

Additionally, the county's varied terrain, including coastal plains, inland valleys, and surrounding mountain ranges, creates microclimates that can intensify or weaken thunderstorm activity depending on where the storm occurs. For example, thunderstorms moving inland from the coast can intensify as they encounter warmer temperatures and rising topography, triggering more severe weather.

5.3.2.3 Extent (Magnitude/Severity)

Extent for adverse weather, particularly severe storms that involve heavy rain and hail can be measured according to hail by diameter sizes. The National Weather Service (NWS) classifies hail by diameter size, and corresponding everyday objects to help relay scope and severity to the population. Table 5-15 below indicates the hailstone measurements utilized by the NWS.

There is no clear distinction between storms that do and do not produce hailstones. Nearly all severe thunderstorms probably produce hail aloft, though it may melt before reaching the ground. Multi-cell thunderstorms produce many hailstones, but not usually the largest hailstones. In the life cycle of the multi-cell thunderstorm, the mature stage is relatively short so there is not much time for growth of the hailstone. Supercell thunderstorms have sustained updrafts that support large hail formation by repeatedly lifting the hailstones into the very cold air at the top of the thunderstorm cloud. In general, hail 2 inches (5 cm) or larger in diameter is associated with supercells (a little larger than golf ball size which the NWS considers to be 1.75 inch.). Non-supercell storms are capable of producing golf ball size hail.

Table 5-15 Hail Measurements

AVERAGE DIAMETER	CORRESPONDING HOUSEHOLD OBJECT
.25 inch	Pea
.5 inch	Marble/Mothball
.75 inch	Dime/Penny
.875 inch	Nickel
1.0 inch	Quarter
1.5 inch	Ping-pong ball
1.75 inch	Golf-Ball
2.0 inch	Hen Egg
2.5 inch	Tennis Ball
2.75 inch	Baseball
3.00 inch	Teacup
4.00 inch	Grapefruit
4.5 inch	Softball

Source: National Weather Service

Thunderstorms can vary widely in scale, from brief, localized storms to massive systems stretching across entire regions, bringing winds, lightning, and heavy rain. NWS defines a severe thunderstorm as measured wind gusts to at least 58 mph and/or hail to at least one inch in diameter. Small-scale storms may cause localized flooding, power outages, and minor infrastructure damage, while larger storm systems, such as supercell thunderstorms, can lead to tornadoes, flooding, etc. NWS uses the following scale to understand severe thunderstorm risk categories:

Figure 5-9 Thunderstorm Risk Categories



Source: National Weather Service

Lightning is measured by the Lightning Activity Level (LAL) scale, created by the National Weather Service to define lightning activity into a specific categorical scale. The LAL is a common parameter that is part of fire weather forecasts nationwide. The LAL is reproduced in Table 5-16. San Luis Obispo is susceptible to lightning events across all severity categories, ranging from isolated strikes to more widespread and intense thunderstorms. While lightning is less frequent in coastal areas, it can still occur, particularly during summer storms or unusual weather patterns. In the county's inland and mountainous regions, lightning strikes are more common and pose a significant wildfire ignition risk, especially during periods of dry vegetation and low humidity.

Table 5-16 Lightning Activity Level Scale

LIGHTNING ACTIVITY LEVEL	
LAL 1	No thunderstorms
LAL 2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground strikes in a five-minute period
LAL 3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a five-minute period.
LAL 4	Scattered thunderstorms. Moderate rain is commonly produced. Lightning is frequent, 11 to 15 cloud to ground strikes in a five-minute period.
LAL 5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a five-minute period.
LAL 6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag warning.

Source: National Weather Service

The heavy precipitation that San Luis Obispo County and all of California experiences is often the result of an atmospheric river. Atmospheric rivers are categorized by a unit of measurement known as the Integrated Water Vapor Transport (IVT), which considers the amount of water vapor in the system and the wind that moves it around. For a storm to be classified as an atmospheric river it has to reach an IVT threshold of 250 units; 1,000 IVT or more is considered to be "extreme" (Arcuni, 2019). In 2019 a system for categorizing the strength and impacts of atmospheric rivers was developed by the Center for Western Weather and Water Extremes (CW_3E), out of the Scripps Institution of Oceanography at UC San Diego. The newly developed scale ranks ARs into five categorizes from weak to exceptional. Unlike the Fujita scale for tornadoes that focuses on potential damages, the AR scale accounts for both storms that may be hazardous and storms that can provide benefits to the local water supply. A category one AR is considered to be primarily beneficial, generally lasting only 24 hours and produces modest rainfall. While a category five AR is considered "exceptional" and primarily hazardous, lasting for several days and associated with heavy rainfall and runoff that may cause significant damages. Table 5-17 below describes the scale further. The center developed the scale as a tool for officials with an operational need to assess flooding potential in their jurisdictions before the storms makes landfall.

San Luis Obispo has experienced multiple atmospheric rivers. According to Climate Central, from December 2022 to March 2023, a series of at least 12 atmospheric rivers hit the coast of California. Using the AR scale developed by CW3E, the ARs in 2022-2023 were all considered to be moderate to extreme and concentrated more on California, resulting in heavy precipitation. This also indicated significant water vapor and prolonged storm conditions throughout the planning area.

Table 5-17 Atmospheric River Categories

CATEGORY	POTENTIAL IMPACTS
AR Cat 1: Weak	Primarily beneficial. For example, a Feb. 2, 2017, AR hit California, lasted 24 hours at the coast, and produced modest rainfall.
AR Cat 2: Moderate	Mostly beneficial, but also somewhat hazardous. An atmospheric river on Nov. 19-20, 2016, hit Northern California, lasted 42 hours at the coast, and produced several inches of rain that helped replenish low reservoirs after a drought.
AR Cat 3: Strong	Balance of beneficial and hazardous. An atmospheric river on Oct. 14-15, 2016, lasted 36 hours at the coast, produced 5-10 inches of rain that helped refill reservoirs after a drought, but also caused some rivers to rise to just below flood stage.
AR Cat 4: Extreme	Mostly hazardous, but also beneficial. For example, an atmospheric river on Jan. 8-9, 2017, that persisted for 36 hours produced up to 14 inches of rain in the Sierra Nevada and caused at least a dozen rivers to reach flood stage.
AR Cat 5: Exceptional	Primarily hazardous. For example, a Dec. 29, 1996, to Jan. 2, 1997 atmospheric river lasted over 100 hours at the Central California coast. The associated heavy precipitation and runoff caused more than $1 billion in damages.

Source: Center for Western Weather and Water Extremes, Scripps Institution of Oceanography at UC San Diego. Scale was developed by F. Martin Ralph Director of CW3E in collaboration with Jonathan Rutz of NWS

5.3.2.4 Previous Occurrences

Severe weather in San Luis Obispo County typically occurs during the late fall and winter months, though storms and heavy rains can happen year-round. According to the Western Regional Climate Center (WRCC), the county receives most of its precipitation from winter storms, with January typically experiencing the highest rainfall. Summertime precipitation is rare and usually limited to isolated rain showers. Snow and hailstorms are infrequent due to the county's moderate climate, and severe occurrences of either are uncommon. However, winter storms frequently bring strong winds, which are often responsible for the most significant storm-related damage in the region. These wind events typically accompany passing storm fronts, causing downed trees, power outages, and property damage. For more information on wind-related weather patterns, refer to Section 5.3.3 of the local mitigation plan.

The NCEI records 15 heavy rain, hail and frost/freeze events that have taken place in San Luis Obispo County from 1996 to 2023. NCEI did not record any dense fog or lightning events but does not mean they do not occur in the county. The previous plan noted that the National Weather Service issued fog advisories in 2011 and 2012. Since the last plan update, San Luis Obispo County has experienced multiple federally and state declared disasters related to severe weather, including eight winter storm declarations. Refer to Table 5-14 for more NCEI hazard events for adverse weather.

According to NCEI records, heavy rainstorms in San Luis Obispo County can trigger widespread flooding, often resulting in significant localized drainage problems. In addition to flood risks, strong winds associated with these storms can cause further damage especially when combined with saturated ground conditions. This dangerous combination can uproot mature trees, leading to power outages, road closures, and property damage.

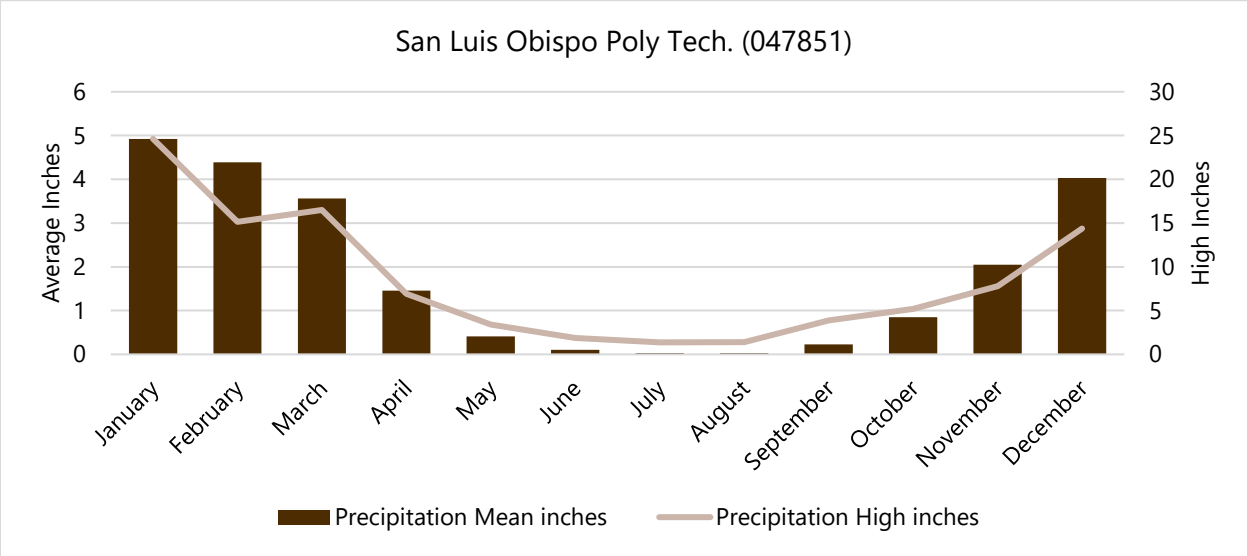
Information from the four representative weather stations introduced in subsection 5.2.3.1 Adverse Weather: General is summarized below in Figure 5-10 through Figure 5-13 and detailed in Table 5-18.

San Luis Obispo Polytech (Period of Record 1893 to 2024)

Information from the closest weather station with the most comprehensive data to represent the City of San Luis Obispo Area, the San Luis Obispo Polytech Weather Station, is summarized below in Figure 5-10.

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Figure 5-10 City of San Luis Obispo Area – Monthly Average Total Precipitation (Period of Record 1893-2024)

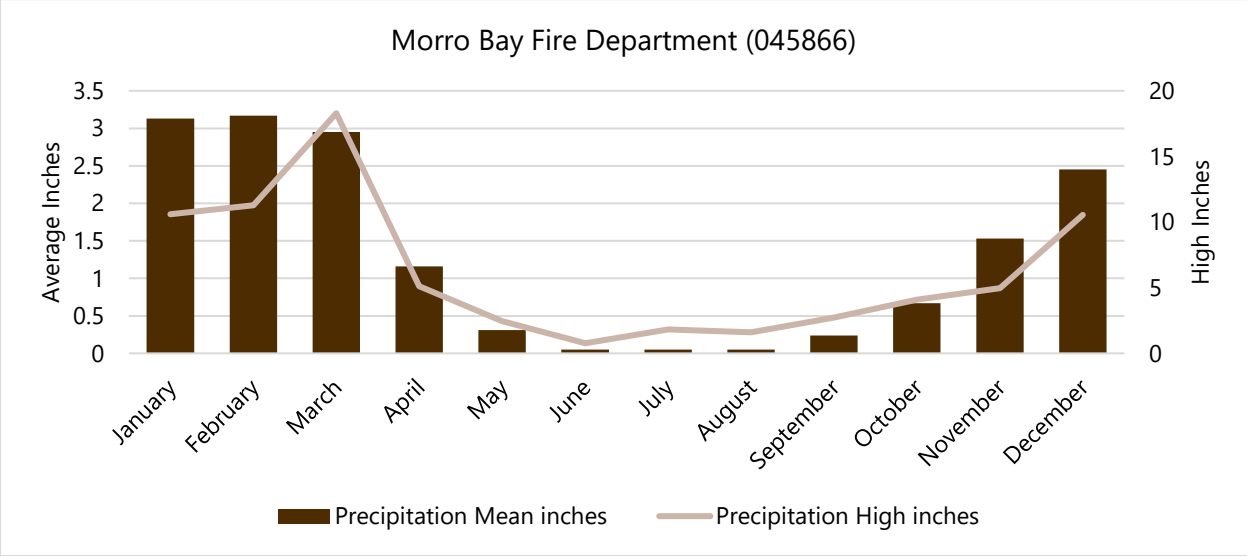


Source: Western Regional Climate Center, www.wrcc.dri.edu/

North County Coastal Area – Morro Bay Fire Department Weather Station (Period of Record 1959 to 2012)

Information from the closest weather station with the most comprehensive data to represent the North County Coastal Area of San Luis Obispo, the Morro Bay Fire Department Weather Station, is summarized below in Figure 5-11.

Figure 5-11 North County Coastal Area – Monthly Average Total Precipitation (Period of Record 1959 -2024)

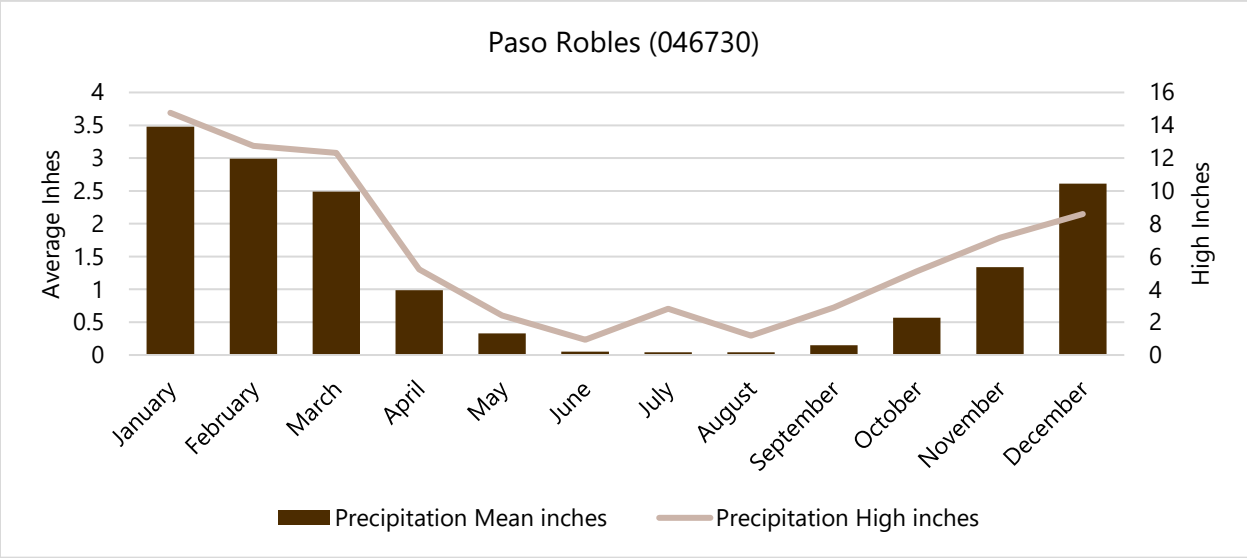


Source: Western Regional Climate Center, www.wrcc.dri.edu/

North County Inland Area – Paso Robles Weather Station (Period of Record 1894 to 2016)

Information from the closest weather station with the most comprehensive data to represent the North County Inland Area of the county, Paso Robles Weather Station, is summarized below in Figure 5-12.

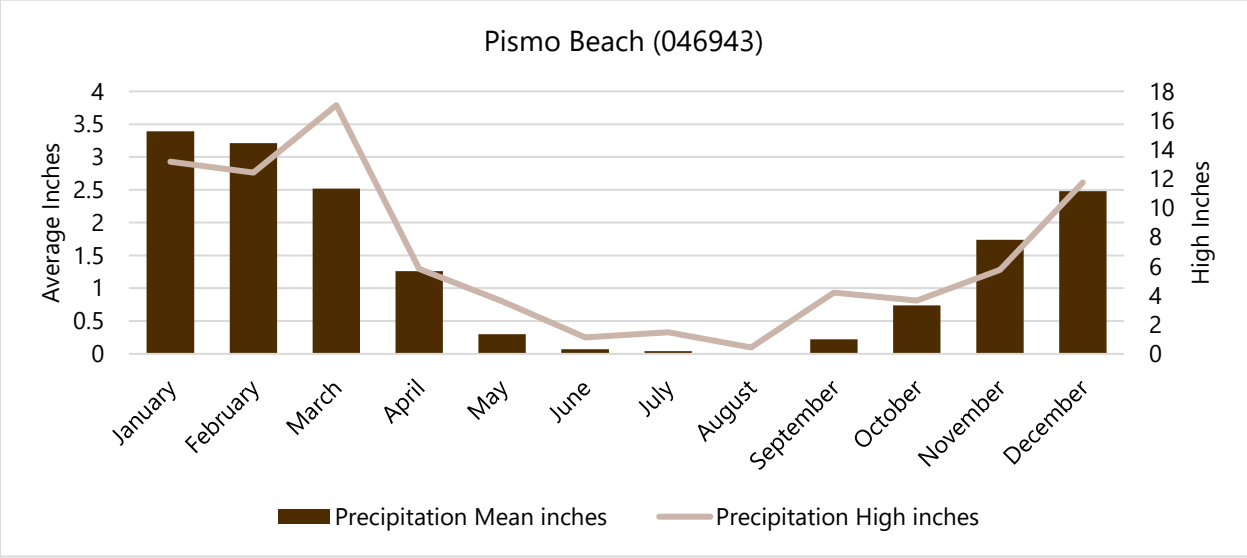
Figure 5-12 North County Inland Area – Monthly Average Total Precipitation (Period of Record 1894 -2016)



South County Area – Pismo Beach Weather Station (Period of Record 1949 to 2016)

Information from the closest weather station with the most comprehensive data to represent the South County Area of the county, Pismo Beach Weather Station, is summarized below in Figure 5-13.

Figure 5-13 South County Area – Monthly Average Total Precipitation (Period of Record 1949 -2016)



Source: Western Regional Climate Center, www.wrcc.dri.edu/

Precipitation data for these weather stations show significant variability in rainfall patterns across the County, as shown in Table 5-18 below. The weather station at San Luis Obispo Polytech recorded the highest average annual precipitation at over 22 inches, while Paso Robles had the lowest at just under 15 inches. Additionally, single-day maximum rainfall events were most intense along the coast., reflecting the influences of geographic factors such as topography and costal proximity.

Table 5-18 Weather Station Precipitation Data

	AVERAGE ANNUAL PRECIPITATION	HIGHEST RECORDED ANNUAL PRECIPITATION (YEAR)	1-DAY MAXIMUM PRECIPITATION (DATE)	LOWEST ANNUAL PRECIPITATION (YEAR)
San Luis Obispo Poly Tech.	22.01 in.	48.76 in. (1969)	6.05 in. (Jan. 9, 2023)	4.56 in. (2013)
Morro Bay FD	15.64 in.	34.63 in. (1983)	8.82 in. (March 11, 1995)	3.95 in. (2013)
Paso Robles	14.88 in.	29.19 in. (1941)	5.25 in. (Dec. 6, 1966)	2.78 in. (2013)
Pismo Beach	15.92 in.	33.58 in. (1983)	5.16 in. (Jan. 19, 1969)	3.23 in. (2013)

Source: Western Regional Climate Center, www.wrcc.dri.edu/

The following table reports the records collected from the NCEI Storm Events Database for heavy rain, hail and frost/freeze events. No dense fog events are reported in the database. Table 5-19 is a summary of the most significant adverse weather events as recorded in the NCEI Storm Events.

Table 5-19 San Luis Obispo County Heavy Rain/Hail/Freeze Events, 1950-2023

EVENT TYPE	DATE	MAGNITUDE	PROPERTY DAMAGE	CROP DAMAGE	DEATHS	INJURIES
Heavy Rain						
	2/20/1996	4-6 in.	0	0	0	0
	11/ 10/1997	0.50-1.50 in. (coastal) 3.0 in. (mountains)	0	0	0	0
	1/10/2001	2-5 in. (coastal) 5-10 in. (mountains)	0	0	0	0
	2/11/2001	2-8 in.	0	0	0	0
	2/ 24/2001	1-4 in.	0	0	0	0
	3/4/2001	2-6 in. (coastal) 6-13 in. (mountains)	0	0	0	0
	12/ 27/2004	2-8 in. (coastal) 6-13 in. (mountains)	0	0	0	0
	12/ 30/2004	1-3 in. (coastal 3-6 in. (mountains)	0	0	1	0
	1/7/2005	3-10 in.	$5,000,000	0	0	0
Hail						
	3/6/2001	0.75 in.	0	0	0	0
	2/23/2005	0.75 in.	0	0	0	0
	5/28/2009	0.75 in.	0	0	0	0
	3/22/2017	1 in.	0	0	0	0

EVENT TYPE	DATE	MAGNITUDE	PROPERTY DAMAGE	CROP DAMAGE	DEATHS	INJURIES
Frost/Freeze						
	12/21/1998	-	0	$83,000,000*	0	0
	1/13/2007	-	0	$25,000,000	0	0
Totals			$5,000,000	$108,000,000	1	0

Source: NCEI Storm Events Database
*Note this recorded crop damage amount is representative of a four-county area

Table 5-20 Past Thunderstorm/Heavy Rain/Dense Fog/Freeze Events, 1950-2023

DATE OF EVENT	INCIDENT DESCRIPTION
February 18, 1993	Thunderstorms -A thunderstorm caused damage to many of the same areas as winds to nearly 50 mph. Pea-sized hail was reported at Pismo Beach. Power outages due to lightning strikes were reported in Nipomo and San Luis Obispo. $50,000 in property damage was reported
February 20, 1996,	Heavy rain in the mountains of San Luis Obispo County led to 4-6 inches of rain and caused urban and small stream flooding and associated debris flows in the steep terrain and along Hwy 1 and 101.
February 2, 1998	Along with the strong winds (refer to Table 5-5 for information on the wind event), heavy rain drenched the entire area. On average, rainfall totals ranged from 2 to 8 inches over coastal areas, up to 12 inches in the mountains. Widespread flooding was reported in all areas (refer to the past events table in the Flood section).
February 5, 1998	Strong winds, gusting up to 70 mph, knocked down many trees and power lines. Rainfall totals ranged from 1 to 3 inches over coastal areas, up to 6 inches in the mountains. Numerous flooding problems were reported across the area. Most highways, including the 1, 101, 126 and 154 were closed due to flooding or debris flows.
December 21-24, 1998,	Freeze. An unseasonable cold air mass produced a three-night period of sub-freezing temperatures across Central and Southern California. The California Department of Food and Agriculture reported over $83 million in crop losses over the four-county area. Crop damage in San Luis Obispo was reported to be a total of $5.4 million.
1990 to present (events number more than 5)	Very cold Pacific storms brought snow fall to the higher elevations of the county. On rare occasions, it caused damage to the naturally occurring vegetation. This resulted in an increased fire season threat as the damaged vegetation dried out and augmented the normal fuel loading. The snow caused rare transportation impacts on Hwy. 101 at Cuesta Grade and Hwys 41 and 46 at higher elevations.
March 4, 2001	A powerful and slow-moving storm brought heavy rain, strong winds and snow to Central and Southern California. Across San Luis Obispo and Santa Barbara counties, rainfall totals ranged from 2 to 6 inches over coastal and valley areas to 6 to 13 inches in the mountains. In San Luis Obispo County, the heavy rain produced numerous flooding. Refer to the Flood section for information related to the resulting flood event.
March 6, 2001,	A severe thunderstorm produced dime size hail in the community of Santa Margarita.
December 30, 2004	A powerful Pacific storm brought more heavy rain, snow and flash flooding to Central and Southern California. Total rainfall amounts ranged from 1 to 3 inches on the coastal plain to between 3 and 6 inches in the mountains. Refer to the Flood section for information on the resulting flooding.

DATE OF EVENT	INCIDENT DESCRIPTION
February 23, 2005	Nickel size hail was reported in a remote area of San Luis Obispo county.
January 13-15, 2007,	A very cold arctic storm brought widespread freezing temperatures and some gusty offshore winds to the area. Across the agricultural areas of San Luis Obispo, Santa Barbara, Ventura and Los Angeles counties, the freezing overnight temperatures nearly $350 million in crop damages. Widespread freezing conditions were reported across agricultural areas. Total crop damages in San Luis Obispo county were estimated to be around $25 million.
May 28, 2009	A severe thunderstorm was reported in San Luis Obispo county near the community of La Panza. Three quarter inch hail was reported by the local fire station.
April 2011	In mid-April, a bitter cold weather system sent temperatures plunging to the mid-20s, bringing hail and freezing rain for at least two nights and in some lower elevation areas, three or four. Thousands of acres of vineyards lost newly emerging grape buds, which experts say could amount to 50% of the area's 2011 crop. Loss estimates range from 70 to 80 million dollars.
July 19, 2015	Paso Robles received nearly 3.6 inches of rain in less than 8 hours. The intense rainfall (remnant of Hurricane Dolores) eroded bare hillsides located outside the City limits and caused very high volumes of sediment to fill City drainage ways and culverts. 20-30 homes were impacted causing mud and water damage.
March 22, 2017	Several strong thunderstorms developed across the Central Coast of California. In Creston, a severe thunderstorm developed, producing one-inch hail.

Source: NCEI Storm Events Database, 2014 County LHMP, HMPC

In February 2019, San Luis Obispo County experienced severe winter storms that caused heavy rain, hail, and light snow showers in some areas of the county. The National Weather Service issued a freeze warning for the County on February 18th, 2019, that lasted until February 22nd, 2019. The County had been experiencing drought conditions throughout 2023 but received enough rain in the 2019 season to bring it out of the abnormally dry and drought conditions for the first time in 11 years (San Luis Obispo Tribune, 2019). Refer to the Drought section for more information related to drought conditions in the county. On February 25th, 2019 Caltrans announced it would be closing portions of Highway 1 along the Central Coast, in anticipation of a heavy rain event and would not be reopening the highway until the end of that week after the storm passes to allow for crews to inspect and clean up the highway (San Luis Obispo Tribune, 2019).

The county continued to experience severe winter storms into March 2019. On March 5th ,2019 a severe thunderstorm, brought heavy rain, thunder and lightning to the South County area. The National Weather Service's Los Angeles station reported that the region, San Luis Obispo, Santa Barbara, Los Angeles and Ventura counties, received 4,500 lighting strikes including about 2,500 cloud-to-ground strikes (San Luis Obispo Tribune, 2019). At one point the NWS recorded 1,489 in one five-minute stretch alone off the coast of Central Coast region (Los Angeles Times, 2019). The county and the region are accustomed to thunderstorms with the occasional lighting strike accompanying the storms, but this amount of lightning strikes in one thunderstorm event it rare. The storm also caused 300 residents in Grover Beach, 149 residents in rural Arroyo Grande and 70 near See Canyon Road in San Luis Obispo for a total 519 residents in the county to lose power due to the winter storm. Power was restored by the next morning. The California Highway Patrol (CHP) reported multiple car accidents and downed trees due to same adverse weather event.

5.3.2.5 Probability of Future Occurrences

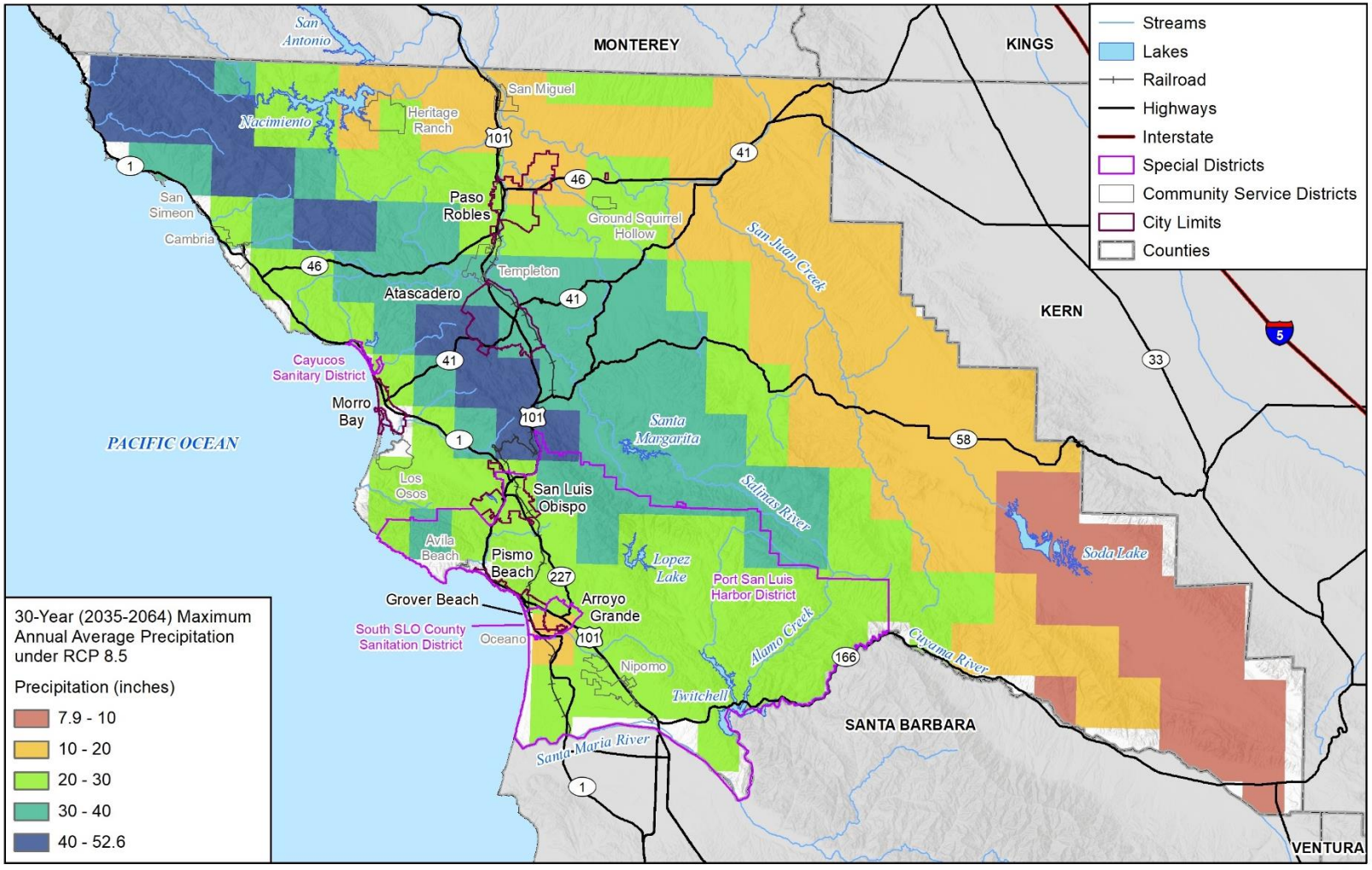
Thunderstorms producing heavy rain and the potential for hail are well-documents seasonal weather events in the San Luis Obispo planning area. These storms are most common during transitional seasons, such as late spring and early fall, but they can occur throughout the year under specific atmospheric conditions. The county's diverse geography, with its coastal influence, inland valleys, and mountainous regions, creates unique microclimates that contribute to the formation and intensity of these storms. Coastal areas may experience milder thunderstorm activity, while inland and higher elevation areas are more prone to intense rainfall, hail, and strong winds associated with convective storms. Given the region's established weather patterns and the consistent reoccurrence of these storms, the probability of future thunderstorms with heavy rain and hail occurring in the San Luis Obispo planning area is considered **highly likely** (Table 5-22).

5.3.2.6 Climate Change Considerations

Precipitation trends in San Luis Obispo County are expected to become more extreme, with fluctuations toward both excessive rainfall and prolonged dry periods. By mid-century (2035-2064), maximum one-day precipitation levels are projected to range from 1,283 to 2.053 inches according to climate models from Cal-Adapt. Additionally, the maximum length of dry spells in the County could extend to between 122 and 164 consecutive days, while the 30-year average precipitation is estimated to be 16.9 inches. By the end of the century, the 30-year maximum annual average precipitation across all climate models could range between 13.3 and 22.8 inches. These projections indicate that precipitation will increasingly concentrate over shorter periods, heightening the risk of flooding.

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Figure 5-14 San Luis Obispo County 30-Year (2035-2064) Maximum Annual Average Precipitation under RCP 8.5



Map compiled 1/2025;
Intended for planning purposes only.
Data Source: San Luis Obispo County, Cal-Adapt

*Representative Concentration Pathways (RCP)

Thunderstorms and heavy precipitation in San Luis Obispo County are sometimes linked to lightning, fog, and freezing conditions under specific weather patterns. For instance, lightning is associated with convective thunderstorms, which are rare in the County but do occur, usually in late summer and early fall. The County commonly experiences fog due to the northwest winds and semi-permanent high-pressure system over the eastern Pacific. Lastly freezing temperatures are relatively rare in San Luis Obispo County but can occur. Particularly, freezing conditions occur in higher elevations, although in low elevations it is possible for cold air to settle after heavy precipitation, leading to frost and freeze conditions overnight.

San Luis Obispo County is experiencing the impacts of climate change, which are influencing local weather patterns, including thunderstorms, heavy rain, dense fog and freeze events. Warming atmospheric conditions can increase the potential for severe thunderstorms by providing more energy for storm formation. According to California's Fourth Climate Change Assessment, Central Coast Region Report (2018), the number of days each year on which the atmospheric rivers bring "extreme" amounts of rain and snow to the region are expected to increase under the projected climate change for the state, possibly increasing more than a quarter. As average temperatures increase over time, this generally will result in higher extreme temperatures and more warming in the atmosphere can trigger climate changes, which could result in more frequent extreme weather events. Coastal fog patterns along California's Central Coast are influenced by ocean temperature and atmospheric circulation.

According to California's Fourth Climate Change Assessment, Central Coast Region Report (2018), the number of days each year on which the atmospheric rivers bring "extreme" amounts of rain and snow to the region are expected to increase under the projected climate change for the state, possibly increasing more than a quarter. Pacific Northwest National Laboratory researchers have also found that atmospheric rivers will reach the West Coast more frequently (Gao, 2015). This study shows future changes in atmospheric rivers over western America. ON average, the West receives rain or snow from these atmospheric rivers between 25 and 40 days each year depending on the specific location and annual vulnerability. By the end of this century, days on which the atmospheric rivers reach the coast could increase by a third this century, between 35 and 55 days a year.

Decreases in precipitation in spring months will also have an impact on runoff which may have an impact on water supply sources, refer to the Drought section for more information on water supply vulnerability; while the projected increases in precipitation in the spring months will also increase the county's risk to flooding in some areas, refer to the Flood section for more information in flooding risk and vulnerability.

The City of San Luis Obispo discussed residents concern of climate change in the area. In 2022, the city adopted the Climate Action Plan 2023-2027 Work Program which provided an update, as well as an innovative set of implementation tasks to guide the next several years of climate actions in the County. Since the 2020 Climate Action Plan for Community Recovery, there has been substantial progress on progress climate action throughout the communities such as clean electricity, carbon sequestration, active transportation, tree planting, etc.

5.3.2.7 Vulnerability: Thunderstorm/Heavy Rain/Dense Fog/Freeze

Structures

The San Luis Obispo County experiences winter storms throughout the winter months through early spring. These winter storms can include significant precipitation as well as high winds, and hail. The primary effect of these storms has not resulted in significant injury or damages to people and property, or the losses are typically covered by insurance. It is the secondary hazards caused by weather, such as floods, which have had the greatest impact on the County. Historically, damage and disaster declarations related to adverse weather conditions have occurred, and similar events are expected to continue in the future. Heavy rain and

thunderstorms are the most frequent type of severe weather occurrences in San Luis Obispo County, which can be accompanied by lightning and sometimes leading to fog and freezing conditions. Utility outages, downing of trees, debris blocking streets and damage to property can be a direct result of these storm events. Given the nature of these types of storms, the entire County is potentially at risk.

People

Severe thunderstorms in San Luis Obispo County bring a combination of heavy rain, lightning, fog, and sometimes even freezing conditions and hail, all of which pose a significant safety risk. Lightning strikes are one of the most unpredictable and dangerous aspects of a thunderstorm, capable of causing severe injury or even death. Hail, depending on its size and velocity, can damage property, vehicles, and crops, but it rarely results in serious harm to people. Floodwaters can rise quickly during intense rainfall, creating hazardous conditions that may trap individuals, sweep away vehicles, or cause structural damage. Dense fog and freezing temperatures may follow storm activity, further increasing hazards by reducing visibility and creating icy road conditions.

Reduced visibility is the greatest risk to people when heavy fog is prevalent. Particularly when fog is dense, it can be hazardous to drivers, mariners and aviators and contributes to numerous accidents each year. To reduce injury and harm, people should avoid driving when dense fog is prevalent, if possible. If driving is pertinent, emergency services advise driving with lights on low beam, avoiding stopping on highways, and avoiding crossing traffic lanes.

Aspects of the population who rely on constant, uninterrupted electrical supplies may have a greater, indirect vulnerability to lightning. As a group, the elderly or disabled, especially those with home health care services relying on rely heavily on an uninterrupted source of electricity. Resident populations in nursing homes, residential facilities, or other special needs housing may also be vulnerable if electrical outages are prolonged. If they do not have a back-up power source, rural residents and agricultural operations reliant on electricity for heating, cooling, and water supplies are also especially vulnerable to power outages.

Common problems associated with severe storms include the loss of utilities or immobility. Loss of life is uncommon but can occur during severe storms. Immobility can occur when roads become impassable due to dense fog, heavy rains causing flooding, downed trees, or a landslide. Fog specifically poses a risk to commuters and driving conditions as fog typically forms rapidly in the early morning hours. Fog can have devastating effects on transportation corridors in the county. Nighttime driving in the fog is dangerous and multi-car pileups have resulted from drivers using excessive speed for the conditions and visibility. Loss of utilities, specifically power lines can occur due to downed trees, high winds and heavy snows. While snow accumulation is unlikely within the San Luis Obispo planning area, high winds and downed trees are known to result in power outages.

Social Vulnerability

Outdoor laborers are particularly at risk to thunderstorms and the association hazards of precipitation, hail and the increased risk of being struck by lightning. Based on the SVI data presented and discussed in subsection 4.4.1, the communities located in north county San Luis Obispo such as Paso Robles, San Miguel and Atascadero and in south county such as Oceano and Nipomo, where many agricultural activities take place are also among the areas of the county with the highest ranking overall social vulnerability.

Critical Facilities and Lifelines

The unpredictable nature of severe thunderstorms, including heavy rain, lightning, fog, and freezing conditions, makes it difficult to anticipate their exact impacts. As a results, critical above ground infrastructure, such as power lines, communication towers, transportation

networks, and buildings, is equally exposed to these hazards. Unlike other natural disasters with more predictable patterns, these storms can develop and change direction rapidly, leaving little time for targeted protective measure. Fog and freezing conditions that may follow a storm can further compound risks by reducing visibility and creating hazardous travel conditions. Due to the random nature of these threats, a more specific risk assessment was not conducted for this plan.

Economy and Community Values

The economic impacts of a severe thunderstorm are typically short-term but can be significant. Lightning may cause power outages and spark fires, while hail can damage exposed property. However, the most substantial long-term economic consequences often stem from secondary hazards triggered by severe thunderstorms, including wildfires ignited by lightning and flooding (refer to the Flood section for more details).

In general, all adverse weather poses a risk to agriculture economy in the county. Table 5-21 describes the crops losses related to adverse weather events and associated indemnity amounts or loss payments from the United States Department of Agriculture (USDA), Risk Management Agency in the past three years. Heat and frost/freeze have been the cause of the majority of crop losses related to weather since 2015. Overall, in the past three years there have been 292 adverse weather events that have led to crop losses in the county, totaling in over $26 million in loss payments due to adverse weather.

Table 5-21 San Luis Obispo County Crop Losses and Loss Payments, 2015-2021

CAUSE OF LOSS	NUMBER OF EVENTS	INDEMNITY AMOUNTS (LOSS PAYMENTS)
Frost/Freeze	78	$9,163,301
Cold Winter	8	$68,241
Excess Moisture/Cold Wet Weather	90	$8,263,999
Hail	7	$717,347
Heat	105	$8,228,815
Other	4	$64,589
Totals	292	$26,506,292

Source: USDA Risk Management Agency, https://www.rma.usda.gov/SummaryOfBusiness/CauseOfLoss

Historic, Cultural, and Natural Resources

Severe thunderstorms are a natural environmental process. These storms contribute to the redistribution of heat and moisture in the atmosphere, supporting regional weather patterns. Environmental impacts include the sparking of potentially destructive wildfires by lightning and localized flattening of plants by hail. As a natural process, the impacts of most severe thunderstorms by themselves are part of the overall natural cycle and do not cause long-term consequential damage.

Development Trends

While San Luis Obispo County's population growth is slower compared to other regions in California, steady increases are observed, particularly in cities like San Luis Obispo, Paso Robles, and Atascadero. New critical facilities, such as communication towers should be built to withstand heavy rain, wind, and hail damage. Future development projects should consider adverse weather hazards at the planning, engineering and architectural design stage with the goal of reducing vulnerability. Stormwater master planning and site review should account for buildings to withstand adverse weather events considered for all new development. Thus, development trends in the County and jurisdictions since the last plan update have not increased overall vulnerability to the hazard.

Risk Summary – Thunderstorm/Heavy Rain/Dense Fog/Freeze

- The overall significance of severe weather events associated with heavy rain, thunderstorms, hail, and fog is rated as **Medium**.
- San Luis Obispo County has experienced 15 hail, heavy rain, and frost/freeze events since 1996.
- Average annual precipitation ranges from 22.4 inches to 15.2 inches depending on the area of the County
- Since 2015 over $30 million in loss payments from USDA related to crop losses from adverse weather events have been paid.
- Related hazards: Flood, Wildfire, Landslide and Debris Flow, Coastal Storm/Coastal Erosion/Sea Level Rise, Agriculture/Pest Infestation/Plant Disease/Tree Mortality

Table 5-22 Hazard Risk Summary - Thunderstorm/Heavy Rain/Dense Fog/Freeze

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY	OVERALL SIGNIFICANCE
San Luis Obispo County	Significant	Highly Likely	Negligible	Medium
City of Arroyo Grande	Significant	Likely	Limited	Medium
City of Atascadero	Significant	Likely	Limited	Low
City of Grover Beach	Significant	Likely	Limited	Low
City of Morro Bay	Extensive	Highly Likely	Limited	High
City of Paso Robles	Significant	Highly Likely	Limited	Medium
City of Pismo Beach	Significant	Likely	Limited	Low
City of San Luis Obispo	Extensive	Likely	Limited	Medium
Avila Beach Community Service District (CSD)	Significant	Occasional	Negligible	Low
Cambria CSD	Significant	Likely	Negligible	Medium
Ground Squirrel Hollow CSD	Limited	Likely	Negligible	Medium
Heritage Ranch CSD	Extensive	Highly Likely	Critical	High
Los Osos CSD	Significant	Likely	Limited	Medium
Nipomo CSD	Limited	Likely	Negligible	Low
Oceano CSD	Significant	Likely	Limited	Medium
San Miguel CSD	Extensive	Likely	Catastrophic	High
San Simeon CSD	Significant	Likely	Limited	Low
Templeton CSD	Significant	Highly Likely	Limited	High
Cayucos Sanitary District	Extensive	Likely	Critical	High
Port San Luis Harbor District	Extensive	Highly Likely	Limited	Medium
San Luis Obispo FCWCD	Significant	Highly Likely	Negligible	N/A
South San Luis Obispo Sanitary District	Significant	Likely	Limited	Low

5.3.3 Adverse Weather: High Wind/Tornado

5.3.3.1 Hazard/Problem Description

High winds, often accompanying severe thunderstorms, can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss. Windstorms in San Luis Obispo County are typically straight-line winds. Straight-line winds are generally any thunderstorm wind that is not associated with rotation (i.e., is not a tornado). It is these winds, which can exceed 100 mph, which represent the most common type of severe weather and are responsible for most wind damage related to thunderstorms. These winds can overturn mobile homes, tear roofs off houses, topple trees, snap power lines, shatter windows, and sandblast paint from cars. Other associated hazards include utility outages, arcing power lines, debris blocking streets, dust storms, and an occasional structure fire.

Tornadoes are another severe weather hazard that can affect the San Luis Obispo County planning area. Tornadoes form when cool, dry air sits on top of warm, moist air. Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up to 300 mph, usually accompanying a thunderstorm. Tornadoes are the most powerful storms that exist. They can have the same pressure differential that fuels 300-mile-wide hurricanes across a path only 300-yards wide or less.

5.3.3.2 Geographic Area

Wind and tornadoes have the potential to happen anywhere in the County. While tornadoes are rare in this region, strong wind events are more common leading to more significant damages. While tornadoes are rare in this region due to its coastal Mediterranean climate and lack of atmospheric conditions typically associated with tornado formation, they are not impossible. On occasion, small tornadoes or funnel clouds have been reports, usually associated with severe winter storms or unusual atmospheric instability. The actual risk to the County is dependent on the nature and location of any given thunderstorm or tornado event.

More commonly, strong wind events impact the county, leading to significant damage. For instance, the Santa Ana and Sundowner Winds are dry and gusty winds along the coast that can rapidly develop, and this can increase the possibility of hazards in the planning area. The severity of damage from wind and tornado events often depends on population density, infrastructure concentration, and the presence of vulnerable structures or natural features. The geographic extent for the planning area is rated **significant**, meaning 10-50% of the planning area is affected.

5.3.3.3 Extent

The Enhanced Fujita Scale (EF) Scale, introduced on February 1, 2007, is the updated system for estimating tornado intensity based on observed damage. This scale refines the original Fujita (F) Scale by incorporating 28 specific damage indicators and a range of associated degrees of damage, allowing for a more detailed and accurate assessment of tornado impacts.

Unlike the original scale, the EF Scale accounts for variations in building materials, structural integrity, and the type of objects affected by tornado winds. This level of precision improves the correlations between observed damage and estimated wind speeds, leading to better consistency and reliability in tornado classification.

Wind speeds on the EF Scale correspond to different levels of damage, providing a clearer understanding of tornado strength and its effects on the built environment. For more detailed information about the Enhanced Fujita Scale's damage indicators and degrees of damage, resources are available online at www.spc.noaa.gov/efscale/ef-scale.html.

Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis and better correlation between damage and wind speed. It is also more precise because it takes into account the materials affected, and the construction of structures damaged by a tornado. Table 5-23 shows the wind speeds associated with the original Fujita scale ratings and the damage that could result at different levels of intensity. Table 5-24 shows the wind speeds associated with the Enhanced Fujita Scale ratings. The Enhanced Fujita Scale's damage indicators and degrees of damage can be found online at www.spc.noaa.gov/efscale/ef-scale.html.

Table 5-23 Original Fujita Scale

FUJITA (F) SCALE	FUJITA SCALE WIND ESTIMATE (MPH)	TYPICAL DAMAGE
F0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown, and large missiles generated.
F5	261-318	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur.

Source: National Oceanic and Atmospheric Administration Storm Prediction Center, www.spc.noaa.gov/faq/tornado/f-scale.html

Table 5-24 Enhanced Fujita Scale

ENHANCED FUJITA (EF) SCALE	ENHANCED FUJITA SCALE WIND ESTIMATE (MPH)	POTENTIAL DAMAGE
EF0	65-85	Minor damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0.
EF1	86-110	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	Considerable damage. Roofs torn off from well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains

ENHANCED FUJITA (EF) SCALE	ENHANCED FUJITA SCALE WIND ESTIMATE (MPH)	POTENTIAL DAMAGE
		overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations are badly damaged.
EF4	166-200	Devastating damage. Well-constructed and whole frame houses completely leveled; cars and other large objects thrown, and small missiles generated.
EF5	Over 200	Incredible damage. Strong-framed, well-built houses leveled off foundations are swept away; steel-reinforced concrete structures are critically damaged; tall buildings collapse or have severe structural deformations; some cars, trucks, and train cars can be thrown approximately 1 mile (1.6 km).

Source: National Oceanic and Atmospheric Administration Storm Prediction Center, www.spc.noaa.gov/faq/tornado/ef-scale.html

Table 5-25 below outlines the Beaufort scale, which describes the damaging effects of wind speed.

Table 5-25 Beaufort Wind Scale

WIND SPEED (MPH)	DESCRIPTION – VISIBLE CONDITION
0	Calm; smoke rises vertically
1-4	Light air; direction of wind shown by smoke but not by wind vanes
4-7	Light breeze: wind felt on face; leaves rustle; ordinary wind vane moved by wind
8-12	Gentle breeze; leaves and small twigs in constant motion; wind extends light flag
13-18	Moderate breeze; raises dust and loose paper; small branches are moved
19-24	Fresh breeze: small trees in leaf begin to sway; crested wavelets form on inland water
25-31	Strong breeze; large branches in motion; telephone wires whistle; umbrellas used with difficulty
32-38	Moderate gale whole trees in motion; inconvenience in walking against wind
39-46	Fresh gale breaks twigs off trees; generally, impedes progress
47-54	Strong gale slight structural damage occurs; chimney pots and slates removed
55-63	Whole gale trees uprooted; considerable structural damage occurs
64-72	Storm very rarely experienced; accompanied by widespread damage
73+	Hurricane devastation occurs

Source: NWS

Since 1950, the tornado events that have taken place in San Luis Obispo County have been F0 or EF-1 tornadoes. However, it should be noted that, although unlikely, larger tornadoes could occur. Should the County be hit by an EF-3 or higher tornado, it can be extrapolated that because of its relative size and the potential size and length of a tornado's path a significant

portion of the County could be impacted, resulting in property and crop damage and loss of life.

Although stronger tornadoes are possible, less than 10 percent of the County would be impacted by a tornado in the EF0-2 range. The impact to quality of life or critical facilities and functions in the affected area would depend on where the tornado occurred. Injuries or deaths are possible due to wind thrown trees or property damage caused by wind events.

Overall, impacts from high wind and tornado events would likely be **negligible**, with less than 10 percent of property severely damaged and shutdown of facilities due to loss of power for 24 hours or less.

5.3.3.4 Previous Occurrences

Based on NCEI records between 1950 and 2024 there have been a combined 81 high wind/thunderstorm winds events and seven tornado/ funnel cloud events in San Luis Obispo County which has resulted in a total of $4,050,000 in property damage. The most damaging event took place on January 2, 2006 and was a 56-mph wind event that resulted in $4,000,000 in property damages. Overall, the impacts of high wind/ tornado events are expected to be limited, with the majority of damage stemming from downed trees, which can lead to property damage and power outages.

During the rainy season, the San Luis Obispo planning area is prone to relatively strong thunderstorms, sometimes accompanied by high winds and tornadoes. While tornadoes do occur occasionally, most often they are of F0 intensity. The NCEI Storm Events Database does not record any F1, F2, or F3 events that have occurred in the planning area in the past. In the County, there has been three recorded tornadoes, with the most recent event happening in Grover Beach on February 7, 2024, and rated as an EF1. April 13, 2024, there was a Federal Disaster Declaration in the County for severe weather. This included severe winter storms, tornadoes, floodings, landslides, and mudslides. Documented incidents of high wind/thunderstorm winds and tornado/funnel cloud events in San Luis Obispo from the NCEI Database are listed in the following tables. Table 5-27 Past High Wind and Tornado Events contains incident descriptions for significant historic events.

Table 5-26 San Luis Obispo County High Wind Events

DATE	MAGNITUDE (MPH)	PROPERTY DAMAGE
February 18, 1993	-	$50,000
November 26, 1997	62	0
February 2, 1998	78	0
February 5, 1998	61	0
February 7, 1998	61	0
February 19, 1998	50	0
April 3, 1999	55	0
February 11, 2000	52	0
December 17, 2000	48	0
January 10, 2001	55	0
March 4, 2001	65	0
November 24, 2001	55	0
December 7, 2001	52	0
December 19, 2002	55	0
February 25, 2004	47	0
January 7, 2005	58	0
January 2, 2006	56	$4,000,000
December 7, 2007	51	0

DATE	MAGNITUDE (MPH)	PROPERTY DAMAGE
January 4, 2008	65	0
January 27, 2008	54	0
February 23, 2008	65	0
October 13,2009	68	0
December 13, 2009	50	0
January 18, 2010	52	0
January 20, 2010	52	0
December 11, 2014	50	0
January 27, 2021	63	0
December 13, 2021	58	0
November 8, 2022	50	0
December 10, 2022	70	0
January 4, 2023	56	0
January 9, 2023	65	0
February 21, 2023	57	0
February 24, 2023	56	0
March 9, 2023	54	0
March 10, 2023	55	0
March 14, 2023	57	0
March 21, 2023	57	0
November 20, 2023	61	0
February 19, 2024	51	0
March 2, 2024	50	0
Total		$4,050,00

Source: NCEI Storm Events Database *NOTE no reports of crop damages, deaths or injuries were recorded

Table 5-27 Past High Wind and Tornado Events

DATE OF EVENT	INCIDENT DESCRIPTION
November 26, 1997	A line of severe thunderstorms rumbled across San Luis Obispo and Santa Barbara counties. The storms produced winds gusting up to 71 mph and heavy rain.
February 2, 1998	Hearst Castle, in San Luis Obispo county, reported winds gusting to 90 mph. Elsewhere, winds gusting in excess of 70 mph were reported. Hundreds of trees and power lines were blown down, resulting in numerous power outages. Along with the strong winds, heavy rain drenched the entire area. (refer to Table 5-4 for details on the rain event).
February 19, 1998	Strong thunderstorms moving across San Luis Obispo county produced strong winds in the Templeton area. A spotter reported winds gusting to 58 mph.
May 5, 1998	A small tornado developed over the City of San Luis Obispo. The tornado knocked out power to several hundred homes. Also, four homes were damaged, including a home struck by a fallen cypress tree. (F0)
February 11, 2000	A powerful cold front brought strong winds and heavy snow to parts of Central and Southern California. In Morro Bay, southeast winds, gusting to 60 mph ahead of the front, knocked down numerous trees and power lines.
December 17, 2000	Gusty offshore winds buffeted coastal sections of San Luis Obispo county. In the City of San Luis Obispo, the winds blew out the windows in an unoccupied mobile home, as well as destroyed part of a car port. In Nipomo, a weather spotter reported sustained winds of 35 mph with gusts to 55 mph. Also, the strong winds produced widespread power outages.

DATE OF EVENT	INCIDENT DESCRIPTION
January 10, 2001	A strong thunderstorm produced damaging winds in northern San Luis Obispo County. Across southern sections of Atascadero, trees were uprooted as well as damage to fences and decks.
March 4, 2001	Across Central and Southern California, strong southeasterly winds accompanied the storm. Widespread winds between 30 and 50 MPH with stronger gusts were reported from the coastal areas to the mountains. (Refer to Table 5-4 for more details on the heavy rain and flooding that accompanied this event)
November 24, 2001	A strong cold front moved though San Luis Obispo County, producing strong and gusty winds. Weather spotters and the Morro Bay Fire Department reported sustained winds between 35 and 45 mph with gusts as high as 62 mph. Numerous small trees and power lines were blown down between Morro Bay and Atascadero.
December 7, 2001	Gusty northeast winds knocked down power lines and small trees in the community of Morro Bay. Wind speeds were estimated between 25 and 35 mph with local gusts as high as 60 mph.
February 2, 2004	A waterspout, which developed offshore of Oceano Dunes, came onshore as a weak tornado. The weak tornado hit a park ranger in his truck. Fortunately, the park ranger was not injured, and his truck sustained no reportable damage.
January 2, 2006	Strong west to northwest winds, gusting to 65 MPH, affected the community of Cambria in San Luis Obispo County. In total, 84 homes sustained damage with 31 homes sustaining major damage. Estimates of property damage were around $4 million.
January 4, 2008	In early January, a powerful Pacific storm brought strong winds, heavy rainfall, flash flooding and winter storm conditions to Central and Southern California. The strongest winds were reported across San Luis Obispo and Santa Barbara counties as well as all mountain areas. The winds knocked down trees and power lines, producing numerous power outages. An automated sensor in Atascadero reported sustained winds of 43 mph. A weather spotter in Morro Bay reported a southeasterly wind gust of 75 mph.
January 27, 2008	An observer at Hearst Castle reported southeast winds gusting to 62 mph. The last of several January storms brought high winds and heavy snow to sections of Central and Southern California. Across San Luis Obispo and Santa Barbara counties, strong southeasterly winds gusting to 65 mph knocked down trees and power lines across the area.
February 23, 2008	An automated sensor at Atascadero reported southeast winds gusting to 59 mph. An automated sensor at Point Arguello reported southeast winds gusting to 63 mph. In the nearby community of Cambria, numerous trees and power lines were knocked down by the winds. Strong southeast winds gusting to 75 mph were reported in the mountains of San Luis Obispo county. A powerful cold front moved across Central and Southern California in late February. Although the front did not produce significant rainfall, it did bring strong and gusty southeasterly winds to the area. Wind gusts as high as 75 to 86 mph were reported in some areas. The strongest and most widespread winds occurred across the Central Coast as well as the mountains. Numerous trees and power lines were knocked down.
October 13, 2009	From October 12th through October 14th, the first significant storm of the season moved through Southern California. The storm brought heavy rainfall and very gusty southerly winds to the area. Rainfall totals were very impressive, generally ranging between 1 and 3 inches over coastal areas to between 4 and 10 inches in the mountains. Some isolated areas received rainfall amounts over

DATE OF EVENT	INCIDENT DESCRIPTION
	10 inches over San Luis Obispo and Santa Barbara counties. This storm brought very strong and gusty southerly winds to the area with warning-level winds reported in many areas.
December 13, 2009	A trained weather spotter reported a wind gust of 58 MPH associated with a severe thunderstorm. A powerful winter storm brought heavy rain, flash flooding, gusty winds and severe thunderstorms to Central and Southern California. Rainfall amounts for this storm ranged from 1 to 3 inches over coastal areas to between 3 and 6 inches in the mountain and foothill areas. With such heavy rainfall, there were several reports of flash flooding along with mud and debris flows near the Station Fire burn area. In San Luis Obispo County, a severe thunderstorm producing very strong winds.
January 18, 2010	Strong and gusty south winds associated with an approaching winter storm affected the coast of San Luis Obispo County. A weather spotter in Grover Beach reported south winds gusting to 60 MPH. A series of powerful winter storms affected Central and Southern California between the 18th and 22nd of January. As this series of storms moved across the area, they brought heavy rain, flash flooding, gusty winds, heavy snow and even severe weather to the area.
January 20, 2010	Strong and gusty south winds associated with an approaching winter storm affected the interior valleys of San Luis Obispo county. The Carrizo RAWS sensor reported south winds gusting to 60 MPH while the ASOS at Paso Robles reported sustained south winds of 40 MPH. A trained spotter in the Grover Beach area reported a thunderstorm wind gust of 58 MPH.
February 13 – 14, 2019	February 2019 brought heavy rain and high wind throughout the County. These events resulted in downed power lines and trees. The National Weather Service issued a wind advisory which lasted from February 13th – 14th. On February 13th, 2019, high winds lead to 2,000 PG&E customers to lose power and downed power lines in Arroyo Grande causes roads to be closed. The Atascadero Fire Department reported a 50-foot pine tree fell on two single-story multi-family residences leading to eight people being displaced but none were injured. The fallen tree led to $400,000 in property damage due to a broken water line (San Luis Obispo Tribune, 2019).
January 27, 2021	A powerful winter storm impacted Central and Southern California with heavy rain and snow, gusty winds and widespread urban flooding. The heaviest rainfall totals (4-10 inches) fell across San Luis Obispo and Santa Barbara counties due to the influence of an atmospheric river. With such rainfall totals, numerous reports of flooding were received in these areas. Across Ventura and Los Angeles counties, rainfall totals were less, but still significant. Ventura county received 2 to 6 inches of rainfall with 1-4 inches across Los Angeles County. With snow levels around 5000 feet, significant snowfall fell in the mountains of Ventura and Los Angeles counties with 1 to 2 feet of snowfall reported. Along with the precipitation, southerly winds, gusting up to 80 MPH, impacted the area.
December 10, 2022	A powerful winter storm brought heavy rain, mountain snow and gusty winds to Southwestern California. Rainfall totals were very impressive, ranging from 1-4 inches across coastal and valley areas to 4-8 inches across the foothills and mountains. Fortunately, only nuisance urban flooding was reported. Snow levels remained quite high during the bulk of the storm with areas above 6000 feet receiving up to 5 inches of new snowfall. Along with the precipitation, strong southwesterly wind impacted many areas with peak gust in excess of 80 MPH reported across the mountains.
February 7, 2024	A second, very strong, winter storm impacted Southwestern California. Rainfall totals were very significant across the area. Los Angeles county reported rain

DATE OF EVENT	INCIDENT DESCRIPTION
	totals of 4 to 14 inches, Ventura County reported 2 to 10 inches, Santa Barbara county reported 4 to 12 inches and San Luis Obispo county reported 2 to 5 inches. With the heavy rainfall, numerous reports of flooding were received. In the mountains, very significant snowfall was reported with amounts in the 1-to-3-foot range. Also, severe thunderstorms and tornadoes were reported in Grover Beach near Los Osos.

Source: NCEI Storm Events Database, 2014 San Luis Obispo LHMP

Refer to the map in Section 5.3.1 for the location of the past high wind and tornado events that are described in the table above.

5.3.3.5 Likelihood of Future Occurrences

According to the NCEI dataset there has been 77 total recorded severe high wind and tornado events since 1998 in San Luis Obispo County. The probability of future occurrences is rated as highly likely. Tornado is the least documented type of windstorm in the planning area and high wind events are the most common.

Historical wind activity within the planning area indicates that the area will likely continue to experience high wind during thunderstorm events with a potential of the formation of funnel clouds and low intensity tornadoes during adverse weather conditions.

5.3.3.6 Climate Change Considerations

Climate change is altering weather patterns throughout the Country, and while tornadoes remain rare in California, shifting atmospheric conditions could influence their occurrence. According to the Fifth Nation Climate Assessment (NCA5), warming temperatures are increasing atmospheric instability, which can contribute to more severe storms in certain regions. While tornado alley in the Central U.S. has been shifting trends in tornado frequency and intensity, California's risk remains low but not nonexistent.

The California Fourth Climate Change Assessment discusses rising temperatures and increased precipitation variability along the Central Coast. These changes can lead to more extreme weather patterns, including stronger winds and localized storms. While the state does not experience frequent tornadoes, isolated events, particularly weak tornadoes or funnel clouds, have been observed, often associated with Pacific storms or convective weather.

Because of uncertainty with the influence of climate change on tornadoes, future updates to the mitigation plan should include the latest research on how the tornado hazard frequency and severity could change. The level of significance of this hazard should be revisited over time.

5.3.3.7 Vulnerability to Severe Weather: High Wind and Tornadoes

Structures

General damages are both direct (what the wind event physically destroys) and indirect, which focuses on additional costs, damages and losses attributed to secondary hazards spawned by the event, or due to the damages caused by the wind event. The severity of these damages depends on the magnitude of the wind event, as well as the size and path of a tornado if one occurs. Tornadoes, depending on their intensity, can damage or completely destroy almost anything in their path. However, the use of resilient construction practices and adherence to modern building codes can significantly enhance the ability of structures to withstand wind-related damage, reducing both direct and indirect impacts.

High winds and tornadoes can cause damage to property and loss of life. While most tornado damage is caused by violent winds, most injuries and deaths result from flying debris. Property damage can include damage to buildings, fallen trees and power lines, broken gas lines,

broken sewer and water mains, and the outbreak of fires. Agricultural crops and industries may also be damaged or destroyed. Access roads and streets may be blocked by debris, delaying necessary emergency response.

Secondary impacts of damage caused by wind events often result from damage to infrastructure. Downed power and communications transmission lines, coupled with disruptions to transportation, create difficulties in reporting and responding to emergencies. These indirect impacts of a wind event put tremendous strain on a community. In the immediate aftermath, the focus is on emergency services.

Downed trees caused by a wind event are a common occurrence in the county (refer to Table 5-28). Falling trees can cause significant damage to property and put people at risk. Due to multiple years of drought in the county, combined with tree disease and pests, (refer to the Drought section and the section on Agricultural Pest Infestation, Plant Disease, Marine Invasive Species and Tree Mortality), many trees in the area have been impacted making them more susceptible to blow-down during wind events.

People

Community members are the most vulnerable to high wind and tornado events, especially those living in downtown areas and residential neighborhoods with higher density of development. Those living in greater compacted areas have a greater risk of being exposed to flying debris, downed trees, and infrastructure damage. The availability of sheltered locations such as basements, buildings constructed using tornado-resistant materials and methods, and public storm shelters, all reduce the exposure of the population. However, there are also segments of the population that are especially exposed to the indirect impacts of high winds and tornadoes, particularly the loss of electrical power. These populations include the elderly or disabled, especially those with medical needs and treatments dependent on electricity. Nursing homes, community-based residential facilities, and other special needs housing facilities are also vulnerable if electrical outages are prolonged since backup power generally operates only minimal functions for a short period of time.

Social Vulnerability

Communities that are vulnerable to the impacts of a high wind or tornado event are the same areas of the county with the highest-ranking vulnerable household compositions and overall high ranking of social vulnerability such as Paso Robles and Grover Beach. Based on the SVI data presented in and discussed in subsection 4.4.1, mitigation efforts to address vulnerability to high wind and tornado should be focused on the communities with the highest social vulnerability rankings.

Critical Facilities and Lifelines

The primary transportation disruptions resulting from high winds and tornadoes typically involve road closures and loss of access. These events can inflict significant damage to trees and powerlines, leading to obstruction of roads with debris, hindering transportation, isolating communities, and disrupting both inbound and outbound travel. Of particular concern are roads that provide access to remote areas and vulnerable populations such as the elderly as mentioned above.

Among the most common challenges associated with these weather events is the loss of utilities. Downed powerlines can trigger widespread blackouts, effectively isolating large areas. Furthermore, disruptions to phone, water, and sewer systems may occur. The loss of electricity and phone connectivity could leave certain populations stranded, as residents would be unable to request assistance.

Public gathering places including (but not limited to) schools, community centers, shelters, nursing homes and churches, may have increased impacts at certain times of day if struck by a

tornado. Other critical and essential facilities, transportation and utility lifelines, and high potential loss facilities such as power plants could also be significantly affected by powerful wind or tornado events, particularly in areas impacted by tree mortality (refer to 5.3.5 Agricultural Pest Infestation).

In the following two tables summarizing critical facilities, GIS overlay analysis was performed to find which of these facilities fall within the high tree mortality areas. Table 5-15 summarizes the facilities found in tree mortality hazard zones by type, while Table 5-16 summarizes the total facilities in these tree mortality areas by jurisdiction. According to this analysis, most critical facilities found at risk are in the unincorporated portions of county, with 47 in Paso Robles and 13 or fewer in Pismo Beach, Grover Beach, and Arroyo Grande. The three most common facility types at risk are microwave service towers, public schools, and day care facilities. Most of the critical facilities are found in Tier 2 tree mortality areas (190), though 5 facilities are in Tier 1 tree mortality areas.

Table 5-28 Critical Facilities Within Tree Mortality Hazard Zones, by Jurisdiction

JURISDICTION	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Arroyo Grande	5	-	-	-	4	3	1	-	13
Grover Beach	2	-	1	1	1	6	1	4	16
Morro Bay	-	-	-	-	-	1	-	-	1
Paso Robles	10	2	3	6	4	20	16	1	62
Pismo Beach	3	-	-	-	3	8	10	-	24
Unincorporated	69	6	1	3	8	55	50	11	203
Total	**89**	**8**	**5**	**10**	**20**	**93**	**78**	**16**	**319**

Source: San Luis Obispo County, CAL FIRE, FRAP, TMTF October 2022, CalARP, HIFLD, NBI, NID, WSP Analysis

Table 5-29 Critical Facilities Within Tree Mortality Hazard Zones, by Community Service District

COMMUNITY SERVICE DISTRICT	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Avila Beach	3	-	-	-	-	-	-	-	3
Cambria	13	-	1	-	3	30	6	-	53
Heritage Ranch	1	-	-	-	1	1	-	1	4
Nipomo	5	-	-	-	-	3	-	1	9
Oceano	1	-	-	-	-	-	4	-	5
San Simeon	1	-	-	-	-	-	-	1	2
Templeton	-	-	-	-	-	2	-	-	2
Total	**24**	**0**	**1**	**0**	**4**	**36**	**10**	**3**	78

Source: San Luis Obispo County, CAL FIRE, FRAP, TMTF October 2022, CalARP, HIFLD, NBI, NID, WSP Analysis

Historic, Cultural, and Natural Resources

High winds and tornadoes pose a risk to the historic, cultural, and natural resources throughout the planning area. This hazard can cause massive damage to the natural environment, uprooting trees and other debris. While these disturbances can cause immediate damage, they also play a natural role in shaping the landscape and the resilience of ecosystems. Over time, the environment tends to recover through ecological processes like succession and regeneration. Similarly, through preservation and restoration efforts, historic and cultural resources can be repaired and protected for the future.

GIS was used to estimate the potential for wind damage to historic properties from fallen trees, assuming that tree mortality areas will be most susceptible. The analysis indicates that a total of 35 historic properties in San Luis Obispo County are located in a high hazard tree-mortality zone.

Table 5-30 Historic Sites Exposed to Tree Mortality Hazard Zones by Jurisdiction

JURISDICTION	COUNT
Morro Bay	1
Paso Robles	1
Unincorporated	33
Total	**35**

Source: San Luis Obispo County, CAL FIRE, FRAP, TMTF October 2022, WSP Analysis

Economy and Community Values

Winds typically do not have long-term impacts on the economy, although wind does have an impact on the agriculture economy in the county. As shown in Table 5-31 wind events have been a leading cause of crop loss in the past (2015-2021), resulting in over $30 million in loss payments from the USDA.

Both winds and tornadoes may impact exposed critical infrastructure such as power lines; depending on the impact and the function, this could cause a short-term economic disruption. The most common problems associated with tornadoes and high winds are loss of utilities. Downed power lines can cause power outages, leaving large parts of the county isolated, and without electricity, water, and communication. Damage may also limit timely emergency response and the number of evacuation routes. Downed electrical lines following a storm can also increase the potential for lethal electrical shock. Damaging winds can also cause wildfires, refer to the Wildfire section for more information on the county's vulnerability to wildfires.

Development Trends

As the County continues increase in population, the number of people and housing developments exposed to the hazard increases. Adherence to current building codes, coupled with proper education on building techniques and the use of sturdy building materials, attached foundations, and other structural techniques may minimize the property vulnerabilities. Public shelters at parks and open spaces may help reduce the impacts of tornadoes and high wind events on the recreational populations exposed to storms.

Risk Summary – High Wind and Tornadoes

The overall impact to the community from tornadoes and wind due to severe storms could include:

- San Luis Obispo has experienced 77 wind and tornado events since 1998;

- Most damaging wind event occurred on 1/2/2006 and resulted in $4,000,000 in property damages.
- Over $4 million in crop indemnities have been paid due to crop loss from excessive wind;

Related hazards: Wildfire, Coastal Storm/Coastal Erosion/Sea Level Rise, Agriculture/Pest Infestation/Plant Disease/Tree Mortality

Table 5-31 Hazard Risk Summary - High Wind and Tornadoes

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY	OVERALL SIGNIFICANCE
San Luis Obispo County	Significant	Highly Likely	Negligible	Low
City of Arroyo Grande	Significant	Likely	Negligible	Low
City of Atascadero	Extensive	Likely	Limited	Low
City of Grover Beach	Significant	Likely	Negligible	Low
City of Morro Bay	Significant	Highly Likely	Limited	Medium
City of Paso Robles	Significant	Highly Likely	Limited	Low
City of Pismo Beach	Significant	Likely	Limited	Low
City of San Luis Obispo	Extensive	Occasional	Limited	Medium
Avila Beach CSD	Significant	Occasional	Negligible	Low
Cambria CSD	Significant	Likely	Negligible	Low
Ground Squirrel Hollow CSD	Limited	Likely	Negligible	Medium
Heritage Ranch CSD	Extensive	Highly Likely	Critical	High
Los Osos CSD	Significant	Likely	Limited	Medium
Nipomo CSD	Limited	Likely	Negligible	Low
Oceano CSD	Significant	Likely	Negligible	Low
San Miguel CSD	Extensive	Likely	Catastrophic	High
San Simeon CSD	Significant	Likely	Limited	Low
Templeton CSD	Significant	Highly Likely	Limited	High
Cayucos Sanitary District	Extensive	Likely	Critical	High
Port San Luis Harbor District	Extensive	Highly Likely	Limited	Medium
San Luis Obispo FCWCD	Limited	Highly Likely	Negligible	Low
South San Luis Obispo Sanitary District	Significant	Likely	Negligible	Low

5.3.4 Adverse Weather: Extreme Heat

5.3.4.1 Hazard/Problem Definition

Extreme heat events can have severe impacts on human health and mortality, natural ecosystems, the agriculture sector and other economic sectors. According to information provided by FEMA, extreme heat is defined as a long period, typically 2 to 3 days of high heat and humidity, with readings exceeding 90 degrees or significantly above the region's average high (FEMA 2024). The average high temperature for the City of San Luis Obispo in August is 80 degrees (U.S. Climate Data 2023). The NWS will initiate alert procedures when the Heat Index is expected to exceed 105 degrees to 110 degrees (depending on local climate) for at least two consecutive days (NWS n.d.). According to Cal-Adapt, an extreme heat day is when the daily maximum exceeds the 98th historical percentile of daily maximum temperatures based on observed historical data from 1961 to 1990 (Cal-Adapt 2018).

Heat kills by taxing the human body beyond its abilities, usually from heat stroke. In a normal year, about 175 Americans succumb to the demands of summer heat. According to the NWS, among natural hazards, only the cold of winter—not lightning, hurricanes, tornadoes, floods, or earthquakes—takes a greater toll. As a comparison, in the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died. A heat wave is defined a period of abnormally and uncomfortably hot and unusually humid weather that lasts two or more days (NOAA n.d.) The 2018 California State Hazard Mitigation Plan (SHMP) notes the 2006 heat wave lead to 650 deaths in a 13-day period (Cal OES 2018) and in the past 15 years heat waves have claimed more lives in California than all other declared disaster events combined (California Climate Adaptation Strategy 2018). According to the 4th Climate Change Assessment, heat waves in California will grow more severe and persistent, shortening the lives of thousands of Californians (CNRA 2018).

Heat disorders generally have to do with a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating or a salt imbalance caused by too much sweating. When heat gain exceeds the level the body can remove, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise, and heat-related illness may develop. The elderly, small children, individuals who work outside, patients with chronic medical conditions, those on prescription medication therapy, and people with weight and alcohol problems are particularly susceptible to heat reactions, especially during heat waves in areas where moderate climate usually prevails. Table 5-32 illustrates the relationship of temperature and humidity to heat disorders.

Table 5-32 National Weather Service Heat Index

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure and/or Strenuous Activity

Caution Extreme Caution Danger Extreme Danger

Source: National Weather Service

Note: Since heat index values were devised for shady conditions, exposure to full sunshine can increase heat index values by up to 15˚F.

5.3.4.2 Geographic Area

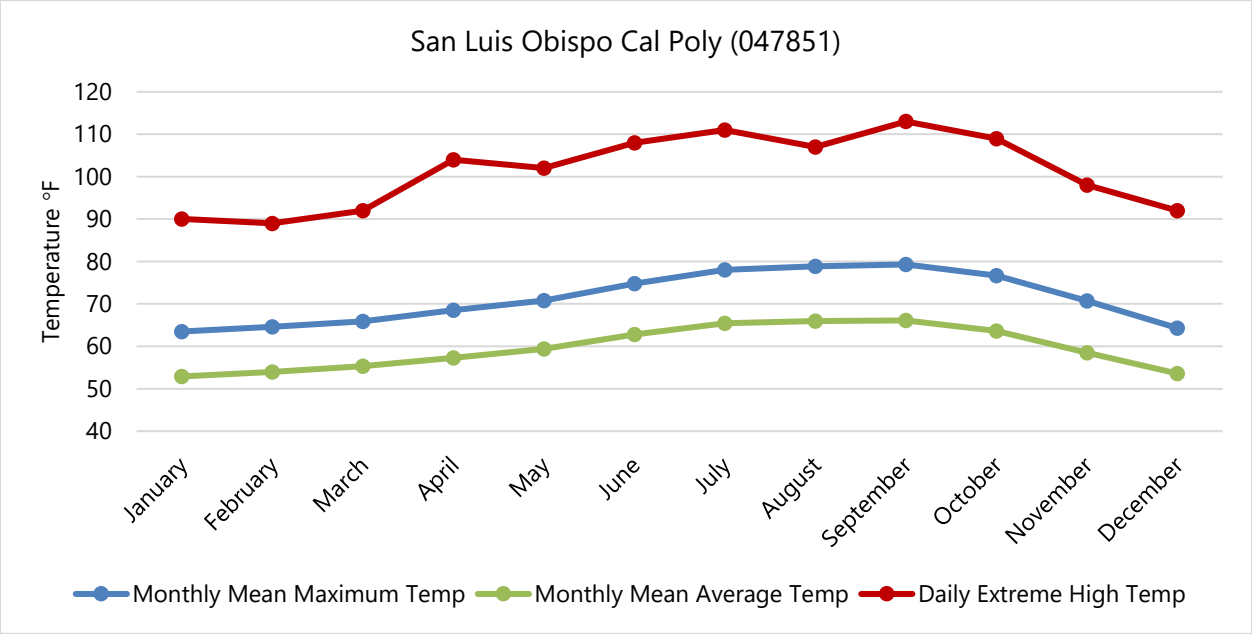
All of San Luis Obispo County is at risk of extreme heat events, although some areas of the County may be more vulnerable than others. On average, coastal communities have lower temperature variability than inland communities and may be less at risk to extreme temperatures. However, these communities are potentially less acclimatized to high temperatures when they do occur. The North County inland area has the potential for the highest extreme heat days.

Information from the four representative weather stations introduced in subsection 5.3.1 Adverse Weather: General is summarized below in Figure 5-15 through Figure 5-18, providing an overview of the diverse weather variability observed throughout the County. These stations capture a wide range of environmental factors, reflecting differences in elevation, terrain, and localized weather patterns.

City of San Luis Obispo Area

Figure 5-15 shows monthly high temperature trends for the San Luis Obispo Cal Poly weather station from 1927 to 2024. This location experiences a summer average temperature of 64.7˚F, with a summer average maximum of 77.3˚F. The highest recorded temperature at this location was 113˚F, which occurred on September 9, 2020.

Figure 5-15 San Luis Obispo Poly Tech Daily Temperature Averages and Extremes (Period of Record 1927-2024)

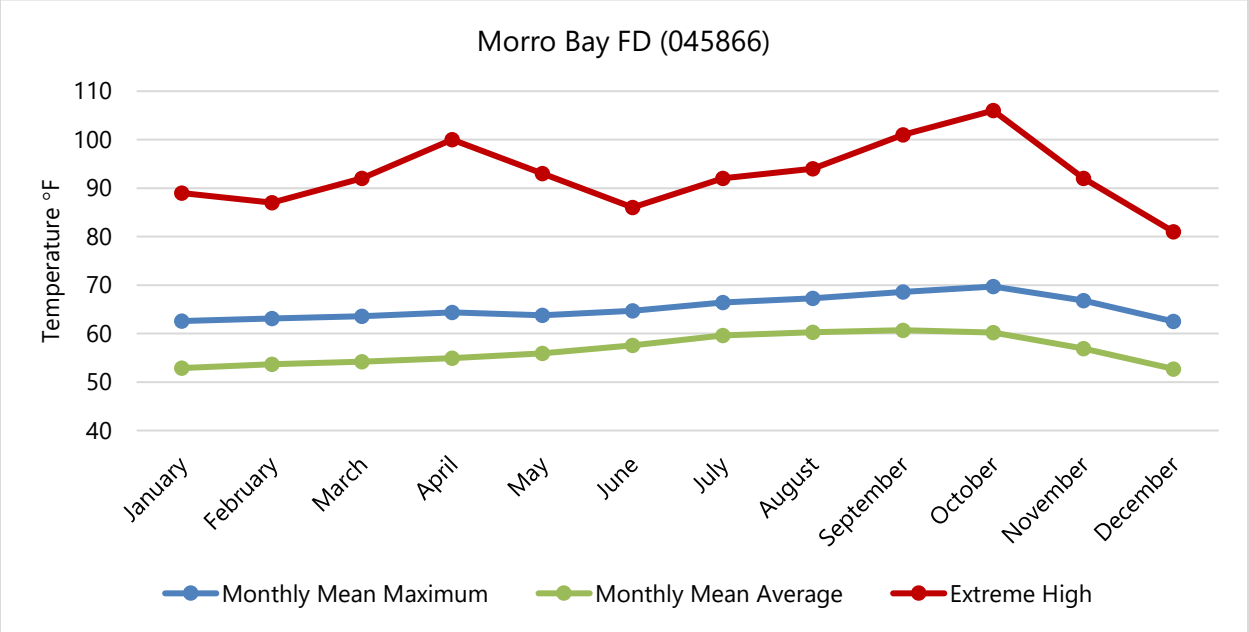


Source: Western Regional Climate Center, www.wrcc.dri.edu/

North County Coastal Area

Figure 5-16 shows monthly temperature trends for the Morro Bay Fire Department weather station from 1959 to 2016. This location has a summer average temperature of 59.1˚F and a summer average maximum of 66.0˚F. The highest recorded temperature there was 106˚F, recorded on October 4, 1987.

Figure 5-16 North County Coastal Area – Daily Temperature Averages and Extremes (Period of Record 1959-2016)

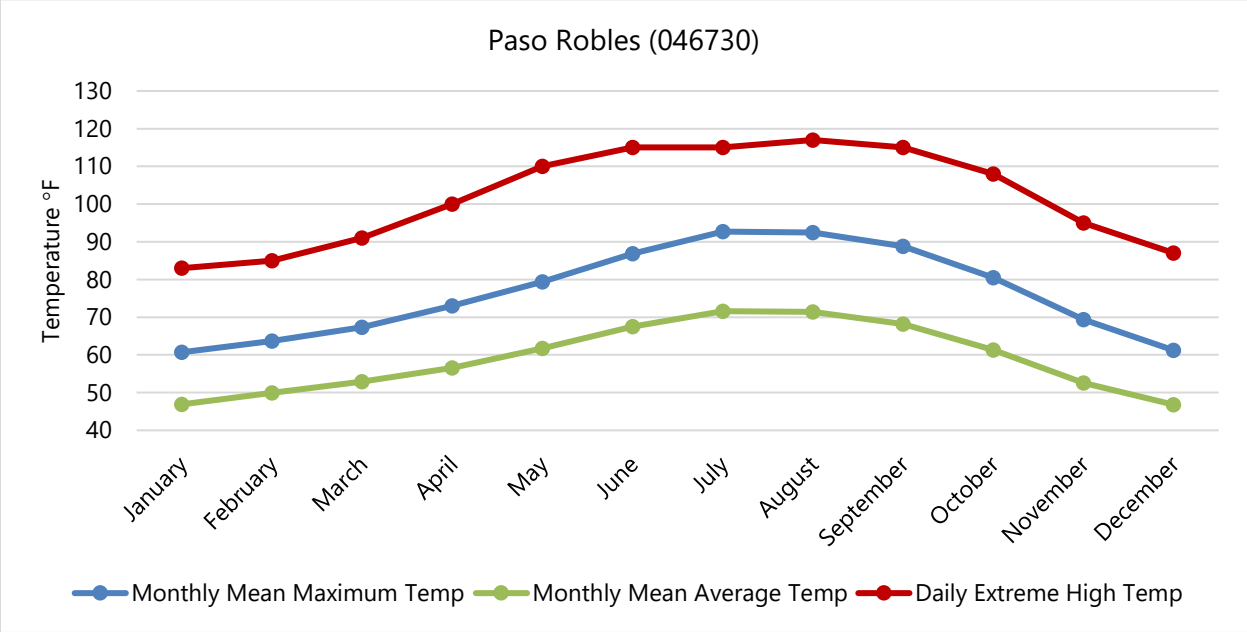


Source: Western Regional Climate Center, www.wrcc.dri.edu/

North County Inland Area

Figure 5-17 shows monthly temperature trends for the Paso Robles weather station from 1894 to 2025. This location experiences a summer average temperature of 70.2˚F and a summer average maximum of 90.8˚F. Its highest recorded temperature was 117˚F, occurring on August 13, 1933.

Figure 5-17 North County Inland Area – Daily Temperature Averages and Extremes (Period of Record 1894 -2025)

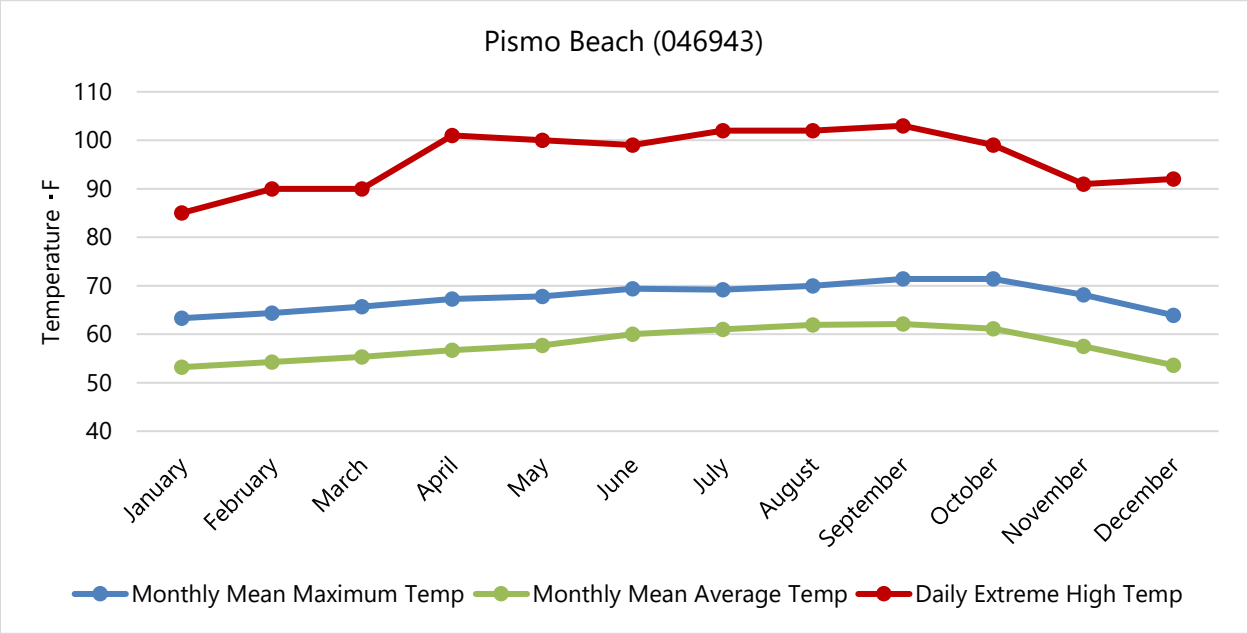


Source: Western Regional Climate Center, www.wrcc.dri.edu/

South County Area

Figure 5-18 shows monthly temperature trends for the Pismo Beach weather station from 1949 to 2017. This location has a summer average temperature of 60.9˚F, with a summer average maximum of 69.5˚F. The highest recorded temperature at this location was 103˚F on September 3, 1982.

Figure 5-18 South County Area – Daily Temperature Averages and Extremes (Period of Record 1949-2017)

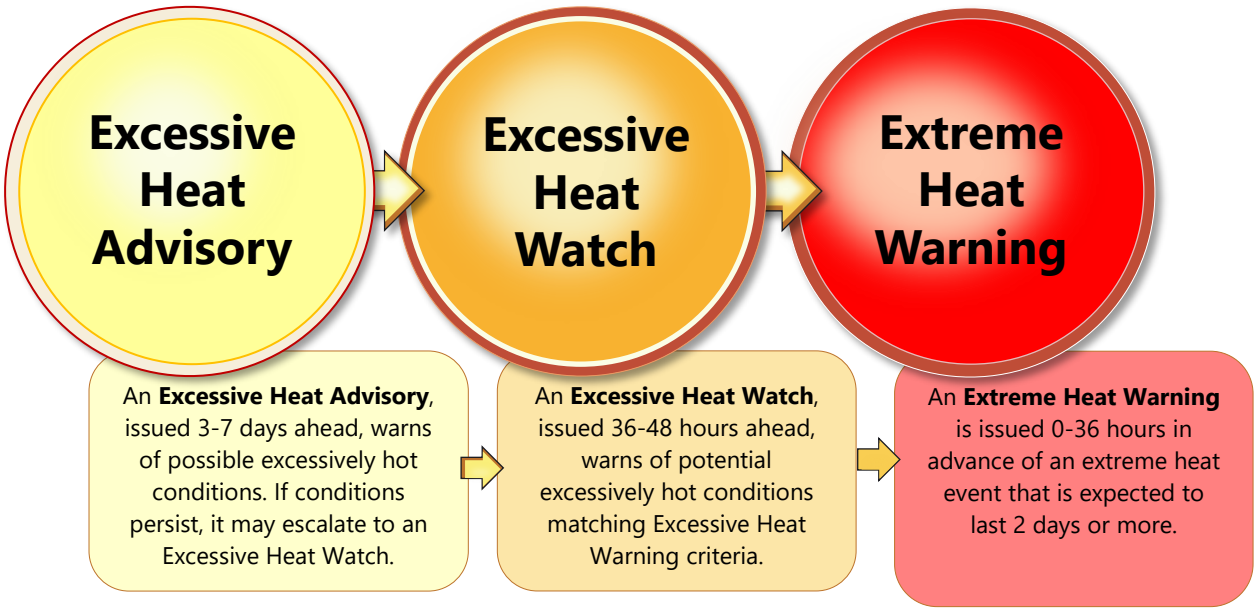


Source: Western Regional Climate Center, www.wrcc.dri.edu/

5.3.4.3 Extent (Magnitude/Severity)

The NWS has a system in place to initiate alert procedures when high temperatures are expected to have a significant impact on public safety. The expected severity of the heat determines which type of alert is issued. Using climate-region-specific criteria, the NWS will issue alerts in the form of a Special Weather Statement that is based on how far in advance of the event they are making the prediction. NWS alert levels are detailed in Figure 5-19 below.

Figure 5-19 NWS Extreme Heat Advisory Levels



When temperatures spike for two or more consecutive days without an adequate drop in nighttime temperature to cool the outdoor and indoor environments, there is a significant increase in the risk to vulnerable populations.

5.3.4.4 Previous Occurrences

The Iowa Environmental Mesonet (IEM) NWS Warning Search is a comprehensive archive of NWS Watch, Warning, and Advisory (WWA) products. Between January 1, 2020 (when record keeping began), and January 1, 2025, the County received 52 heat WWAs, detailed in Table 5-33 below.

Table 5-33 Heat WWAs for San Luis Obispo County, 2022-2024

ROW LABELS	2022	2023	2024	GRAND TOTAL
Heat Advisory	11	8	9	**28**
Excessive Heat Watch	3	4	6	**13**
Extreme Heat Warning	3	3	5	**11**
Grand Total	**17**	**15**	**20**	**52**

Source: IEM, https://mesonet.agron.iastate.edu/

Events of Note

July 22, 2006 – San Luis Obispo County, along with neighboring counties, experienced periods of excessive heat due to high pressure and above-normal humidity, with heat index values ranging from 100˚F to 119˚F. During the 2006 California heat wave, the Central Coast region, including San Luis Obispo, accounted for a disproportionately high number of emergency room visits (28%) and hospitalizations (47%) compared to its population share (18%). This was attributed to the region's typically cooler climate and residents' lack of acclimatization to extreme heat.

September 3, 2007 – The combination of above normal temperatures and relative humidity produced excessive heat conditions across the mountains and valley of San Luis Obispo county. Heat index values between 105˚F and 112˚F were reported. The heat wave which started at the end of August continued into the first few days of September. The combination of above normal temperatures and relative humidity continued to produce excessive heat conditions across sections of Southern California.

June 20, 2008 – The combination of strong high pressure centered over Arizona and weak offshore flow generated extreme heat conditions across Central and Southern California. Across many sections of the area, afternoon temperatures climbed to between 100˚F and 114˚F which set numerous high temperature records. The extreme heat resulted in several power outages due to excessive electrical use. The automated sensor at Paso Robles reported a high temperature of 107˚F with a heat index of 105˚F degrees.

September 2020 – The highest recorded temperature for the San Luis Obispo area was 113˚F in Sep. 9, 2020 according to the WRRC/NOAA; Note: a Cal Poly weather station reached 120 degrees F on Sep 6, 2020 (https://www.sanluisobispo.com/news/weather-news/article245535995.html).

2021 Western Heat Wave: During the record-breaking heat wave in June and July 2021, San Luis Obispo County, like the rest of California, experienced a notable increase in heat-related health impacts. Statewide, heat-related deaths rose from 12 in 2020 to 25 in 2021, with a significant rise in emergency room visits for heat-related illnesses (SHMP 2023).

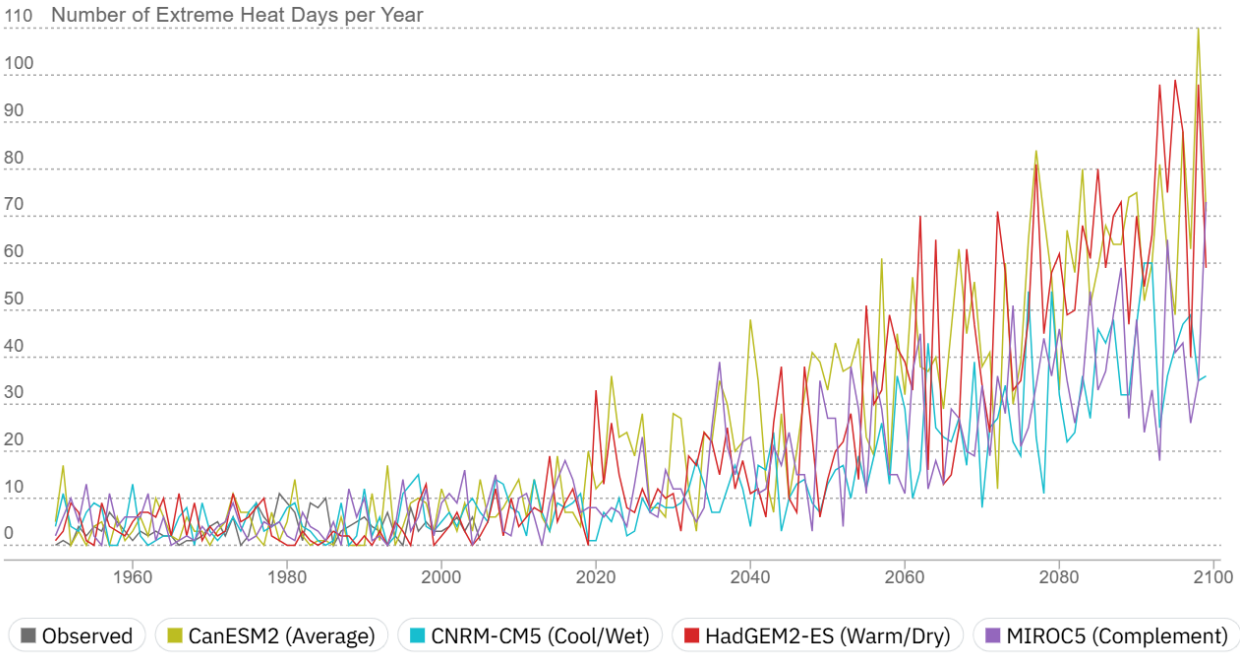
July 2024: An excessive heat warning was issued for inland areas, with temperatures forecasted to reach between 105˚F and 115˚F. Coastal valleys were under a heat advisory during this period.

5.3.4.5 Probability of Future Occurrences

Likely—Based on the NWS IEM data, 52 heat advisories have occurred over the last five years since the last plan was adopted in 2020 which equates to approximately 10 extreme heat events annually. This makes it likely that an extreme heat event will happen during any given year. A study by the US EPA indicates that heat waves are occurring more frequently in all major cities across the United States especially in western states and their frequency has steadily increased, from an average of two heat waves per year during the 1960s to six per year during the 2010s and 2020s (US EPA 2022).

As climate change progresses, these events are likely to become more common. Future temperature estimates from Cal-Adapt for the County under high emission scenarios are shown in Figure 5-20 and summarized in Table 5-34. These figures show the number of days per year when daily maximum temperature is above the locally-defined extreme heat threshold of 90.3˚F. Note: The threshold temperature used in Cal-Adapt is defined as the 98th percentile value of historical daily maximum/minimum temperatures (from 1961–1990), between April and October) observed in the County. As shown, the number of future extreme heat days in the County is expected to increase substantially through the end of the century.

Figure 5-20 Future Extreme Heat Days in San Luis Obispo County



Source: Cal-Adapt. Data: LOCA Downscaled CMIP5 Climate Projections (Scripps Institution of Oceanography), Gridded Observed Meteorological Data (University of Colorado Boulder), LOCA Derived Products (Geospatial Innovation Facility).

Table 5-34 Projected changes in Number of Extreme Heat Days per Year

	MODELED HISTORICAL (1961-1990)	MID-CENTURY (2035-2064)	END-CENTURY (2070-2099)
30-Year average	4 days/year	24 days/year	49 days/year

	MODELED HISTORICAL (1961-1990)	MID-CENTURY (2035-2064)	END-CENTURY (2070-2099)
30-Year Range	0-14 days/year	3-70 days/year	8-110 days/year

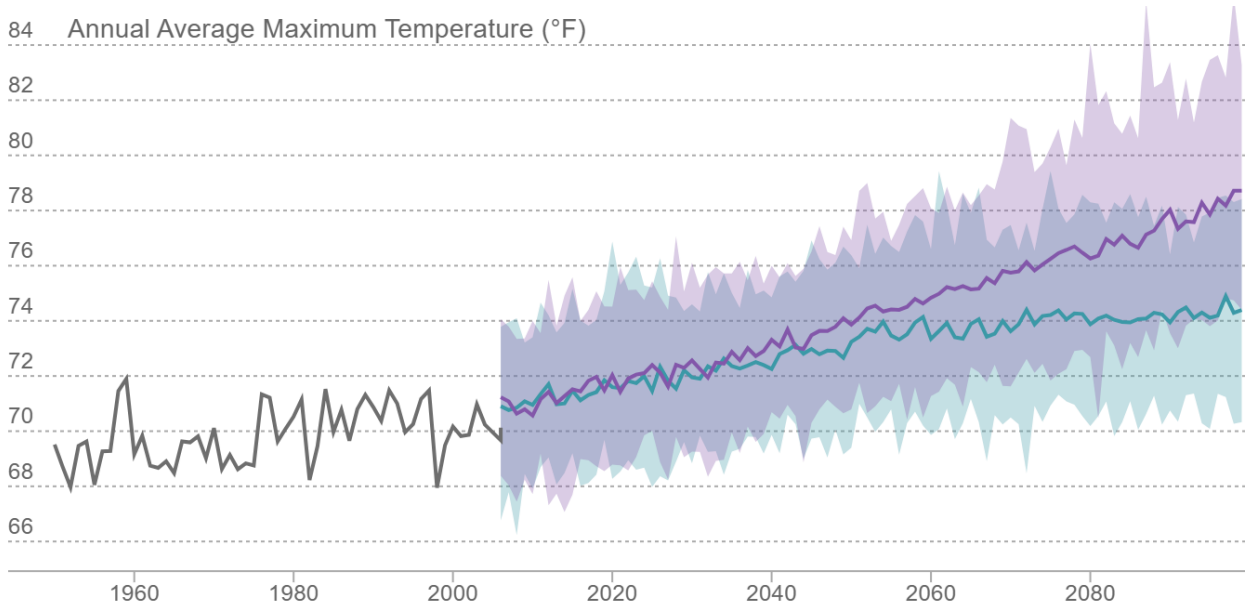
Source: Cal-Adapt, 2025

5.3.4.6 Climate Change Considerations

According to the Central Coast Region Report of California's Fourth Climate Change Assessment, both average high and average minimum temperatures are expected to increase, with the greatest increases in the inland regions of the Central Coast. Due to rising temperatures heat waves are likely to become more frequent, which will have direct impacts on people, property, and the economy, as further detailed in the vulnerability assessment below.

The annual average maximum temperature is defined by Cal-Adapt as the average of all the hottest daily temperatures in a year. Figure 5-21 shows observed, modeled, and projected annual average maximum temperature in the County under both medium and high emission scenarios. Projected changes under a range of high emission scenarios are further detailed in Table 5-35.

Figure 5-21 Annual Average Maximum Temperature



Source: Cal-Adapt, 2025

Table 5-35 30-Year Annual Average Maximum Temperatures

	MODELED HISTORICAL (1961-1990)	MID-CENTURY (2035-2064)	END-CENTURY (2070-2099)
Change from Baseline	--	+4.2 ˚F	+7.4 ˚F
30-Year Average	69.7 ˚F	73.9 ˚F	77.1 ˚F
30-Year Range	69.3 – 70.2 ˚F	72.1 – 75.4 ˚F	74.5 – 80.3 ˚F

Source: Cal-Adapt, 2025

5.3.4.7 Vulnerability: Extreme Heat

Cascading impacts are the impacts that result when one type of hazard event triggers one or more other hazard events, which may in turn trigger still other hazards. Examples of cascading impacts associated with extreme heat events are detailed in Table 5-36

Table 5-36 Cascading Impacts of Extreme Heat

Air Quality 	• Poor air quality can occur when stagnant atmospheric conditions trap humid air and pollutants near the ground. Ozone, a major component of smog, is created in the presence of sunlight. Hot weather can increase ozone levels, which often cause or worsen respiratory problems (EPA 2022b). • Ozone can impact plant health by interfering with plants' ability to produce and store food. This can lead to reduction in agricultural yields of many crops (Avnery, et al. 2011, Ainsworth 2017).
Disease 	• Climate change-driven heat events can promote the spread of vector-borne diseases, including dengue, Zika, yellow fever, and chikungunya, even in areas previously unaffected. Warmer temperatures increase mosquito feeding, breeding, and lifespan, enabling them to travel farther and spread viruses more effectively.
Power 	• Air conditioning used during extreme heat events increases energy demand and could increase the risk of energy shortages. In the summer of 2020, the demand for electricity during heat waves in California contributed to the State's first rolling blackout in nearly 20 years (Kim, et al. 2021). • Under certain severe weather conditions, utility service providers shut off power to help prevent wildfire. A public safety power shutoff (PSPS) may be called in response to a combination of dry vegetation and high winds that can uproot trees, blow branches onto power lines, or create sparks if power lines contact one another.
Wildfire 	• Extreme heat contributes to more severe wildfires in a longer wildfire season and increases the health and safety risk experienced by wildland firefighters and populations near wildfires due to additional reductions in air quality. • Wildfire can also further exacerbate worsening air quality caused by extreme heat, placing all vulnerable populations at risk of new or worsened respiratory conditions.

Water



- Heat evaporation can lead to loss of stored water in reservoirs and aqueducts. The amount of water lost depends largely on local climate conditions. High air temperatures, low humidity, strong winds and sunshine will increase evaporation.
- Elevated temperatures can increase algal blooms in reservoirs and water bodies, reduce oxygen levels, and promote the proliferation of harmful bacteria, making water treatment more challenging.

Source: Modified from 2023 State Hazard Mitigation Plan, https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf

Structures

All property is vulnerable to extreme heat events, but property and buildings are less vulnerable to temperature swings the same way people or critical facilities are vulnerable. Cascading impacts on urban systems can result from extreme heat stress applied on water, power, and transportation systems (UCLA Luskin Center for Innovation 2021). Heat can compromise infrastructure safety and reliability; it can cause issues such as train track buckling and road material softening. Extreme heat exposure may also affect older, poorly built, or uninsulated buildings; elevated summer-month temperatures may also increase energy demand for cooling in these poorly insulated buildings and losses associated with air conditioning if they lack efficient HVAC systems.

Extreme heat can also prevent aircraft from taking off as it reduces the density of air mass, making it more difficult for aircraft to lift, in addition to possibly softening tarmac materials (UCLA Luskin Center for Innovation 2021). This could have direct implications for the passengers and cargo that use the San Luis Obispo County Airport and, under extreme conditions, could impair the movement of essential goods.

People

Certain populations in San Luis Obispo County are at heightened risk during extreme heat events due to demographic, socioeconomic, and geographic vulnerabilities. Elderly individuals, including those aged 65 and over who make up 21.6% of the County's population, face significant risks because they are less able to regulate body temperature and may have pre-existing health conditions. Limited mobility or lack of access to cooling resources may further exacerbate their vulnerability. Young children, including those under 5 years of age who make up 4.4% of the County's population, are also particularly vulnerable due to their developing physiology and inability to control their environment.

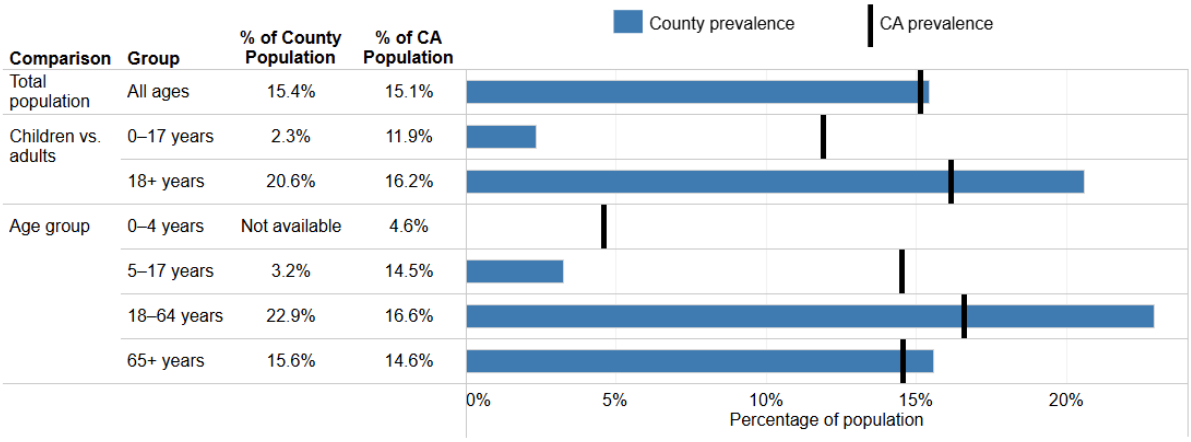
Households with low incomes are another high-risk group, as they may lack air conditioning or the financial means to afford increased energy bills during heat waves. Additionally, poor-quality housing can contribute to unsafe indoor temperatures. According to CalEnviroScreen 4.0's 2021 data, about 27.7% of the County's population is living below two times the federal poverty level (chosen due to the high cost of living in California).

Individuals who work outdoors, such as agricultural or construction workers, are at increased risk of heat stress due to prolonged exposure to high temperatures. In 2010, San Luis Obispo County had approximately 8,888 outdoor workers whose occupation increased their risk of heat illness (Maizlish et al. 2017). Adequate shade and misting stations could provide extra protection for such workers. Additionally, the unhoused population faces extreme vulnerability due to constant exposure to heat without access to shelter. According to the 2024 San Luis Obispo Point-in-Time Count, 1,175 individuals were experiencing homelessness in 2024 (SLO

2024). This population, like low-income households may lack nighttime relief from the heat, elevating their risk of heat stroke.

Those with chronic health conditions, such as cardiovascular disease, respiratory issues, or diabetes, are also particularly vulnerable to heat-related complications. Additionally, those who utilize electricity dependent medical equipment or medications are at increased risk. According to the California Department of Public Health, 15.4% of the County across all age groups has been diagnosed with asthma. Asthma diagnoses in the County is further explored in Figure 5-22 below.

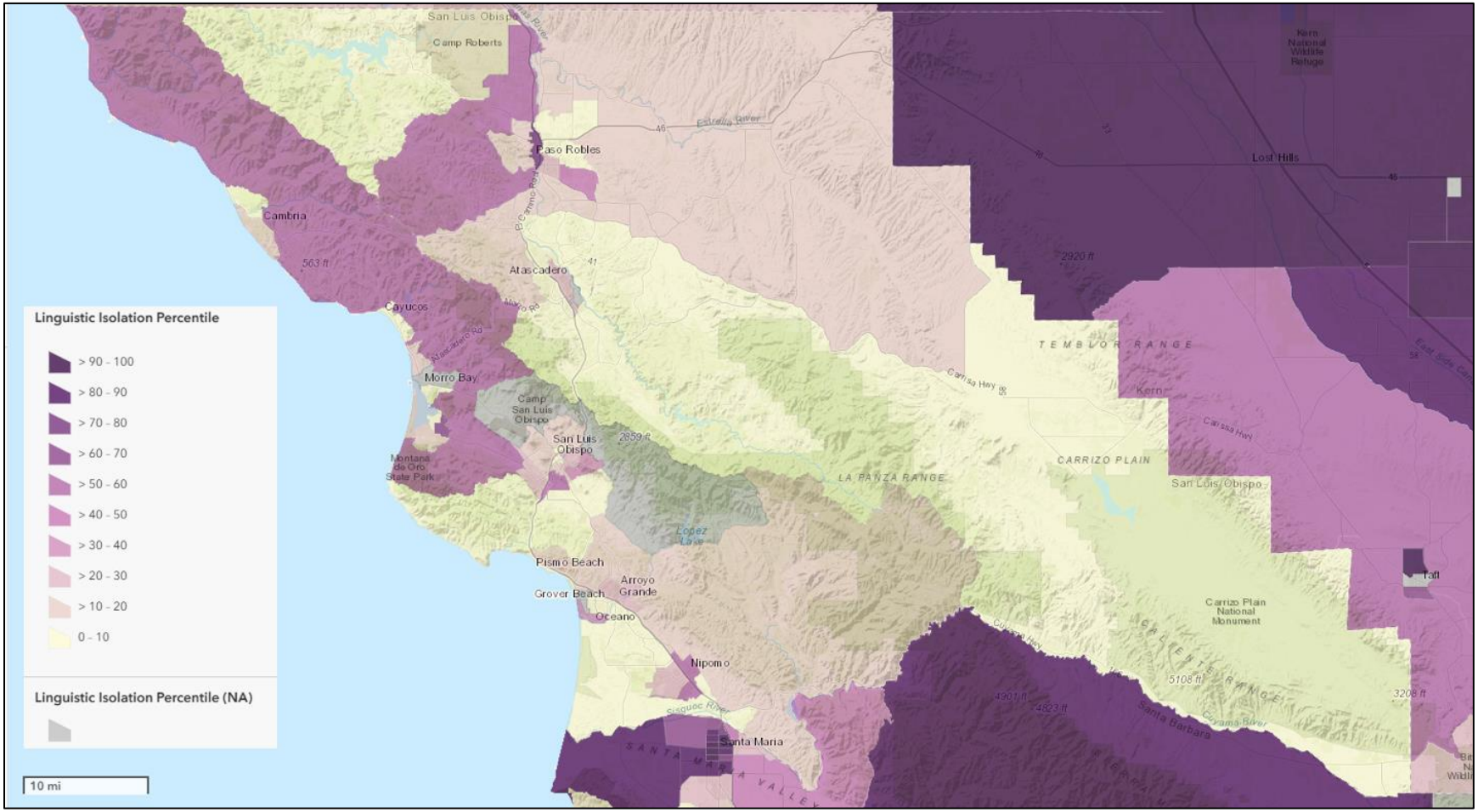
Figure 5-22 Percentage Ever Diagnosed with Asthma In San Luis Obispo County (2019-2020)



According to the Centers for Disease Control and Prevention (CDC) Interactive Atlas of Heart Disease and Stroke, 6.0% of the County's population aged 18 years and older have coronary heart disease, and 30.3% have high blood pressure. Additionally, according to the CDC's Diabetes Surveillance, 8.2% of the population aged 20 years and over had been diagnosed with diabetes. Many of these groups vulnerable to heat-related complications are more likely to experience heat-related emergency room visits.

Non-English speaking or undocumented communities may struggle to access resources due to language barriers or fear of engaging with public systems. According to the ACS, 5.8% of the County aged five years and over speak English less than "very well." Linguistic isolation in the County is shown geographically in Figure 5-23 below.

Figure 5-23 Linguistic Isolation in San Luis Obispo County



Source: CalEnviroScreen 4.0, 2025

Critical Facilities and Lifelines

Extreme heat can affect all critical facilities, specifically road infrastructure by damaging and buckling road surfaces. Other direct impacts to critical infrastructure include utility failures due to power line sagging and power surges, referred to as unplanned power outages due to increased use of air conditioning. Critical infrastructure that relies on public utility systems that could be overloaded may result in impacts during extreme heat events. Peak demand exceeding the local utility's capacity for supply can lead to blackout or brownout conditions. The loss of utilities or power outages during extreme heat events could also impact all critical facilities that rely upon electricity for power unless they are connected to a backup power source. The loss of power can also result in adverse secondary impacts to sensitive populations. Additionally, electrical power outages may impact response capabilities or care capabilities for hospitals and clinics.

Economy and Community Values

Extreme heat impacts on the economy may be more indirect compared to other hazards. San Luis Obispo has a large agriculture economy. As noted previously outdoor laborers who are exposed to extreme heat and at a high risk of heat related illnesses, and a long-term heat event could cause work interruptions. Long-term heat events could also cause a loss of days outdoor workers are able to perform work, such as construction workers. Crops are also impacted by heat events and could have an impact on the overall economy in the county. According to the USDA RMA Indemnity Report, in the ten years between 2012 and 2021, there have been a total of 10,637.3 acres of insured crops lost to extreme heat, resulting in over $10.9 million in indemnity payments.

Historic, Cultural, and Natural Resources

Extreme heat can cause an increase in water temperatures in streams, rivers, and lakes. During storm events, increased and warmer runoff from impervious surfaces into streams can lead to a degradation of habitat. This impairs water quality and compromises aquatic species' metabolism and reproduction. Elevated water temperatures can inhibit aquatic life, especially if a species can only survive in a small range of water temperatures. The effects of thermal pollution are highly dependent upon air temperature conditions before the storm, suggesting that as temperatures rise, the impacts from heat pollution will also rise (Herb et al, 2008). Increasing temperatures may also cause species to shift habitats in elevation and latitude, and extended periods of extreme heat can stress both flora and fauna species.

Extreme heat may cause temporary drought-like conditions. For example, several weeks of extreme heat increases evapotranspiration and reduces moisture content in vegetation, leading to higher wildfire ignition potential for that time period even if the rest of the season is relatively moist. Wildfires can also result in the loss of cultural heritage assets, and long-periods of extreme heat can also increase the probability of stress on older historic structures (e.g., cracking of stone-constructed buildings, etc.) that could lead to structural instabilities.

Development Trends

Since structures are not usually directly impacted by severe temperature fluctuations, continued development is less impacted by this hazard than others in the plan. The exception may be the creation of more impervious surfaces (e.g., buildings, roads, parking areas), which can exacerbate the urban heat island effect. For example, future development built on open space or green fields will increase the overall amount of impervious surfaces in the County. However, pre-emptive measures such as construction of green buildings that require less energy to heat and cool, use of good insulation on pipes and electric wirings, and smart construction of walkways, parking structures, and pedestrian zones that minimize exposure to

severe temperatures may help increase the overall durability of the buildings and the community to the variations of the heat island effect. Continued development also implies continued population growth, which raises the number of individuals potentially exposed to heat variations. Public education efforts should continue to help the population understand the risks and vulnerabilities of outdoor activities, property maintenance, and regular exposures during periods of extreme heat.

Risk Summary – Extreme Heat

- The inland area of the eastern County is more likely to experience an extreme heat event
- Coastal areas are potentially vulnerable to extreme heat due to lack of acclimatization to high temperatures and less air conditioning.
- Highest recorded temperature for the San Luis Obispo Area was 113˚F in Sep. 9, 2020 according to the WRRC/NOAA; a Cal Poly weather station reached 120 degrees F on Sep 6, 2020 (https://www.sanluisobispo.com/news/weather-news/article245535995.html.
- Highest recorded temperatures for North County Coastal Area was 106˚F on Oct. 4, 1987.
- Highest recorded temperatures for Inland Area was 117˚F on Aug. 13, 1933.
- High recorded temperatures for South County Area was 103˚F on Sept. 3, 1982.
- Extreme heat can have considerable impacts on human health, the natural environment and the economy.
- The County's agriculture economy is at risk of extreme heat from outdoor laborers being vulnerable to heat illnesses as well as crop losses due to heat.
- The very young, the very old, people with poor physical health, outdoor laborers, and the homeless are more susceptible to the impacts of extreme temperatures.
- Climate change is projected to increase temperatures and the frequency of extreme heat events in the Central Coast region of the State.

Related hazards: Agriculture/Pest Infestation/Plant Disease/Tree Mortality, Drought, Land Subsidence, Wildfire

Table 5-37 Hazard Risk Summary - Extreme Heat

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY	OVERALL SIGNIFICANCE
San Luis Obispo County	Extensive	Likely	Limited	Low
City of Arroyo Grande	Extensive	Occasional	Negligible	Low
City of Atascadero	Extensive	Occasional	Negligible	Low
City of Grover Beach	Extensive	Occasional	Negligible	Low
City of Morro Bay	Significant	Highly Likely	Limited	Medium
City of Paso Robles	Extensive	Highly Likely	Limited	Medium
City of Pismo Beach	Significant	Likely	Limited	Low
City of San Luis Obispo	Extensive	Occasional	Negligible	Low
Avila Beach CSD	Significant	Occasional	Negligible	Low
Cambria CSD	Extensive	Occasional	Negligible	Low
Ground Squirrel Hollow CSD	Limited	Likely	Negligible	Medium
Heritage Ranch CSD	Extensive	Highly Likely	Critical	High

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY	OVERALL SIGNIFICANCE
Los Osos CSD	Significant	Likely	Limited	Medium
Nipomo CSD	Limited	Likely	Negligible	Low
Oceano CSD	Extensive	Occasional	Negligible	Low
San Miguel CSD	Extensive	Likely	Catastrophic	High
San Simeon CSD	Significant	Likely	Limited	Low
Templeton CSD	Significant	Highly Likely	Limited	High
Cayucos Sanitary District	Extensive	Likely	Critical	High
Port San Luis Harbor District	Extensive	Highly Likely	Limited	Medium
San Luis Obispo FCWCD	Extensive	Occasional	Negligible	N/A
South San Luis Obispo Sanitary District	Extensive	Occasional	Negligible	Low

5.3.5 Agricultural Pest Infestation, Plant Disease, Marine Invasive Species and Tree Mortality

5.3.5.1 Hazard/Problem Definition

Agricultural pests and pathogens (insects, fungi, bacteria, viruses and invasive plants) cause injury or destruction to crops or livestock. From exotic fruit flies to noxious weeds, California's agriculture can be impacted by a wide variety of invasive pests. These pests pose significant threats to the state's agricultural crops, economy, food supply and native habitat. The number of invasive pests and pathogens newly detected in California and the rest of the United States has increased at alarming rates in recent years, and that trend is projected to continue.

Invasive species are not just contained to dry land. Marine invasive species can take over enclosed water ecosystems, disrupting delicate ecological structure and displacing entire native species. Marine invasive species can also foul pipes of hydroelectrical facilities, water works, and other industrial facilities, impairing facility functions.

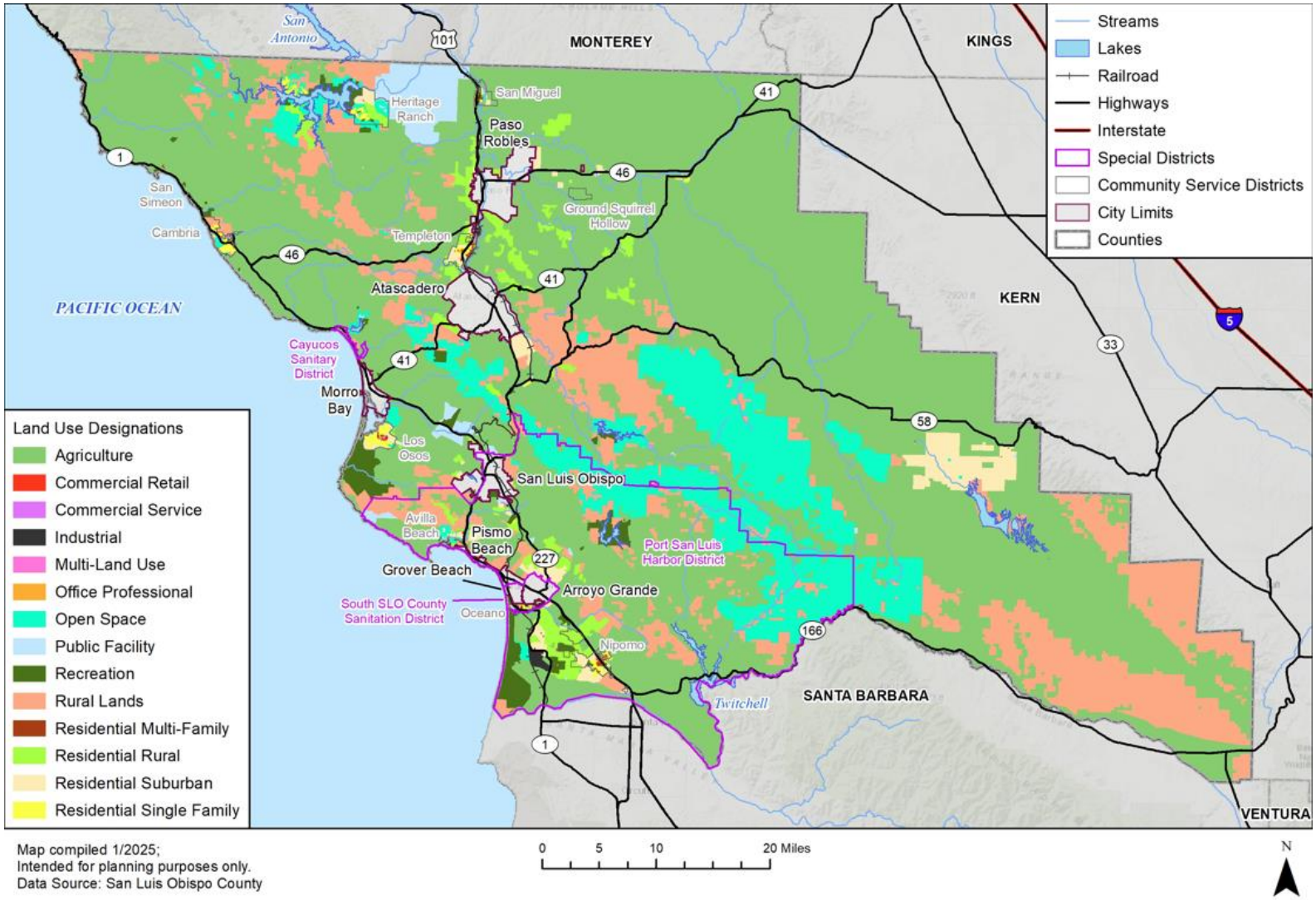
A specific concern of the county is tree vulnerability and mortality. Over 100 million trees have died and more continue to die due to many years of drought that have weakened trees, and left millions of acres of forestland highly susceptible to insect attacks. The drought stress is exacerbated in forests with too many trees competing for limited resources, especially water. Forest pests (insects and diseases) annually destroy ten times the volume of timber lost to due to forest fires. Native bark beetles took hold in Southern California forests and caused unprecedented tree mortality. Pitch Canker disease has attacked Monterey Pines along the central coast. Sudden Oak Death has been found in 14 counties in California and has killed thousands of oaks. Tree losses due to drought stresses and bark beetle attacks are expected to increase until precipitation levels return to normal or above normal for one to multiple years.

5.3.5.2 Geographic Area

Agricultural pests usually occur in rural areas used for the growing of crops, though tree mortality can affect urban and rural forested areas; marine invasive species usually occur in contained aquamarine areas, including rivers, creeks, ponds and lakes. In San Luis Obispo County, agriculture lands are interspersed across the county but largely focused in the North County region.

Figure 5-24 shows land use across the county; agricultural lands are shown in light green.

Figure 5-24 San Luis Obispo – County Land Use



During discussions with the HMPC, it was noted that while most agricultural pests occur in rural areas, the initial introduction of those pests is often due to human/vehicle movement and occurs in more urbanized areas. Often, especially in the case of insect pests, the species will first become established in a residential or urban area, and then move into croplands.

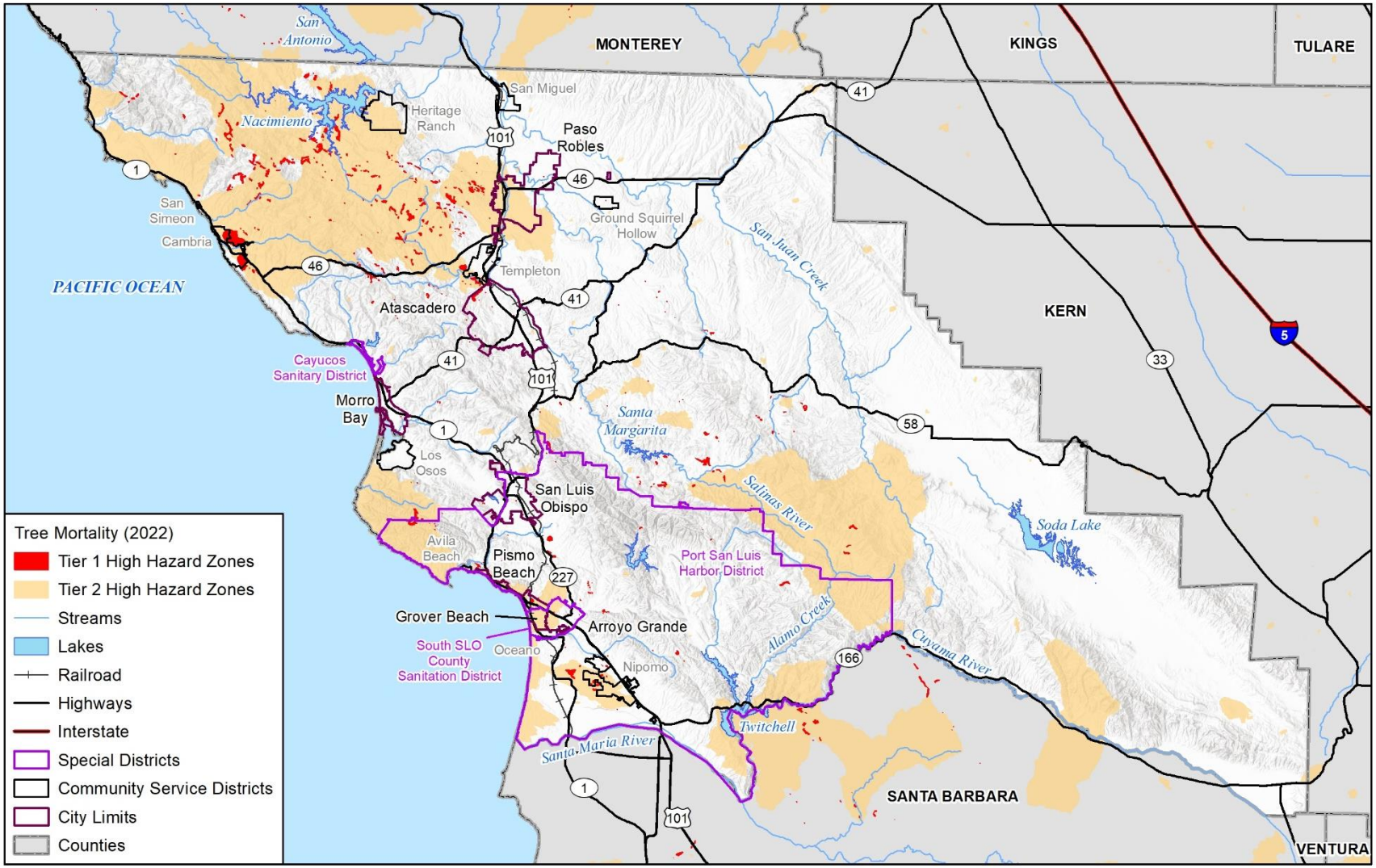
Marine invasive species are a threat to marine areas with a relatively enclosed, self-contained ecosystem.

Figure 5-24 shows main bodies of water and waterways in the county; specific points of interest include Nacimiento Reservoir, Soda Lake, Twitchell Reservoir, Santa Margarita Lake and Whale Rock Reservoir. The Dam Incident section has more information on reservoirs and other bodies of water.

Tree Mortality: Tree mortality was identified as an additional drought impact of significance to the county during the 2025 update. Tree mortality is a cascading impact which also affects (or worsens) other hazards such as wildfire, agricultural and biological hazards, and wind. In recent years, due to the multi-year drought throughout the planning area and state-wide, a vast number of trees have been (and continue to be) impacted within San Luis Obispo County foothill and mountain communities and beyond. Standing dead trees could fall and pose a risk to people, buildings, power lines, roads and other infrastructure. In addition, drought-impacted trees become susceptible to diseases and insect infestations (bark beetle) further adding to the risk of tree mortality and related potential impacts.

California established the California Tree Mortality Task Force in October 2015. As part of the work of the Task Force, areas of tree mortality were identified and mapped to show areas that pose the greatest potential to harm people and/or property. These areas, known as High Hazard Zones, are the areas prioritized for tree removal, and are separated into Tiers. Tier I High Hazard Zones are areas where mortality and the asset to be protected (utilities, roads, recreation sites etc.) directly coincide with mortality identified by the USFS. Tier 2 HHZ is based on watersheds and are intended to focus on ecosystem health and identify watersheds where there is both the greatest amount of ecological assets to be protected, as well as the greatest threat. Figure 5-25 shows High Hazard Zones in the county, as well as areas of tree mortality and community boundaries. Paso Robles, Atascadero, Pismo Beach, Arroyo Grande, Grover Beach and the unincorporated county are all impacted by Tier 2 High Hazard Zones. The 2024 tree mortality map shows that more of the unincorporated areas by the Salinas River as well as the areas north of San Simeon and Cambria are impacted by Tier 2 Hazard Zones than in 2019. Areas in Los Osos as well as near Avilla Beach also saw a spread of Tier 2 High Hazard Zones. Tier I High Hazard Zones are found in the unincorporated county, as well as Atascadero with very little spread since 2019.

Figure 5-25 San Luis Obispo – Tree Mortality and High Hazard Zone



Map compiled 1/2025;
Intended for planning purposes only.
Data Source: San Luis Obispo County, CALFIRE, FRAP,
Tree Mortality Task Force (TMTF): updated October 2022

5.3.5.3 Extent (Magnitude/Severity)

Limited – Different pests can impact different crops in different ways; while there is no scale to define the extent of an infestation, a pest could have a major economic impact on the value of infested crops.

Another large factor that may influence crop yield is the spread of invasive plants, which may compete with crops for resources and in some cases also introduce pests. According to California Invasive Plant Council (Cal-IPC), invasive plants cost California $82 million every year in control, monitoring and outreach; estimated actual impacts can reach into the billions. Indemnities are financial compensation and protection for farmers who suffer losses due to adverse events such as drought, freezes, hail, wind, disease, and price fluctuations. USDA data shows that San Luis Obispo paid $24,674,643 in indemnities between 2020-2024. With the threat of disease and invasive species continuing to be prevalent, this cost could continue to increase.

5.3.5.4 Previous Occurrences

San Luis Obispo County has a demonstrated vulnerability to pest infestation including insects such as the Vine Mealybug and Glassy-winged sharpshooter, but also diseases such as the Pine Pitch Canker and Sudden Oak Death. There were not any federal or state disaster declarations in the last five years for agricultural pest infestation, plant disease, or marine invasive species.

Vine Mealybug: The Vine Mealybug (VMB), *Planococcus ficus*, is an exotic pest in California that was first found in San Luis Obispo County in 1991. It causes an enormous amount of damage, is very difficult and costly to treat, and can lead to total crop loss without the diligent use of insecticide treatment. Although it has only been found on grapes so far in California, alternate hosts include avocados, citrus and other crops. It is currently seen in most grape growing counties of California including vineyards in San Luis Obispo, Santa Barbara and Monterey counties.

The Vine Mealybug has 5 to 7 generations per year, enabling populations to grow very rapidly. Unlike other mealybugs, all life stages of the VMB can be present year-round on a vine. During winter months, eggs, crawlers, nymphs, and adults are found under bark, within developing buds, and on roots.

Prevention: A report done in April of 2024 by Nichino, a pest control company, shows that Vine mealybug populations in San Luis Obispo County remain light but are still widespread. They recommend implementing an Integrated Pest Management plan to areas that are being affected, including scouting, trapping, insecticide treatments, and pheromone disruption.

Additionally, the female VMB can easily be transported through contaminated nursery stock, equipment, personnel as well as birds and other wildlife. Vineyard managers need to employ strict biosecurity and sanitation in the vineyard. Best Management Practices (BMP) in the vineyard and at the wineries that process the grapes can reduce the spread of VMB. Monitoring vineyards for the presence of VMB by detection trapping is essential to the early detection and successful treatment of the pest. It is unlikely that VMB will be eradicated from most vineyards. With early detection and vigilant treatment VMB populations can be kept in check.

Glassy-Winged Sharpshooter (GWSS): The Glassy-winged sharpshooter (*Homalodisca coagulata*) is an insect that poses a significant hazard to California agriculture. When feeding, it can transmit Pierce's disease, caused by the bacterium, Xylella fastidiosa, to grapevines, and other diseases to almond trees, alfalfa, citrus and oleanders. First detected in California in 1994, this insect has spread throughout Southern California and into the southern San Joaquin Valley. The first major infestation in California occurred in 1999 in Temecula, where more than 300 acres of vineyards were destroyed.

Figure 5-26 Glassy-winged Sharpshooter



The Glassy-winged sharpshooter is considered a serious threat to San Luis Obispo County's multimillion-dollar wine industry because it spreads bacteria that cause a lethal disease to grape plants. It is also a nuisance to homeowners because it deposits a sticky residue on plant.

Localized infestations have been found in San Luis Obispo County, although these are believed to be eradicated. However, according to the CFDA San Luis Obispo County is still listed among counties that are at risk of a Pierce's Disease Outbreak. As of 2024, surrounding counties Kent and Santa Barbara have reported outbreaks of Pierce's Disease. Kern County has an infested area that shares a border with San Luis Obispo County.

Prevention: The San Luis Obispo County Agricultural Commissioner's Office (SLOCACO) is in partnership with the California Department of Food and Agriculture (CDFA), the United States Department of Agriculture, the University of California, and other county Agricultural Commissioner's offices to collaborate with the Pierce's Disease Control Program (PDCP). The PDCP works to minimize the statewide impact of Pierce's Disease and the Glassy-winged sharpshooter. The strategy is to slow or stop the spread of GWSS while both short and long-term solutions to Pierce's disease are developed.

This strategy relies on the following five elements:

- Containing the Spread
- Statewide Survey and Detection
- Rapid Response
- Outreach
- Research

The bulk of the SLOCACO's efforts have been in excluding the sharpshooter from San Luis Obispo County and implementing a detection program most heavily weighted in nursery and urban settings. The exclusion efforts for the program consist mainly of inspecting incoming plant shipments from infested portions of the state bound for wholesale and retail nurseries throughout San Luis Obispo County.

The detection efforts for the program consist mainly of deploying insect traps in nursery and urban residential areas. Monitoring of the traps is performed every two weeks along with periodic relocation of the traps.

Pine Pitch Canker: A condition that is threatening the health of the Monterey pine trees in the Cambria area is the Pine Pitch Canker (*Fusarium subglutinans pini*). This disease, native to Mexico and the southeastern United States, was first found in California in 1986. Since then, it has been found in 16 counties, and is spread by insects, the use of contaminated tools, and the transport of infected wood. The Pine Pitch Canker is a significant threat to the continued

survival of the Monterey Pine ecosystem. Large native stands of the trees are now only found in the Ano Nuevo, Monterey, and Cambria areas. If a tree becomes infected with the Pine Pitch Canker, the disease can spread quickly and can result in the rapid death of the tree. If an infected or dead tree is not properly removed, it not only becomes a threat to spread the disease, but can also result in a safety threat, as a large dead tree is a fire hazard as well as presenting the potential to become uprooted and to fall during a storm. This pathogen is also a serious concern to the commercial nursery industry.

The Pine Pitch Canker was declared a zone of infestation in San Luis Obispo County by the USDA and CAL FIRE in 2022. It received a high score on economic and environmental impacts by the USDA, due to its ability to lower crop yield and biodiversity.

Symptoms and Impact: In nurseries the main symptoms are yellowish needles and the wilting of foliage and shoots, as pictured below. Along with a rapid death of trees, the pine pitch canker can also cause resin bleeding, resinous cankers, and wilting of needles.

Figure 5-27 Pine Pitch Canker Needles



Prevention: Preventative measures consist of pest detection, exclusion and eradication in production nursery settings, and informing the public and nursery industry about the dangers of moving infected plant material out of infested areas.

Asian Citrus Psyllid/Citrus Greening Disease (Huanglongbing): The Asian citrus psyllid (ACP) is a pest that acts as a carrier or vector spreading "huanglongbing", a devastating disease of citrus trees. This bacterial disease is transmitted to health trees by the psyllid after it feeds on infected plant tissue.

ACP was first identified in San Luis Obispo County in March 2014 in Arroyo Grande. In response to the identification, the San Luis Obispo Agriculture Department implemented a quarantine in a five-mile radius from the site. The quarantine required growers and nursery owners to use pesticides to eradicate any ACP before moving fruit or trees out of the area. Numbers of the ACP identified in San Luis Obispo County have been steadily on the rise; according to the California Department of Agriculture, more than 100 invasive insects were found in southern San Luis Obispo County (specifically in the Nipomo area) in 2018; this was triple the number found in 2017. The County has a proactive detection program, with approximately 2,000 traps set up around the county, mostly in the South County.

Symptoms and Impact: ACP damages plants directly through its feeding activities; new shoot growth that is heavily infested by psyllids does not expand and develop normally and is more susceptible to breaking off. While direct damage is serious, there is even greater concern that the psyllid is an efficient vector of the bacterium that causes the economically devastating disease citrus greening, or huanglongbing.

Prevention: The California Department of Food and Agriculture tracks the presence of pests and disease and establishes quarantines to help protect California citrus trees.

Invasive Shot Hole Borer/Goldspotted Oak Borer: The goldspotted oak borer (GSOB) is an invasive pest contributing to the ongoing oak tree mortality; it is a concern for both native oaks and oak woodlands. The invasive shothole borer are potential pests for agriculture, native trees and urban forests. The insects can attack over 110 tree species, including sycamore, cottonwood, alder, willows and boxelders.

A zone of infestation was declared by CAL FIRE in August 2020, with this species being found in San Luis Obispo County. Data from November 2024 from the University of California Agriculture and Natural Resources shows this species is located specifically in the City of San Luis Obispo.

Symptoms and Impact: Widespread tree mortality caused by borer beetles can have severe implications and impacts to the environment and human safety, including tree death and increased wildfire danger.

Prevention: Most of the prevention activities undertaken by the county revolve around public information and awareness. Many wood-boring pests are spread by the transport of infested wood material. According to the University of California Agriculture and Natural Resources, researchers believe that the goldspotted oak borer may have traveled to California from Arizona on infested firewood. Refraining from moving firewood, proper disposal of infested material and proper pruning are recommended to prevent the spread of these pests.

Sudden Oak Death: A disease of oak trees and more than one hundred other plant species, *Phytophthora ramorum* (or Sudden Oak Death), has been found throughout much of coastal California, and was identified in San Luis Obispo County for the first time in 2016 in Bay Laurel Trees. This disease has killed over a million trees in Coastal California forests and has the potential for broad ecological changes to natural areas, including significantly increasing the risk of wildfire.

Figure 5-28 Sudden Oak Death



This pathogen is also a serious concern to the commercial nursery industry.

Symptoms and Impact: On oaks and tanoak, cankers are formed on the stems. Cankered trees may survive for one to several years, but once crown dieback begins, leaves often turn from green to pale yellow to brown within a few weeks.

Figure 5-29 Bleeding Ooze from a Canker on an Oak



Black or reddish ooze often bleeds from the cankers, staining the bark, as well as killing the mosses that grow on it. Bleeding ooze may be difficult to see if it has dried or has been washed off by rain. Necrotic bark tissues surrounded by black zone lines are present under affected bark. Because these symptoms can also be caused by other Phytophthora species, laboratory tests must be done to confirm pathogen identity. Infected coast live oaks sometimes gradually lose their leaves and fade out slowly. If bleeding oaks and leaf spots on bay laurel or other symptomatic hosts are adjacent to one another, the presence of *Phytophthora ramorum* is likely.

Prevention: Preventative measures consist of pest detection, exclusion and eradication in production nursery settings, and informing the public and the nursery industry about the dangers of moving infected plant material out of infested areas. In 2024 "SOD Blitzes" were implemented in San Luis Obispo and neighboring counties. The Blitz was a weeklong effort in which the San Luis Obispo Agricultural Department encouraged residents to drop off wood and bay leaves to test for SOD. According the 2024 SOD Blitz announcement, blitzes inform and educate the community about SOD, get local citizen scientists involved in detecting the disease on bay laurel and tanoak leaves, and produce detailed local maps of disease distribution.

Quagga/Zebra Mussels: Quagga/Zebra mussels are non-native freshwater mussels from eastern Europe that clog waterways, undermine healthy lake ecosystems, ruin boat engine cooling systems, and financially burden water resources agencies. Prolific breeders, these mussels can overrun a lake causing hundreds of thousands of dollars' worth of damage annually. Rapid reproduction can negatively disrupt an ecosystem in a short amount of time. Once these mussels are introduced into a waterway, there is no way to fully eradicate the species.

Figure 5-30 Quagga/Zebra Mussels



According to the daily USGS Nonindigenous Aquatic Species Database, no reported Quagga/Zebra mussels have been found in waterways in the county as of June 18th, 2024, though occurrences have been reported both north and south of the county

Prevention: California has passed the Dreissenid Mussel Prevention Program, which requires vulnerability assessments on uninfected reservoirs and development of programs to prevent the introduction of the mussels, including public information, monitoring and management of recreational activities. The San Luis Obispo County Public Works has a "clean, drain, dry" campaign, requiring boat owners to drain and clean their boats, and wait 30 days if they have entered a body of water that is known to be infested with zebra mussels. Boat owners also must obtain a Vessel Screening Permit. In 2024 San Luis Obispo County's Parks and Recreation Department applied for state funding to put in measures such as the "clean, drain, dry" campaign to prevent invasive mussels from infesting Lopez and Santa Margarita Lakes.

5.3.5.5 Probability of Future Occurrences

While probability of future occurrence is usually calculated based on previous experiences, different pests have different recidivism rates across the county. Based on previous experiences, pests and invasive species will continue to present a constant threat to the county and its jurisdictions. If preventative measures such as those listed in each section are implemented, a large reduction in invasive populations could occur.

5.3.5.6 Climate Change Considerations

California's Fifth Climate Change Assessment Engagement Summary (2023) notes that "climate change impacts terrestrial ecosystems and wildlife in multiple ways, including invasion by exotic species, prevalence of wildlife disease, and loss of native habitats." Changing climate conditions can impact viable living areas of species and cause migration; changing habitat temperatures can make previously undesirable habitats welcoming for new species and lengthen habitable seasons. As seen with species such as Pine Pitch Canker, warmer temperatures are more suitable and are more likely to increase the spread of diseases such as this one. As habitats get warmer with more moisture, it can be easier for them to spread to areas previously unhabitable.

5.3.5.7 Vulnerability

Structures

Grapes (glassy winged sharpshooter, vine mealybug), trees (pine pitch canker, light brown apple moth, sudden oak death) and reservoirs and waterways (zebra mussels) are all at risk from invasive species and pests. An infestation of agriculture pests could impact crop yields, potential destroying whole fields. Zebra mussels can cause damage to water-based property, including boat engines.

GIS was used to estimate the potential for wind damage from fallen trees, assuming that tree mortality areas will be most susceptible. Tree mortality composes just over 13% of the county in area and are found to intersect with a total of 18,238 properties across the county, based on the property centroids defined for all the hazards' parcel analyses. The western half of county is most impacted by tree mortality, with the areas most affected being North County Inland and South County Areas. The following table summarizes the number of properties in each jurisdiction found within tree mortality high hazard zones (both Tier 1 and 2) based on GIS overlay analysis. Refer to each jurisdictions annex for more details on the types of properties within tree mortality high hazard zones. Additional analysis related to critical facilities and tree mortality high hazard zones is discussed further below.

Table 5-38 San Luis Obispo County Improved Properties Exposed to Tree Mortality Hazard Zones by Jurisdiction Summary

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	POPULATION
Arroyo Grande	3,223	$1,047,673,325	$636,469,957	$1,684,143,282	6,752
Atascadero	57	$20,024,099	$10,160,550	$30,184,649	141
Grover Beach	4,670	$1,148,900,821	$734,490,528	$1,883,391,349	8,978
Paso Robles	10,288	$3,611,710,847	$2,210,099,467	$5,821,810,314	24,458
Pismo Beach	4,180	$1,785,417,530	$1,107,498,920	$2,892,916,450	7,281
San Luis Obispo City	11	$3,314,588	$2,669,655	$5,984,243	12
Unincorporated	12,634	$4,661,909,435	$2,545,892,401	$7,207,801,836	28,410
Total	**18,238**	**$5,828,309,092**	**$3,591,220,500**	**$9,419,529,592**	**40,329**

Source: San Luis Obispo Assessor Data November 15, 2024, California Geological Survey, Dept. of Conservation, WSP GIS Analysis

Crop Value

The 2023 San Luis Obispo County annual crop statistics released by the San Luis Obispo County Department of Agriculture/Weights and Measures show that agricultural assets in the county have a gross valuation of $1,114,238,000. The top ten value crops based on county data shown in Table 5-39.

Table 5-39 San Luis Obispo County – 2023 Top Ten Value Crops

CROP	VALUE	PERCENTAGE
Strawberries	$274,072,000	24.60%
Wine Grapes	$323,952,000	29.07%
Cattle and Calves	$68,646,000	6.16%
Broccoli	$36,184,000	3.25%
Cauliflower	$20,603,000	1.85%
Celery	$16,172,000	1.45%
Vegetable & Ornamental Transplants	$33,543,000	3.01%
Avocados	$34,202,000	3.07%
Brussel Sprouts	$24,604,000	2.21%
Cut Flowers	$19,067,000	1.71%
Top Ten Total	$851,045,000	76%

Source: San Luis Obispo County Department of Agriculture/Weights and Measures

According to Cal-IPC, invasive plants cost California $82 million every year in control, monitoring and outreach; estimated actual impacts can reach into the billions.

This shows that crops such as strawberries and wine grapes have the highest value but are also highly vulnerable to pests such as the Vine Mealy-bug and Glassy-Winged Sharpshooter that specifically target grapes and other fruits. An outbreak of either could hurt over 50% of crops in San Luis Obispo.

People

A widespread infestation of animals/livestock and crops could impact the economic base of the county and its communities. According to the USDA 2023 Census of Agriculture, San Luis Obispo 2,184 farms in operation, -7% change from the previous census in 2017. Jobs could be

negatively impacted during an agriculture emergency; jobs tangentially tied to the agriculture industry could also be affected.

With strawberries and wine grapes accounting for half of the county's overall crop value the importance of grapes in the agricultural landscape is undisputed. From 2021-2022 wine grapes fell in value by 7% but remain at the number 2 spot in top valued crops. Avocados also saw a decline falling by 42% below the production level from 2021. With invasive species like Vine mealybugs causing a decline in both avocado and wine grapes, it is imperative to implement preventative measures to reduce the amount of loss of both crops.

Disease can exacerbate the impacts from other hazards, and an example of this is adverse weather; dead branches can be broken by high winds, and there are reports of these branches falling and causing harm to people and property.

Social Vulnerability

Based on the SVI data presented and discussed in subsection 4.4.1, the communities located in north county San Luis Obispo where much of the grape production activities take place in the county are also ranked as having the highest overall social vulnerability, including San Miguel and Paso Robles. These communities as well as those working in the agricultural sector in south county, would likely be impacted by the effects of agricultural hazards compared to coastal areas of the county.

Critical Facilities and Lifelines

The major pest/invasive species identified in this section with the potential to impact critical infrastructure is the quagga/zebra mussel. In large concentrations, zebra mussels can accumulate in waterways, clogging pipes and damaging equipment used for drinking water and irrigation. As discussed previously, dead trees can exacerbate the impacts of other hazards; more information on this hazard can be found in the Vulnerability section of the Adverse Weather section. Additionally, dead trees can accelerate the spread of wildfire, adding to the vulnerability of infrastructure; analysis of wildfire risk in relation to parcels is located in the Adverse Weather section as well.

Economy and Community Values

According to the University of California's Center for Invasive Species Research, it has been estimated in California alone that invasive pests cost the state at least $82 billion per year for controlling, monitoring, and outreach. Nationally, it is estimated that invasive species cost the USA $138 billion per year. Economic impacts include both prevention, response and recovery costs.

Historic, Cultural, and Natural Resources

GIS indicates that 35 historical properties are potentially at risk to tree mortality. Details on the specific properties at risk are found in Appendix E.

Trees as a natural resource not only help with ecosystem health but are also a vital part of local economies. Tree mortality could greatly hurt the local timber economy while also increasing fuel for wildfires and a reduction in air quality. Valuing natural resources such as trees and other vegetation creates opportunities to achieve multiple objectives. Carbon sequestration, protection of watersheds, improving soil health, and reducing wildfires can greatly help with both environmental and economic resilience.

Development Trends

It is not known if development trends have increased or decreased vulnerability to the county or its jurisdiction within the last five years. Agricultural development is sensitive to pest species and should continue to take measures to prevent outbreaks such as pest detection, exclusion

and eradication in production nursery settings, and continuing to keep the public informed and aware of any outbreaks. Public awareness campaigns can greatly help to reduce the spread of both pests and diseases. For example, the SOD blitz program helped reduce Sudden Oak Death and the Driessen Mussel Prevention Programs helped stop mussels from entering the county. Without these educational campaigns outbreaks could likely occur.

Risk Summary

- The overall significance is Medium
- San Luis Obispo is vulnerable to a variety of plant diseases, infestations and invasive species; not all pests identified in this section
- Rapid detection, response, efforts are essential to stop the spread of agricultural pests, plant diseases and marine invasive species
- Infestations, pests and invasive species could cost millions in response and recovery
- There are public programs in place regarding prevention, response and eradication to pests and infestations
- Risk Management Agency (RMA) crop indemnities for insect and disease damages have been relatively low compared to total crop value
- Infestations, pests and diseases can worsen impacts from other hazards including wind and drought, and can cascade into other hazards including infrastructure failure and wildfire
- *Related hazards:* Adverse Weather, Drought, Wildfire

Table 5-40 Hazard Risk Summary – Agricultural Pest Infestation, Plant Disease, Marine Invasive Species and Tree Mortality

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY (EXTENT)	OVERALL SIGNIFICANCE
San Luis Obispo County	Limited	Highly Likely	Negligible	Medium
City of Arroyo Grande	Limited	Highly Likely	Negligible	N/A
City of Atascadero	Limited	Occasional	Negligible	Medium
City of Grover Beach	Limited	Highly Likely	Negligible	N/A
City of Morro Bay	Limited	Highly Likely	Negligible	Medium
City of Paso Robles	Limited	Highly Likely	Negligible	Low
City of Pismo Beach	Limited	Highly Likely	Negligible	N/A
City of San Luis Obispo	Limited	Highly Likely	Negligible	Medium
Avila Beach CSD	Limited	Highly Likely	Negligible	N/A
Cambria CSD	Limited	Highly Likely	Negligible	Medium
Ground Squirrel Hollow CSD	Limited	Highly Likely	Negligible	N/A
Heritage Ranch CSD	Limited	Highly Likely	Negligible	N/A
Los Osos CSD	Limited	Highly Likely	Negligible	N/A
Nipomo CSD	Limited	Highly Likely	Negligible	N/A
Oceano CSD	Limited	Highly Likely	Negligible	Medium
San Miguel CSD	Limited	Highly Likely	Negligible	N/A

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY (EXTENT)	OVERALL SIGNIFICANCE
San Simeon CSD	Limited	Highly Likely	Negligible	N/A
Templeton CSD	Limited	Highly Likely	Negligible	Medium
Cayucos Sanitary District	Limited	Highly Likely	Negligible	N/A
Port San Luis Harbor District	Limited	Unlikely	Negligible	N/A
San Luis Obispo FCWCD	Limited	Highly Likely	Negligible	Low
South San Luis Obispo Sanitary District	Limited	Highly Likely	Negligible	Medium

5.3.6 Biological Agents (Naturally Occurring)

5.3.6.1 Hazard/Problem Definition

Public health associated hazards may be naturally occurring or the result of malicious acts such as terrorism. The Hazard Mitigation Planning Committee determined in 2019 that this plan should focus on naturally occurring hazards such as pandemic flu and flood and waterborne illnesses; the 2024 update follows this precedent. The county's Office of Emergency Services addresses terrorism and other homeland security concerns separately.

The following diseases caused by naturally occurring biological agents possess epidemic potential for San Luis Obispo County.

Influenza (Pandemic)

Influenza viruses have threatened the health of humans and animals worldwide for centuries by causing a contagious respiratory illness with mild to severe severity. Annual influenza epidemics create a significant public health problem with the highest risk of complications occurring in the elderly, children under the age of 2, and individuals with prior medical conditions. This virus' diversity and tendency for mutation has prevented the development of both a highly effective universal vaccine and antiviral drugs. Ongoing concern exists over the potential emergence of a new strain of influenza with the ability to infect and be passed between humans. Because humans will not have immunity to this novel virus, a worldwide epidemic (pandemic) could result as it did in 2009-2010.

A novel influenza virus emerged in 2009, H1N1, which spread worldwide and caused the first flu pandemic in over 4 decades. In the U.S., the Centers for Disease Control and Prevention (CDC) believed H1N1 may have been responsible for up to 17,000 deaths as of May 2010. According to the California Department of Public Health, 2018 was an especially strong flu season in the Golden State.

Three human influenza pandemics have occurred in the 20th century each resulting in illness in approximately 30 percent of the world population and death in up to 2 percent of those infected. The 1918 Spanish Influenza (H1N1) pandemic occurred towards the end of World War I. More people died during the flu pandemic than were killed during the entire war. The influenza death toll was an estimated 50–100 million worldwide. In the United States, about 675,000 died. The 1957 Asian Influenza (H2N2) pandemic killed 1–2 million worldwide and caused approximately 70,000 deaths in the United States. The third pandemic, the Hong Kong Influenza (H3N2), occurred in 1968-69 and killed an estimated one million people worldwide.

San Luis Obispo County is proactive in prevention and education efforts every flu season, ensuring residents are informed of the dangers of the flu and encouraging flu shots and other prophylactic measures.

Prevention: Preventing transmission of influenza virus and other infectious agents within healthcare settings requires a multi-faceted approach. Spread of influenza virus can occur among patients, healthcare personnel, and visitors. Additionally, healthcare personnel may acquire influenza from persons in their household or community.

Prevention strategies include:

- Administration of influenza vaccine
- Implementation of respiratory hygiene and cough etiquette
- Appropriate management of ill healthcare personnel
- Adherence to infection control precautions for all patient-care activities and aerosol-generating procedures

- Implementing environmental and engineering infection control measures.

General public prevention measures include:

- Educating the public on cough etiquette and basic personal hygiene
- Immunization with available influenza vaccine

Once an epidemic has been identified, the County of San Luis Obispo County Public Health Department will respond in the following manner:

1. Investigate the epidemic to determine its epidemiology, level of severity, mode of transmission, and persons affected and at risk.
2. Determine and institute control measures to prevent further spread.
3. Communicate control measures to the public and healthcare professionals.

The San Luis Obispo Community Health Assessment, published in July 2018 notes that nationally, an estimated 200,000+ people are hospitalized each year due to flu-related complications. The report notes that from 2014-2016, less than half (41%) of people in the county received their annual flu shot – lower than the state overall in the same period. Between 2000 and 2010, an average of 43 deaths per year occurred in the county with a primary cause of influenza or pneumonia. Influenza/pneumonia was the 9th leading cause of death in the county between 2005 and 2013. Influenza vaccination rates for the last five years have remained between 26 and 29 percent of the population in San Luis Obispo County.

Avian Influenzas (H5N1)

Avian Influenza (H5N1) has impacted California's poultry and dairy industries since 2022. While San Luis Obispo has not reported confirmed cases in domestic livestock or humans, detections in wastewater suggest the virus's presence in the environment. Statewide, H5N1 has led to the loss of over 10 million egg-laying hens between October and December 2024. There have been no reported human cases of H5N1 in San Luis Obispo County. However, the virus's detection in wastewater underscores the importance of ongoing precautionary measures.

Novel Infections (COVID, SARS et al.)

Novel infections, particularly those of viral origin, pose a tremendous risk to public health because the general public has no immunity from prior infections or vaccination, and because a vaccine is not readily available. For influenza viruses, it takes at least six months to produce large quantities of vaccine. For other viral pathogens such as HIV, a vaccine that protects individuals against HIV infection has been the goal of many research programs for the past two decades, yet only in the past few years has a vaccine reached the clinical trial stage.

Vaccines, which are believed to work by activating the body's ability to produce antibodies, eliminated or curtailed smallpox, polio and other feared viral diseases.

One novel virus that took the world by surprise was the appearance of the Severe Acute Respiratory Syndrome (SARS) virus in China at the end of 2002. Within months, this coronavirus spread internationally, with the help of air travel, resulting in 8,098 cases in 26 countries with 774 deaths occurring.

Another novel virus that took the world by surprise in 2020 was Covid-19. COVID-19, caused by the SARS-CoV-2 virus, is a highly infectious respiratory disease that emerged in Wuhan, China, in December 2019. It quickly spread globally, leading the World Health Organization (WHO) to declare it a pandemic on March 11, 2020.

The virus caused a wide range of symptoms, from mild to severe, including fever, cough, and difficulty breathing. The pandemic had a profound impact worldwide, resulting in millions of deaths and significant disruptions to daily life, economies, and healthcare systems.

Governments and States implemented measures such as lockdowns, travel restrictions, and social distancing to curb the spread of the virus. The rapid development and distribution of vaccines starting in late 2020 played a crucial role in controlling the pandemic. California took a very active approach with testing and monitoring of Covid-19 within the State, and especially within the public and private school districts. San Luis Obispo County had 76,500 confirmed and probable cases of infection and 620 deaths.

Prevention: Preventative measures consist of preparedness planning to enable the rapid detection, investigation and detainment of unexplained clusters of illness or death. Isolation of persons with unexplained potentially infectious disease may be needed. Conduct of wastewater monitoring is also a way of showing community level infections and is a way to provide trending information. Covid vaccination rates remain between 17% in 2023-24, and 52% in 2020-2022.

Food and Waterborne Illness

Food and waterborne illnesses are major global health problems resulting in over 2 million deaths per year. In the United States alone, an estimate 76 million cases of foodborne disease occurs annually resulting in 325,000 hospitalizations and 5,000 deaths.

The following biological agents have been historical threats to the food and water supply in this county.

- Staphylococcus aureus
- Salmonella species
- E. coli 0157: H7
- Campylobacter species
- Amebiasis
- Hepatitis A
- Shigella species

Food-borne outbreaks are identified by the presence of illness shortly following a meal. Illness can occur within a few hours and up to several weeks. Symptoms range from mild to severe:

- Upset stomach
- Abdominal cramps
- Vomiting
- Diarrhea
- Fever
- Dehydration

Intrinsic problems in food or water production, processing, storage, distribution, or preparation can all result in contamination of the food supply. Because food production and distribution practices are constantly changing, new unforeseen problems will continue to emerge. The need for ongoing monitoring and control efforts is essential.

Prevention: Preventative measures are based on the principles of: avoiding food contamination, destroying contaminants, and preventing further spread. Specifically, these include:

- Education of food handlers about sanitation, food and personal hygiene, kitchen cleanliness, temperature control, thorough cooking of animal related food products and hand washing before, during and after food preparation.
- Reducing food-handling time from initial preparation to service to be no more than 4 hours at ambient temperature.
- Teaching food handlers, the importance of keeping wounds covered and not working with nasal or eye infections, boils, abscesses or other purulent skin lesions.
- Exclude individuals with diarrhea from food handling and from care of hospitalized patients, the elderly and children.
- Education of farmers on the importance of sanitary work practices and safe food preparation and transportation.

Soil Borne Disease

Valley Fever (coccidioidomycosis): Valley Fever is an illness caused by breathing in a fungus which lives naturally in the soil in San Luis Obispo County. When the soil is disturbed – by wind, construction, or everyday activities such as biking or gardening – people can breathe in the spores from this fungus and develop Valley Fever.

Most people who become infected with Valley Fever (60%) do not experience any symptoms and do not need treatment. Around 30%-40% of people develop flu-like symptoms such as severe fatigue, cough, fever, heavy sweating at night, loss of appetite, muscle and joint aches, and sometimes a rash. A small percentage experience a much more serious form of the disease in which the infection spreads throughout the body. People who experience this serious form of Valley Fever are at risk of dying from complications of the disease and may need to take medication for the rest of their lives. Valley Fever is more common among older adults, though anyone of any age can contract it. Several groups of people are at higher risk for developing the severe forms of Valley Fever, including African Americans, Filipinos, women in the third trimester of pregnancy, and people with weak immune systems.

According to the County of San Luis Obispo Public Health Department, Valley Fever was on the rise in recent years, with 2017 bringing the highest number of recorded cases of 445 to the County. . A downward case trend has been occurring since 2017 with a low of 147 cases in 2022 and 244 cases in 2023. A Regional Analysis of Valley Fever 2000-2018 published in the Morbidity and Mortality Weekly Report (MMWR) published by the Centers for Disease Control and Prevention (CDC) and referenced in the 2023 California State Hazard Mitigation Plan notes that more than 20,000 cases of Valley Fever are reported each year in the United States, but many more cases likely go undiagnosed. Some researchers estimate that each year the fungus infects more than 150,000 people, many of whom are sick without knowing the cause or have symptoms so mild they are not recognized.

Prevention: Persons can limit their risk of Valley Fever by taking steps to avoid breathing dirt and dust in the air, avoiding dusty areas, dampening soil to prevent it from drifting in the air, staying inside and sealing windows during dust storms, and closing car windows and setting air conditioners to recirculate while driving on dust-filled roads.

Antibiotic Resistant Microorganisms (e.g., MRSA, MDR and XDR-TB)

MRSA: Methicillin-resistant Staphylococcus Aureus (MRSA) is a bacterium that is resistant to certain antibiotics called beta-lactams. These antibiotics include methicillin and other more common antibiotics such as oxacillin, penicillin, and amoxicillin. In the community, most MRSA infections are skin infections. More severe or potentially life-threatening MRSA infections occur most frequently among patients in healthcare settings. While 25% to 30% of people are colonized in the nose with staphylococcus, less than 2% are colonized with MRSA.

MRSA Community Transmission: MRSA infections, as with all Staphylococcus, are usually spread by having contact with someone's skin infection or personal items they have used, like towels, bandages, or razors that touched their infected skin. These infections are most likely to be spread in places where people are in close contact with others—for instance, schools and locker rooms where athletes might share razors or towels.

Factors that have been associated with the spread of MRSA skin infections include close skin-to-skin contact, openings in the skin such as cuts or abrasions, contaminated items and surfaces, crowded living conditions, and poor hygiene. People may be more at risk in locations where these factors are common, including athletic facilities, dormitories, military barracks, households, correctional facilities, and daycare centers.

Prevention: Preventative measures consist of good hygiene practices, using Standard Precautions in healthcare settings and patient education.

MDR and XDR Tuberculosis: Tuberculosis (TB) is a disease caused by the infectious bacterium Mycobacterium tuberculosis. It is responsible for 1.7 million deaths globally each year (230,000 are HIV associated cases). Person to person transmission of TB occurs when droplet nuclei are inhaled (typically occurs after sustained or recurrent exposure to an infected patient from coughing, sneezing, talking, singing or spitting). The aerosolized particles (bacilli) are inhaled into the lungs and subsequently ingested by alveolar macrophages initiating a new infection. The treatment regimen for infected patients involves multiple drug therapy for a minimum of 6 months. If not properly treated, TB can be fatal.

Outbreaks of multidrug-resistant TB (MDR-TB) defined as exhibiting resistance to at least isoniazid and rifampicin, have occurred primarily in settings where HIV-infected persons congregate such as hospitals, prisons, drug treatment clinics and HIV residences. These outbreaks have been associated with high fatality rates. Transmission of M. tuberculosis to healthcare workers and other patients also occurred.

Recently, extensively resistant TB (XDR-TB) has emerged. This is defined as MDR-TB plus resistance to any fluoroquinolone and any of the three injectable drugs (amikacin, capreomycin and kanamyin). Outbreaks have primarily occurred in situations where the use of second-line TB drugs has been used and poorly managed. A 2005-2006 outbreak in South Africa resulted in a 98% fatality rate and a median survival rate of 16 days from the date of XDR-TB diagnosis.

Prevention: Preventative measures include: 1) Promptly identifying and treating infectious patients, 2) Active case finding for secondary cases of TB amongst contacts with subsequent treatment, 2) Public education, 3) Reducing overcrowding, and 4) Providing outreach services for direct supervision of patient therapy.

Vector-Borne Diseases

One area of particular concern for the County of San Luis Obispo is the limited surveillance for vector borne diseases such as West Nile Virus. Surveillance efforts throughout California have been extensive, including human and horse case detection, and WNV testing of mosquitoes, sentinel chicken flocks, and dead birds. Because San Luis Obispo County is one of the few remaining counties in California without a Vector Control District, the risk of vector borne diseases increases.

Valley Fever (coccidioidomycosis): Valley Fever is an illness caused by breathing in a fungus which lives naturally in the soil in San Luis Obispo County. When the soil is disturbed – by wind, construction, or everyday activities such as biking or gardening – people can breathe in the spores from this fungus and develop Valley Fever.

Most people who become infected with Valley Fever (60%) do not experience any symptoms and do not need treatment. Around 30%-40% of people develop flu-like symptoms such as

severe fatigue, cough, fever, heavy sweating at night, loss of appetite, muscle and joint aches, and sometimes a rash. A small percentage experience a much more serious form of the disease in which the infection spreads throughout the body. People who experience this serious form of Valley Fever are at risk of dying from complications of the disease and may need to take medication for the rest of their lives. Valley Fever is more common among older adults, though anyone of any age can contract it. Several groups of people are at higher risk for developing the severe forms of Valley Fever, including African Americans, Filipinos, women in the third trimester of pregnancy, and people with weak immune systems.

According to the County of San Luis Obispo Public Health Department, Valley Fever was on the rise in recent years, with 2017 bringing the highest number of recorded cases of 445 to the County. A downward case trend has been occurring since 2017 with a low of 147 cases in 2022 and 244 cases in 2023. A Regional Analysis of Valley Fever 2000-2018 published in the Morbidity and Mortality Weekly Report (MMWR) published by the Centers for Disease Control and Prevention (CDC) and referenced in the 2023 California State Hazard Mitigation Plan notes that more than 20,000 cases of Valley Fever are reported each year in the United States, but many more cases likely go undiagnosed. Some researchers estimate that each year the fungus infects more than 150,000 people, many of whom are sick without knowing the cause or have symptoms so mild they are not recognized.

Prevention: Persons can limit their risk of Valley Fever by taking steps to avoid breathing dirt and dust in the air, avoiding dusty areas, dampening soil to prevent it from drifting in the air, staying inside and sealing windows during dust storms, and closing car windows and setting air conditioners to recirculate while driving on dust-filled roads.

Mosquito-Borne Illness: Mosquito-borne viruses belong to a group of viruses commonly referred to as arboviruses. Although 12 mosquito-borne viruses are known to occur in California, only West Nile Virus, Western Equine Encephalomyelitis (WEE) virus and St. Louis encephalitis (SLE) virus are significant causes of human disease. West Nile continues to seriously affect the health of humans, horses, and wild birds throughout the state. As of 2019, San Luis Obispo County does not provide mosquito abatement services.

Zika virus has been found in California, but according to the California Department of Public Health (CDPH), Zika infections in the state have mainly been reported in people who were infected while traveling in areas outside of California with ongoing Zika transmission. As of November 1st, 2024, CDPH reports that there are no records of local transmission of Zika anywhere in California.

Prevention: The CDC recommends insect repellant, covering exposed skin and making sure mosquitoes stay outdoors as methods of preventing insect bites and disease transmission.

Lyme Disease: The western black-legged tick transmits lyme disease. The ticks prefer cool, moist areas and can be found in wild grasses and low vegetation in both rural and urban areas. Lyme disease was first described in North America in the 1970s. Though the tick has been reported in 56 of the 58 counties in California, the highest incidence of the disease occurs in the northwest coastal counties and northern Sierra Nevada counties with western-facing slopes. According to the California Department of Public Health, San Luis Obispo County is in an area where the western black-legged tick is commonly found; however, Lyme disease cases are not common or go unreported. Ticks are active all year round in California. The Vector Borne Disease Branch of CDPH has confirmed 16 cases of Lyme Disease in San Luis Obispo County from 2014-2023.

Prevention: Risk factors for Lyme disease include spending time in wooded or grassy areas, having exposed skin and not removing ticks promptly and properly. Prevention techniques include covering up, using insect repellents, checking clothing, yourself, children and pets for ticks, and removing a tick as soon as possible with tweezers.

5.3.6.2 Geographic Area

Disease outbreaks usually occur in densely populated areas, where person to person proximity provides ample opportunity for transmission of illnesses. Places of work and business, schools and high-population public spaces are of particular concern when the threat of transmissible illness occurs.

Vector-borne illness are concentrated around the vector. They are transmitted by the risk of Lyme disease is highest in wooded areas, and mosquito-borne illnesses are most prevalent around standing water. Due to its prevalence in the soil across the county, Valley Fever is of concern throughout the planning area.

5.3.6.3 Extent (Magnitude/Severity)

The diseases with the potential to have the most impact is novel influenza/infection, and pandemic flu, which have the potential for high morbidity (infected) and mortality (fatality) rates. This could include treatment and hospitalization of hundreds or more depending on the severity of the outbreak. For example, San Luis Obispo County had 76,500 confirmed and probable cases of Covid-19 infections, close to 1,500 hospitalizations, and 620 deaths.

5.3.6.4 Previous Occurrences

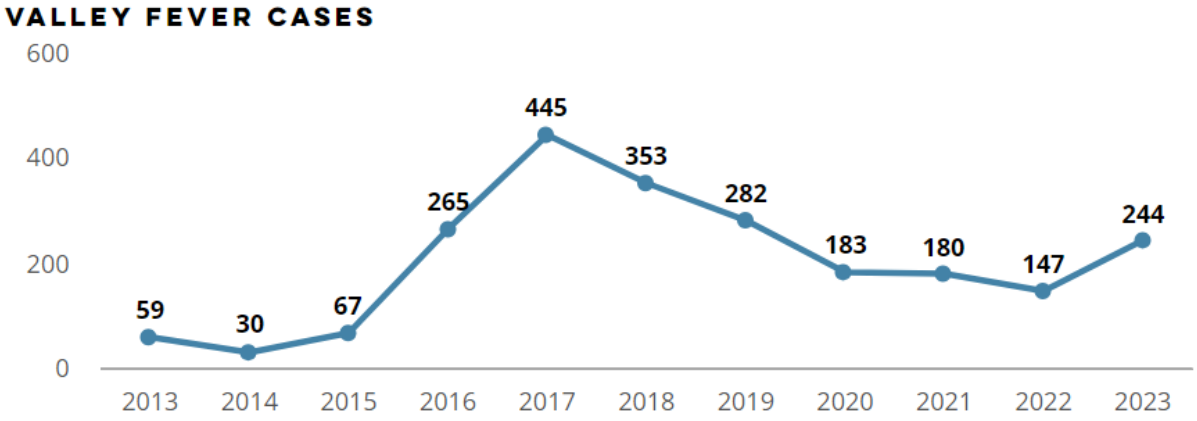
As mentioned previously, the Vector Borne Disease Branch of CDPH provides historical counts of disease in San Luis Obispo County between 2014 and 2023.

West Nile Virus: According to the Vector Borne Disease Branch of CDPH, cases of West Nile virus rose from 442 in 2016 to 553 in 2017; while the last 2 reported cases of the virus in the county occurred in 2019, West Nile continues to be present in the county, as testing of dead birds has confirmed in 2021 and 2023. Each year having 2 reported cases.

Lyme Disease: There were 16 reported cases of confirmed Lyme disease among San Luis Obispo residents from 2014-2023, or an incidence rate of 0.57 per 100,000 population.

Valley Fever: Figure 5-31 notes Valley Fever cases in San Luis Obispo County from 2010–2023. According to the CDC, while the reasons for the increased incidence in Valley Fever in 2017 are not known, climatic and environmental factors favorable to Valley Fever proliferation and airborne release

Figure 5-31 Valley Fever Cases in San Luis Obispo County, 2013-2023



Source: County of San Luis Obispo Public Health Department.

might have contributed, including rainfall after several years of drought and soil disturbance resulting from construction. The UC Davis Valley Fever Center attributes the increase in cases to drought conditions and firefighting equipment stirring up fungus in the soil. SLO does have one of the highest rates in the State according to the 2023 Community Health Assessment.

Foodborne Illnesses: In 2023 San Luis Obispo County reported cases of foodborne illness included 109 cases of campylobacter, 24 cases of E. coli, no cases of listeria, 47 cases of salmonella, and 12 cases of shigella. While it is possibly the most common cause of gastrointestinal disease, data is not available for norovirus as health care providers are not required to report it to the Public Health Department.

Antibiotic Resistant Microorganisms: The CDC reported in 2016 that for the first time, researchers have identified a person in the United States carrying a bacteria resistant to antibiotics of last resort, an alarming development that could mean the "end of the road" for antibiotics. In 2024, the CDC issued an Antibacterial Report stating that there are now six bacterial antimicrobial-resistant hospital-onset infections. The CDC reports that in the U.S., there are more than 2.8 million antimicrobial-resistant infections that occur each year, resulting in over 35,000 deaths.

5.3.6.5 Probability of Future Occurrences

The potential exists within the entire county and in all regions of the U.S. for an outbreak of an infectious disease to occur that would dramatically affect the health and safety of the general public and the economy of the affected area, state and possibly nation. The County of San Luis Obispo Public Health Department has been proactive in its infection control surveillance efforts and in its emergency preparedness planning activities.

The 2023 San Luis Obispo County Community Health Assessment notes annual recurrence in cases of Valley Fever and Lyme Disease between 2013 and 2023, or a 100% annual recurrence rate.

No known cases of Zika Virus transmission have been recorded in the county or the State of California, though once case of travel related Zika was reported in the county in 2016; this constitutes a 0% recurrence interval.

The Center for Disease Control estimates that nationally, it is estimated that 3% to 12% of the population is infected with influenza, though rates of infection vary among age groups.

The greatest ongoing concern national health agencies have is the potential emergence of a novel influenza virus as recently occurred with the 2009 H1N1 pandemic, or a novel SARS virus that recently occurred with Covid-19 For the past several years, federal, state and local governments have been actively engaged in pandemic influenza preparedness planning efforts. The County of San Luis Obispo Public Health Department has an up-to-date Pandemic Influenza Plan and Medical Countermeasure Plan. While influenza is an unpredictable virus, these preparedness measures will facilitate prevention, early detection and treatment when the next pandemic does strike. Globally, an average of three pandemic influenza outbreaks have occurred per century over the past 300 years.

5.3.6.6 Climate Change Considerations

According to the Fifth National Climate Assessment (NCA5), climate change will likely affect vector-borne disease transmission patterns. Rising temperatures and altered precipitation patterns are expected to increase the geographic range and activity of vectors such as mosquitos and ticks, potentially leading to higher incidences of vector-borne diseases.

5.3.6.7 Vulnerability

Structures

Historically, naturally occurring biological agents and vector-borne illnesses do not have a direct impact on Structures.

People

The health of the general public is the main impact from naturally occurring biological agents. Each disease has its own morbidity and mortality rates, as well as various rates and vectors for transmissibility. Specific impacts of diseases profiled in this section are included in the Hazard/Problem Definition section.

As a worst-case scenario, the most notable pandemic influenza outbreak was the 1918 Spanish Flu that was responsible for 20 million to 40 million deaths throughout the world. In 2009, a pandemic of H1N1 influenza, popularly referred to as the swine flu, resulted in many hospitalizations and deaths. More recently, San Luis Obispo County had 76,500 confirmed and probable cases of Covid-19 infection, and 620 deaths.

Social Vulnerability

The areas of the county that have the highest overall social vulnerability, based on the SVI data discussed and presented in subsection 4.4.1, will also be the most vulnerable to the effects of naturally occurring biological agents and pandemics. Mitigation efforts related to these hazards and focusing on the communities that are among the highest social vulnerability will have the greatest benefit for the well-being of San Luis Obispo County.

Critical Facilities and Lifelines

While biological agents and vector-borne illnesses would not have direct structural impacts on Critical Facilities and Lifelines, the potential exists for impacts to critical facility and infrastructure operation. A widespread disease and any associated social distancing could cause absenteeism at the workplace. Disease and illness could also cause pressure on the county's public health system, with an outsized number of patients seeking treatment and the potential for a diminished number of health care workers to meet the demand.

Economy and Community Values

Disease mainly has an impact on economic drivers, including commerce. The risk of disease exposure may cause consumers to avoid brick and mortar establishments, though e-commerce may not be as affected. Social distancing is put in place to limit exposure to and

spread of disease may also impact workplace efficiency, as people stay home and away from public places. Additionally, tourism may be impacted in affected areas.

Historic, Cultural, and Natural Resources

By and large, impacts from naturally occurring biological agents are focused on people; biological agents would not have an adverse impact to historic, cultural or natural resources.

Development Trends

There is only a slight risk increase due to development trends expected from this hazard. According to the U.S. Census Bureau, the population of San Luis Obispo County grew about 4.5% from April 1st of 2020-July 1st, 2023. There are multiple housing and community development projects, as well as some infrastructure and sustainability projects currently in progress. These projects are designed to improve the overall ecosystem health and therefore the resilience of the community to

Risk Summary

- San Luis Obispo County and its population is vulnerable to a variety of different naturally occurring diseases
- Ongoing Public Health surveillance and emergency preparedness planning activities are geared towards minimizing the likelihood and reducing the severity of such an occurrence
- While the greatest impacts in the county from disease occur to populations, secondary impacts include reduced workplace efficiency and effects on the tourist trade
- Past and recent history dictates that the most likely microorganism to be involved in a local epidemic or global pandemic is the influenza virus; antibiotic-resistant microbes are also a grave concern
- Due to an increasingly global marketplace for food products, occurrence of significant foodborne outbreaks is also on the rise
- The continued absence of a Vector Control District within San Luis Obispo County delays the detection of vector borne disease such as plague, tularemia and West Nile Virus
- Vector-borne illnesses can especially be impacted by environmental factors, including drought
- Due to the multiple biological agents referenced in this section, defining a single significance and probability rating for this hazard is difficult; scores in the Hazard Risk Summary table below are based on an outbreak of novel pandemic influenza, likely the worse-case scenario in the county. An overall significance of Medium is assigned to account for the lower probability of this event.

Table 5-41 Hazard Risk Summary - Biological Agents

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY	OVERALL SIGNIFICANCE
San Luis Obispo County	Extensive	Occasional	Critical	Medium
City of Arroyo Grande	N/A	N/A	N/A	N/A
City of Atascadero	Extensive	Occasional	Critical	Medium
City of Grover Beach	N/A	N/A	N/A	N/A
City of Morro Bay	N/A	N/A	N/A	N/A

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY	OVERALL SIGNIFICANCE
City of Paso Robles	Extensive	Occasional	Negligible	Low
City of Pismo Beach	N/A	N/A	N/A	N/A
City of San Luis Obispo	Extensive	Occasional	Critical	Medium
Avila Beach CSD	N/A	N/A	N/A	N/A
Cambria CSD	Extensive	Occasional	Critical	Medium
Ground Squirrel Hollow CSD	N/A	N/A	N/A	N/A
Heritage Ranch CSD	N/A	N/A	N/A	N/A
Los Osos CSD	N/A	N/A	N/A	N/A
Nipomo CSD	N/A	N/A	N/A	N/A
Oceano CSD	Extensive	Occasional	Critical	Medium
San Miguel CSD	N/A	N/A	N/A	N/A
San Simeon CSD	N/A	N/A	N/A	N/A
Templeton CSD	Extensive	Occasional	Critical	Medium
Cayucos Sanitary District	N/A	N/A	N/A	N/A
Port San Luis Harbor District	N/A	N/A	N/A	N/A
San Luis Obispo FCWCD	Extensive	Occasional	Critical	Medium
South San Luis Obispo Sanitary District	N/A	N/A	N/A	N/A

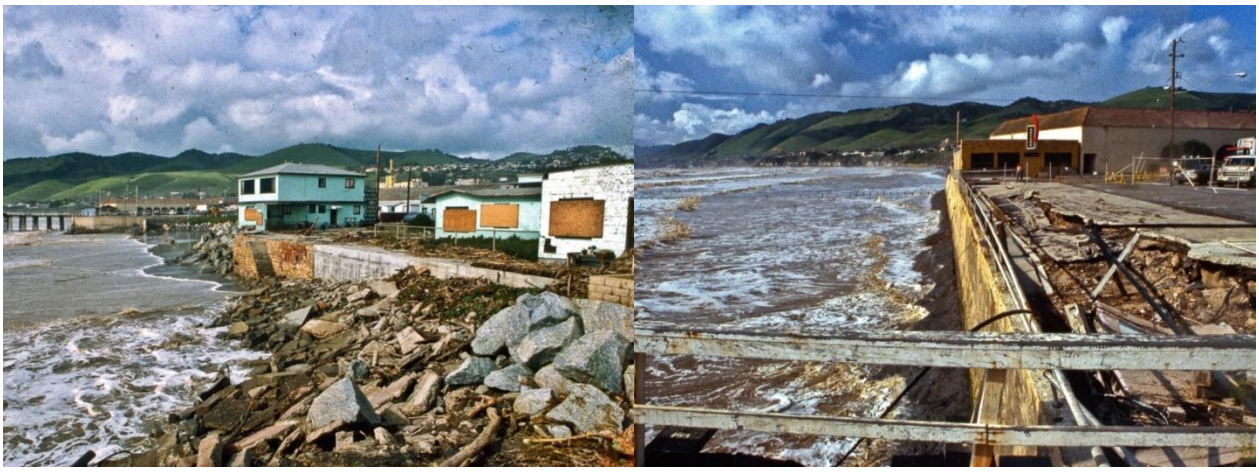
5.3.7 Coastal Storm/Coastal Erosion/Sea Level Rise

5.3.7.1 Hazard/Problem Definition

Coastal Storm: Coastal storms are characterized by offshore storm systems that make landfall, bringing high winds, rain, and storm surges to the coastline (USGS 2018). They originate from the combination of low-pressure systems offshore that circulate counterclockwise with high-pressure systems that blow in one direction over a long period of time, which creates a phenomenon of rising water, resulting in massive waves beyond the normal movement of tides. Coastal storms may have hurricane-force winds and cause damage similar to that of a hurricane; however, they are not classified as such because they do not originate in the tropics. The destructiveness of a coastal storm depends on the duration, wind speeds, and tidal factors, with particularly severe potential for damage where strong storm-generated waves coincide with high tides or King Tides (exceptionally high tides that occur once or twice a year). Such storms can exacerbate beach and cliff erosion and increase risks of bluff failure or flooding in low-lying areas. They have the greatest impact on the coastline and coastal communities in the form of beach and cliff erosion which can expose bluff top structures or facilities to bluff failure or landslides, and flooding of low-lying communities due to storm surges and wave energy. During such events, property and infrastructure in unprotected low-lying areas can be damaged by wave attack or flooding, and evacuation routes in coastal areas can become inaccessible. When coastal storms coincide with high tides, as well as during El Niño years, coastal erosion and flooding hazards substantially increase (Russell & Griggs 2012).

The 1982/83 El Niño event caused widespread coastal damage throughout California, with Pismo Beach experiencing significant infrastructure losses. Figure 5-32, illustrates the extent of destruction, highlighting the impacts on key coastal structures.

Figure 5-32 Coastal Storm Damage at Pismo Beach, 1982/83 El Niño



Coastal storms can severely damage coastal development and substantially erode the shoreline, especially when they coincide with El Niño years; the 1982/83 El Niño-related storms destroyed coastal structures at Pismo Beach, damaging the Pier, RV park, access trail, and seawall; incurring an estimated replacement cost of over $5.5 million in Pismo Beach alone (in 2019 dollars) (Dean et al. 1984). Photo credit: Lance Nix

Coastal Erosion: Coastal erosion is a natural geological process that results in the loss of sand, sediment, vegetation, and soil from beaches, dunes, bluffs, and cliffs due to wave attack, winds, tides, and coastal storms. Erosion rates vary by location and are influenced by long-term factors such as sea-level rise, tectonic activity, and sediment supply. Along the California coast, erosion is driven by high wave energy, extreme storm events, and human activities, leading to the gradual retreat of shorelines and coastal cliffs (USGS, 2024). Coastal erosion takes place gradually over decades to thousands of years, or may occur rapidly, as with landslides or severe storms.

Coastal erosion processes are highly complex and depend on a number of factors such as geologic formation, groundwater seepage, and exposure to wave energy. The 100 miles of the County coastline are variable in terms of geologic composition and exposure to high tides, wave energy and related erosion. Sections of the coast exhibit a variety of backshore landforms including wide sand and cobble beaches backed by cliffs, sandy beaches backed by sand dunes, secluded and undeveloped pocket beaches, rocky intertidal areas, rocky bluffs, and loosely consolidated bluffs. Due to these various backshore types along the shoreline, erosion characteristics also vary significantly.

Driven by rising sea levels, large storms, flooding, tidal action, and powerful ocean waves, coastal erosion wears away the beaches and bluffs along shorelines. Beach and dune erosion occur through high wave run-up during high tides and increased wave energy that carry sand away from the shoreline. Beach and dune erosion may occur gradually over time as beaches naturally accrete and erode, resulting in mild changes in the shoreline and volume of sand present on the beach (Hapke et. al 2006). Energetic coastal storms and particularly strong El Niño events potentially result in the abrupt loss of large quantities of sediment and increased landward retreat of the shoreline.

Coastal bluff erosion also occurs in the form of irreversible landward retreat of coastal bluffs and cliffs (Griggs 2003). Historical bluff erosion has been episodic in nature with rates that vary throughout San Luis Obispo County due to the composition of coastline bluff rock formations and vulnerability to wave interaction with the cliffs. Rising tides, currents, and waves directed

at the base of the bluff cause the erosion of relatively non-resistant rock. As a bluff erodes, the top edge moves landward. This is a natural process that becomes a hazard as it threatens structures or other developed property, infrastructure, as well as recreational trails and public coastal access. The retreat of the bluffs threatens waterfront residences, businesses, and public facilities, eventually rendering them uninhabitable or unusable.

Human alteration of the shoreline can influence long and short-term erosion rates. One of the major causes of beach erosion is the construction of dams and other structures along creeks and rivers that trap sediment and prevent it from reaching the ocean. This deprives the shoreline of the material that would replenish beach sand supplies. Coastal structures such as groins, jetties, seawalls, and breakwaters can also alter littoral drift. Beach groins and breakwaters, for example, can trap littoral sand and build beaches over a limited area; but by doing so, they reduce the amount of sand that flows to down-current beaches. This can result in a rapid loss of beach sand in down-current beaches. Seawalls are often used to protect seacliffs from eroding wave action. These structures, however, can reflect wave energy to strip protective beach sand at an accelerated rate. This may ultimately result in increased seacliff erosion rates, particularly at sections of coastline adjacent to the seawall.

Sea Level Rise: Sea level rise refers to the long-term increase in global and regional sea levels due to ocean thermal expansion, the melting of land-based ice sheets and glaciers, and groundwater extraction. Over the past century, global sea levels have risen by approximately 8–9 inches (21–24 cm), with nearly one-third of that rise occurring in just the last 30 years (NOAA, 2024). The rate of sea level rise is accelerating, driven by ongoing climate change and greenhouse gas emissions, and is projected to continue rising through the 21st century.

While global sea level rise reflects an overall trend, regional and local sea level changes can be higher or lower than the global average due to factors such as tectonic activity, ocean currents, and atmospheric circulation patterns. Rising sea levels contribute to more frequent and severe coastal flooding, increased tidal inundation, and the intensification of coastal hazards such as storm surges and erosion.

Unlike coastal flooding caused by storms, tidal inundation, when combined with sea level rise, occurs predictably with high tides and can permanently submerge low-lying coastal areas over time. Coastal communities along the California coast, including San Luis Obispo County, are expected to experience more frequent flooding and accelerated beach and bluff erosion as a result of ongoing sea level rise (NOAA, 2024; County of San Luis Obispo, 2019).

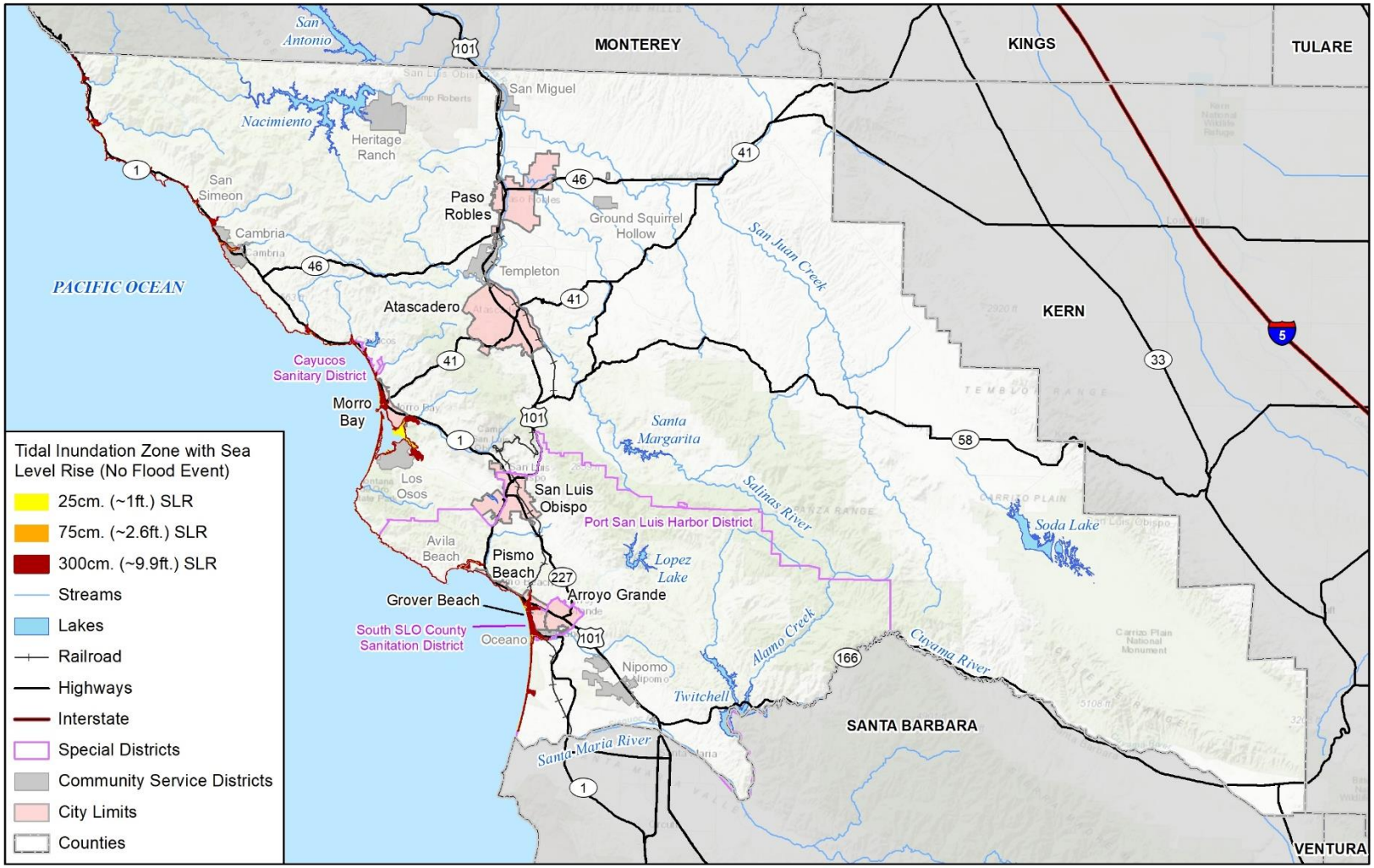
5.3.7.2 Geographic Area

The entire 100-mile coastline of San Luis Obispo County and existing urban development and natural resources are potentially exposed to a range of coastal hazards, including coastal storms, coastal floods, and coastal erosion. Such hazards are projected to become more severe when combined with sea level rise (County of San Luis Obispo 2019a). The creeks and rivers that drain inland mountains in confluence with the Pacific Ocean result in an ecologically diverse range of low-lying habitats including bays, inlets, and coastal wetlands. Additionally, bluffs and dunes line much of the County's coast, including the cities of Grover Beach, Pismo Beach, and Morro Bay. The coastline also includes five large unincorporated communities served by CSDs: Avila Beach, Los Osos, Cambria, Oceano, and San Simeon; and extensive rural areas (County of San Luis Obispo 2019b). These areas contain a number of popular recreational beaches such as Pismo Beach, Morro Bay, Cayucos, and Moonstone, along with visitor-serving uses, developed and undeveloped coastal bluffs and trails, two harbors (Morro Bay and Port San Luis), and a large dune field ranging from the Pismo Dunes through the Guadalupe Dunes. Low-lying portions of Highway 1, an officially designated State Scenic Highway, which has been damaged by past bluff erosion, also extend along the coastline. Designated State Parks in the San Luis Obispo Coast District include Cayucos State Beach, Estero Bluffs State Park, Los Osos Oaks State Reserve, Montana de Oro State Park, Morro Bay State Park, Hearst San Simeon State

Park, and W.R. Hearst Memorial State Beach (Department of Parks and Recreation 2019). Figure 5-33 and Figure 5-34 shows tidal inundation zone boundaries with sea level rise scenarios with 100-year flood and no flooding events.

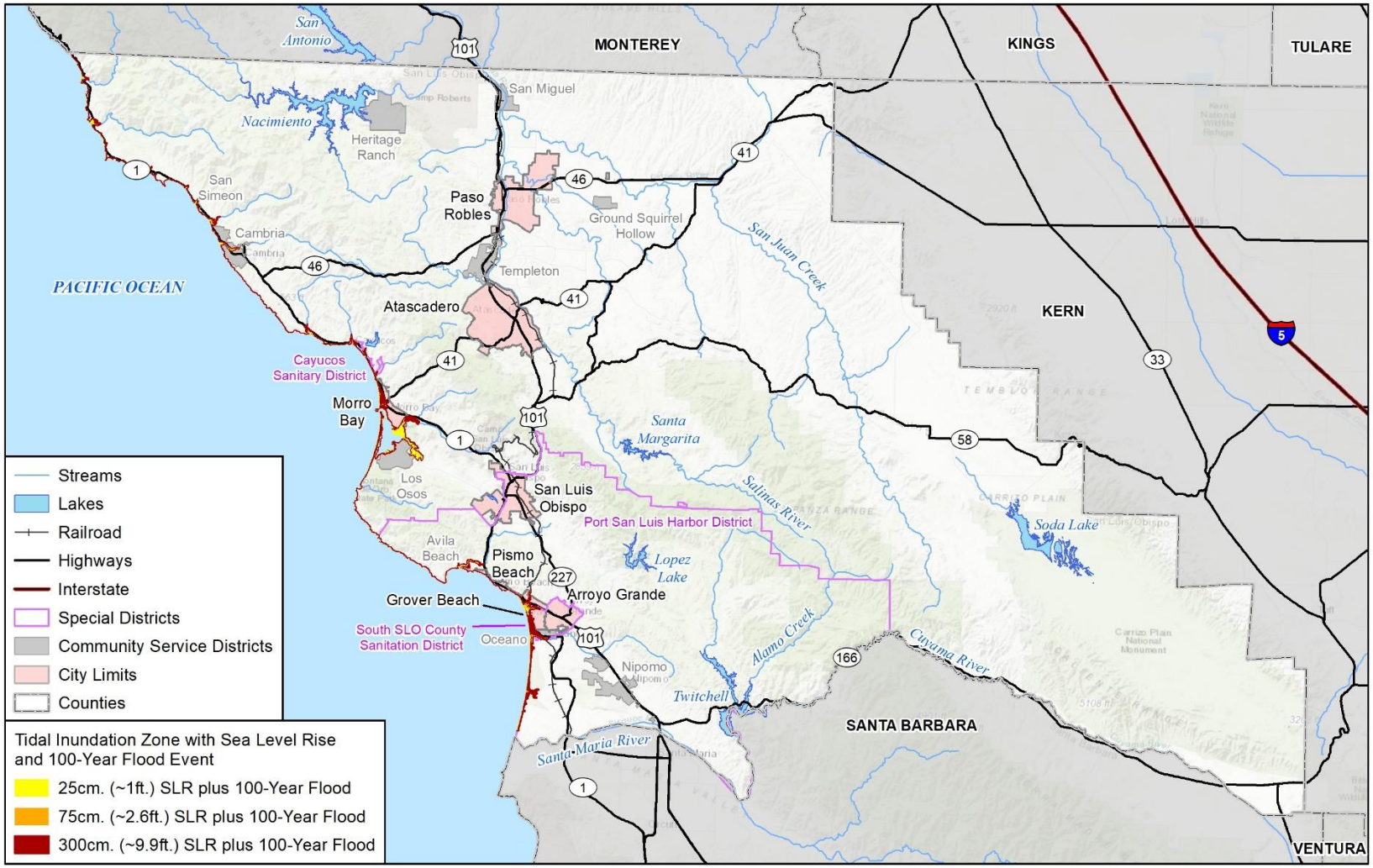
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Figure 5-33 Sea Level Rise Scenario Analysis: Tidal Inundation Only



Map compiled 1/2025;
Intended for planning purposes only.
Data Source: San Luis Obispo County, USGS CoSMoS v3.1
Note: SLR = Sea Level Rise

Figure 5-34 Sea Level Rise Scenario Analysis: Tidal Inundation Plus 100-Year Flood



Map compiled 1/2025;
Intended for planning purposes only.
Data Source: San Luis Obispo County, USGS CoSMoS v3.1
Note: SLR = Sea Level Rise

Table 5-42 highlights the hazard potential of jurisdictions and urban areas within the County coast.

Table 5-42 Hazard Potential of Jurisdictions and Urban Areas within the San Luis Obispo County Coast

JURISDICTION OR URBAN AREA	PRIMARY CHARACTERISTICS AND VULNERABILITIES
City of Grover Beach	• Sandy beaches backed by low sand dunes covered with dense vegetation • Commercial, residential (i.e., mobile homes) and recreational (golf course) development • Active erosion of beaches and dunes, impacts to low-lying coastal recreational uses, commercial and residential structures
City of Morro Bay	• Wide sandy beaches and large sand dunes backed by residential and commercial development on higher elevated terraces • Includes low-lying development, lagoons, trails, and saltwater marsh • Active erosion of beaches and dunes, low-lying areas susceptible to projected sea level rise • Erosion and landward retreat of bluffs
City of Pismo Beach	• Topography varies from sandy beaches and sand dunes to cliffs and bluffs ranging from 10 to 100 feet in height • Commercial and residential development close to the shoreline • Parks on top of bluffs include Dinosaur Caves Park with trails and a playground; Chumash Park; Monarch Butterfly Grove • Erosion of beaches and dunes; erosion and landward retreat of bluffs threaten residential, commercial, and recreational development • Development close to the shoreline vulnerable to coastal hazards and sea level rise
Avila Beach CSD	• Southerly-facing wide sandy beach backed by development including Avila Beach Park, commercial and residential development, and overnight accommodation • Avila Beach beaches and recreational Pier protected from northerly swells by the Point San Luis Breakwater • Erosion of the sandy beach threatens low-lying commercial, residential, and recreational development
Los Osos CSD	• Sand dunes and scenic bluffs of the Los Osos Oaks State Natural Reserve • Active erosion of sand dunes and bluffs • Low-lying development in downtown Los Osos threatened by projected sea level rise, and inundation from coastal storms and flooding
San Simeon CSD	• Low cliffs and rolling coastal hills of the Hearst San Simeon State Park[1] • Supports low-lying areas of Highway 1 with little to no coastal development • Erosion of low cliffs, coastal bluff retreat
Cayucos	• Varies from narrow sandy beaches backed by undeveloped bluffs and sea cliffs; to wider sandy beaches backed by low-lying coastal development • Erosion of bluffs and sea cliffs, active erosion of narrow sandy beaches • Sea level rise and coastal hazards threaten low-lying commercial and residential development

JURISDICTION OR URBAN AREA	PRIMARY CHARACTERISTICS AND VULNERABILITIES
Port San Luis Harbor District	• Port San Luis Pier, Boat Yard, and RV Campground backed by 100-foot-high cliffs which descend eastward to lower elevations • Southerly-facing beach protected from northerly swells by the Port San Luis breakwater • Erosion of 30- to 100-foot-high cliffs, coastal bluff retreat • Sea level rise and coastal storms threaten Port San Luis Pier, Boat Yard, and campgrounds
Cambria	• Rocky shoreline with some areas of narrow beaches backed by low cliffs 20-50 feet high • Bluff top residential development and public open space such as the Fiscalini Ranch Preserve • Bluff retreat, active erosion of sandy beaches • Projected sea level rise and accelerated bluff erosion threaten bluff top residential development
Oceano	• Wide sandy beaches backed by low active dunes, residential development and campgrounds • Popular for beach and dunes for off road vehicle use • Active erosion of sandy beaches and dunes

5.3.7.3 Coastal Storms, Coastal Erosion, and Sea Level Rise by Area

The reported rates of erosion are presented in the following sections approximate future coastal erosion rates and vulnerability due to difficulties in obtaining accurate erosion data.

San Luis Obispo County: The San Luis Obispo County coastline has the potential to be significantly impacted by coastal storms. Bluff erosion resulting in landward retreat of the seacliffs and beach erosion may result in landward retreat of the shoreline and impacts to coastal development and infrastructure. Low-lying areas often located by coastal streams or estuaries are vulnerable to inundation, wave run-up, and flooding associated with projected sea level rise. California's Fourth Climate Change Assessment notes that periodic El Niño events exert a dominant control on coastal hazards across the region, driven by seasonally elevated water levels as high as 30 cm (11.8 inches) above average, and, on average, 30 percent larger winter wave energy in California (Langridge et al. 2018).

Past El Niños, including the extreme 1982-83 and 1997-98 events, caused significant erosion along the Central Coast due to the elevated winter waves and water levels, with impacts more acute along the southern ends of littoral cells due to the more southerly wave approaches driving sand to the north (Langridge et al. 2018). The large El Niño event of 2015-16, one of the three largest in the historical record, resulted in winter wave energy over 25 percent larger than a typical winter along the Central Coast and caused substantial acceleration of beach erosion (State of California 2018). More recently, the 2022 and 2023 winter storm seasons brought heavy rainfall, high surf, and coastal flooding to San Luis Obispo County, causing localized bluff failures, infrastructure impacts, and additional stress on already-eroding beaches, further underscoring the region's vulnerability to compounding coastal hazards.

City of Grover Beach: Grover Beach is fronted by sandy beaches backed by low active dunes that are covered with dense vegetation, backed by a golf course, a mobile home park and Highway 1. The sandy beaches provide structures with moderate protection from storm waves. Timber beach access ramps were damaged, however, during the winter storms of 1983. The Grover Beach shoreline is classified as a "moderate risk" with respect to possible coastal damage incurred by storm waves.

City of Morro Bay: The Morro Bay coast is fronted by large sand dunes from Atascadero State Beach and continuing south through much of Montaña de Oro State Park that provide

protection for developments located on terrace materials behind the sand dunes. Due to the construction of the Morro Bay Harbor Breakwater and the presence of Morro Rock, the littoral drift north of Morro Bay is interrupted and the coast has extended seaward. The beach has widened about 250 feet near San Jacinto Avenue and almost 500 feet in front of Morro Bay High School in the past 50 years. This sandbar protects development in this region. The bay is protected by the sandspit south of Morro Rock that provides a barrier to wave attack that would otherwise impact the developed areas along the Embarcadero. Portions of Morro Bay are low-lying and are classified as a "high risk" with respect to possible future coastal flooding associated with sea level rise.

City of Pismo Beach: Cliffs and bluffs ranging in height from ten to one hundred feet exist along approximately five miles of the northwest portion of the city shoreline, with the southern areas of the city around the Pismo Beach Pier being low-lying. Bluff erosion rates in Pismo Beach vary from an average of 2 inches per year where bedrock is present to up to 12 inches per year in areas with limited bedrock (City of Pismo Beach 2002). Past studies have found that more than 60 homes are within the bluff retreat hazard zone and may be subject to damage or destruction by 2100, without accounting for accelerated bluff retreat associated with sea level rise (City of Pismo Beach 2002). Portions of Pismo Beach are either low-lying or are located atop eroding coastal bluffs and are classified as a "moderate risk" with respect to possible future coastal flooding or accelerated bluff retreat associated with sea level rise. Figure 5-35, below, depicts bluff erosion and overlying development at Dinosaur Caves Park in Pismo Beach in January 2010. This combination of erosion and projected sea level rise has the potential to damage these communities in Pismo Beach.

Figure 5-35 Bluff Erosion and Overlying Development at Dinosaur Caves Park in Pismo Beach, January 2010



Residential structures situated adjacent to coastal bluff cliffs are vulnerable to the impacts of coastal storms and actively eroding bluffs. Irreversible bluff erosion exacerbated by future sea level rise has the potential to damage communities such as those in Pismo Beach (January 2010). Source: San Luis Obispo Tribune 2010.

Avila Beach: Avila Beach is a southerly-facing sandy beach backed by areas of low-lying coastal development in the north along San Luis Creek including commercial and residential uses, hotels and Avila Beach Park, as well as homes atop a 10-35-foot-high low coastal bluff. Although most of Avila Beach is protected by 10 to 20-foot-high seawalls, low-lying areas to the north including Avila Park, and coastal access parking are potentially exposed to wave run-up and flooding. Avila Beach is partially sheltered from northerly swells by the Point San Luis Breakwater but is vulnerable to coastal storms originating from the southwest. The 1983 El Niño event severely damaged the recreational pier at Avila Beach. Low-lying areas of Avila Beach are classified as a "moderate risk" with respect to possible future coastal flooding associated with sea level rise.

Los Osos-Baywood Park: The community of Los Osos-Baywood Park is located a hillside and low-lying areas of the shoreline of Morro Bay. The sand dunes of Morro Bay State Park sandspit and Park currently protect the community of Los Osos from potential wave hazards, although dozens of homes along the shoreline of Morro Bay are constructed just above sea level. The low-lying shoreline areas of this community along Morro Bay may have low to moderate risk with respect to future coastal flooding from sea level rise over the long term. It is unknown whether sea level rise could eventually erode or lead to breaches in the sand dunes along Morro sandspit or to what extent such a breach could affect coastal flooding in Los Osos-Baywood Park.

San Simeon: San Simeon is fronted by a narrow sandy beach backed by low coastal bluffs that support several bluff top homes and a hotel with minimal setbacks and the town's wastewater treatment plant, which is protected by a low rock revetment. These bluff top uses are currently exposed to moderate risk and may be threatened in the near term if bluff retreat rates accelerate with sea level rise. Such threats would be considered medium or high with projected sea level rise and potential accelerated bluff retreat.

Cayucos: The shoreline in Cayucos generally supports narrow beaches backed by low cliffs approximately 20 feet-high as well as a low-lying downtown area by Cayucos Creek, much of which is protected by low rock revetments and a low seawall. Over 100 residences with minimal setbacks from the edge of the bluff are potentially exposed to coastal erosion hazards, although a number are protected by rock revetments or seawalls. In the winter months the sandy beach often erodes, and waves strike directly against the bluffs. The Cayucos shoreline faces south such that its beaches are partially protected from northerly swells. Wave action in this area is still significant. The seacliffs are comprised of Franciscan melanges, characterized by blocks of rocks often surrounded by small zones of sheared or crushed rock that tend to erode easily. Some zones contain more erosion resistant rock blocks that have been exposed as the weaker blocks have eroded away. During the intense storm waves of 1983, these resistant blocks were breached at some spots. As a result, the bluff receded as much as 20 feet (San Luis Obispo County 1999). Figure 5-36, below, shows low-lying residential development fronted by sandy beaches in Cayucos. This also shows how certain segments provide limited protection from potentially severe coastal storms and associated wave run-up and flooding.

Figure 5-36 Low-lying Residential Development Fronted by Sandy Beaches in Cayucos



Cayucos shoreline residential development is typically fronted by a wide sandy beach that protects development from coastal storms and sea level rise; however, the beach provides limited protection from potentially severe coastal storms and associated wave run-up and flooding.

Rates of erosion are highly variable along this coastline and range from 6 to 10 inches per year. Emergency rip-rap and numerous seawalls were constructed in response to the storm waves of 1983 (San Luis Obispo County 1999).

Downtown Cayucos is another area of concern. Built upon the unconsolidated sediment deposited from the Cayucos creek, this area is susceptible to shoreline erosion.

During rainy months when the ground becomes wet, the low permeability of the clays tends to perch or elevate the groundwater table. Consequently, the saturated soils cause increased erosion due to slope instability and slumping of the seacliff face. Therefore, much of Cayucos is either low-lying around the downtown or includes bluff top homes with minimal setbacks and is therefore classified as "moderate to high risk" with respect to both existing coastal hazards and possible future coastal flooding and accelerated bluff retreat associated with sea level rise.

Port San Luis: Port San Luis and the coastline surrounding San Luis Bay is well-protected from the dominant northwesterly swells by the 2,300-foot-long Port San Luis breakwater, though little protection is offered from southerly swells. The Port San Luis area is backed by 100-foot-high cliffs that descend eastward into approximately 30-foot-high cliffs. A rock revetment protects Avila Beach Drive from Port San Luis toward Avila Beach from storm waves and bluff erosion.

Historic storms have shown that both Port San Luis and Avila Beach are susceptible to coastal damage from storm waves, particularly those generated by southerly swells. Winter storm waves during the 1983 El Niño storms, for example, damaged the concrete seawall running parallel to Front Street. More recently, the 2022–2023 storm seasons brought heavy surf and high tides that overtopped sections of the revetment and contributed to localized erosion and infrastructure impacts. This region is classified as having a "moderate risk" of coastal damage from storm waves. Additional information on recent storm impacts can be found in the annex.

Cambria: Cambria is characterized by a rocky intertidal shoreline and narrow beaches backed by low cliffs approximately 20 to 40 feet high. This section of coastline experiences moderate to heavy wave action, primarily from northerly swells. The coastal geology consists of a rock unit commonly referred to as the Cambrian slab, a local term for Cretaceous-age sandstones that form the resistant rock headlands in the area.

Although this type of sandstone is relatively resistant to erosion, coastal cliff retreat still occurs due to wave action and natural weathering processes. The USGS estimates that California's coastal cliffs retreat at an average rate of 0.3 meters per year (approximately 12 inches per year), though erosion rates vary by region. In Cambria, documented sea cliff erosion rates are typically lower, ranging from two to three inches per year, depending on wave energy, sediment composition, and existing protective structures. While some coastal bluff-top homes are protected by rock revetments, many homes along the coastal bluffs have minimal setbacks and remain highly vulnerable to erosion (USGS 2024).

During the 2022–2023 storm seasons, waves overtopped portions of the shoreline and caused damage to several bluff-adjacent structures, reinforcing the area's exposure to intense coastal wave action.

Figure 5-37, below, illustrates the high susceptibility to bluff erosion for communities in close proximity to the shoreline.

Figure 5-37 Low Coastal Bluffs and Residential Development in Cambria



The San Luis Obispo coastline is diverse in geologic composition and subject to variable coastal hazard impacts. Urban development adjacent to coastal bluffs are highly vulnerable to irreversible bluff erosion, such as those in Cambria in close proximity to the shoreline (pictured above).

All developed coastal areas of Cambria are in high hazard zones (USACE 2016). Much of the shoreline of Cambria includes bluff top homes with minimal setbacks and scattered rock revetments is therefore classified as "moderate to high risk" which would increase with respect to possible future accelerated bluff retreat associated with sea level rise.

Shell Beach: The coastline from Fossil Point proceeding eastward to Shell Beach is characterized by offshore rocks and sea stacks backed by 30-to 100-foot eroding cliffs. Seacliff retreat rates range from 4 to 7 inches per year for the Shell Beach coastline; catastrophic rock fall is an important agent of erosion in this area. Although many homes located adjacent to the coastline of Shell Beach are protected by seawalls, bulkheads, sandbags, and rip rap, this stretch of coastline is characterized as "high risk" with respect to possible erosion.

Oceano: Oceano is generally fronted by wide sandy beaches backed by low active dunes. These dunes provide protection for nearby structures; however, they are subject to erosion during storm surges at extreme high tides. Although these sand dunes help buffer dwellings from storm waves, the winter storms of 1983 damaged structures and destroyed timber ramps that provided vehicular beach access. More recently, the 2022–2023 storms caused erosion and localized damage along beach access routes and reinforced the vulnerability of the dune system during sustained wave activity. This region is characterized with a "moderate risk" and a "high risk" region adjacent to the Arroyo Grande Creek mouth with respect to coastal erosion.

South County: The coastline from Oceano southward to the San Luis Obispo/Santa Barbara County line is described as "sandy beaches backed by active dunes with sparse vegetative cover, high intermediate old dunes with vegetative cover, marshes, and lakes" (San Luis Obispo County 1999). Although the dune face is wave-cut and experiences frequent slides, this region is classified with a "moderate risk" with respect to coastal erosion.

5.3.7.4 Extent (Magnitude/Severity)

All low-lying coastal areas within the County, including beaches, are exposed to coastal storm hazards and are at risk of inundation with projected sea level rise. Increased frequency, severity, and duration of high tide and storm events related to climate change may also result in more frequent and severe coastal storms.

To assess and communicate coastal flood hazards effectively NOAA has established three coastal flood severity thresholds:

Minor Flooding: Minimal or no property damage, but possibly some public threat or inconvenience.

Moderate Flooding: Some inundation of structures and roads near the coast. Some evacuations of people and/or transfer of property to higher elevations may be necessary.

Major Flooding: Extensive inundation of structures and roads near the coast. Significant evacuations of people and/or transfer of property to higher elevations.

These thresholds are based on water level heights established by local NWS Weather Forecast Offices, derived from years of impact monitoring in collaboration with local emergency managers. They serve as critical metrics for understanding potential flood impacts and guiding preparedness efforts (NOAA, 2024).

Additionally, the NWS employs a tiered coastal flood warning system to alert the public:

Coastal Flood Watch: Issued when coastal flooding is possible. People in the watch area should be ready to move to safe ground if flooding occurs or if warnings are issued.

Coastal Flood Warning: Issued when coastal flooding is occurring, imminent, or expected within the next 12 hours. People in the warned area should take immediate action to protect lives and property.

Coastal Flood Advisory: Issued when minor coastal flooding is occurring or imminent, posing a threat or causing inconvenience.

These advisories are essential for public safety, providing timely information to mitigate risks associated with coastal flooding (NWS, 2024).

Incorporating these standardized metrics and warning systems into our coastal hazard assessments will enhance our ability to prepare for and respond to coastal flooding events, thereby improving community resilience.

Coastal Storm: Coastal storms can cause high winds and strong storm surges that would affect low-lying "vulnerable" coastal resources and infrastructure located in urban areas such as Morro Bay. For wind hazards, the extent of wind speeds can range from tropical depressions (less than 35 kts), tropical storms (35-65 kts), to hurricane-force winds of 65 kts or greater. Low-lying areas susceptible to wave run-up and coastal flooding due to coastal storms are often protected by seawalls or revetments. These protective structures may be breached during a severe coastal storm, such as those associated with El Niño years and/or a 100-year coastal storm event.

Wave runup elevations are used in coastal flood studies to determine flood hazard areas for sites along the open coast that are subject to direct assault by deep-water waves. Runup elevations vary by location and local beach slope. For a 1% annual chance coastal storm (100-year event), wave runup elevations range from 11 to 24 feet above Mean Sea Level (MSL). The 0.2% annual chance event (500-year storm) can produce runup elevations between 17 and 30 feet above MSL, with most locations experiencing runup around 22 feet above MSL. The actual depth of inundation varies depending on the ground elevation at a particular site.

Areas with ground elevations three feet or more below the 1% annual chance wave runup elevation are classified as velocity hazard zones (VE zones) on FEMA Digital Flood Insurance Rate Maps (DFIRMs), indicating areas subject to high-velocity wave action. The VE zones provide a regulatory basis for coastal floodplain management and highlight areas where structures may face significant damage risks from storm surge and wave forces. More details on specific flood hazard areas can be referenced in the County's Flood Insurance Study (FIS) (FEMA 2025).

Coastal development on coastal bluffs and cliffs that are not susceptible to direct wave run-up and flooding remains vulnerable to coastal storms and resulting bluff erosion. All coastal development in proximity to the shoreline is threatened by landward retreat of the shoreline due to beach and bluff erosion, which are exacerbated by coastal storm events.

Coastal Erosion: Coastal erosion threats include both dune erosion and bluff erosion, and can result from storms, sea level rise, strong wave action, and human activities. Unlike coastal storms, cliff erosion can result in permanent and significant alterations of coastal geology that can expose landward development and resources to additional coastal threats. Large sections of the county coastline, especially those with rocky headlands or sea cliffs, are not vulnerable to flooding, but are highly susceptible to erosion (Heberger et. al 2009). Areas vulnerable to impacts of coastal beach erosion within the county include low-lying areas fronted by sandy beaches and dunes, including sand dunes at Pismo State Beach, Oceano, and Los Osos. Impacts of coastal bluff erosion affect development above or adjacent to coastal cliffs and bluffs, including bluff top residential development in Cambria, Shell Beach, Pismo Beach, and the cliffs at the Point San Luis Lighthouse. Erosion extent can range from gradual wearing a way of coastal land at inches per year to more significant, catastrophic events that can result in bluff failures involving several hundred cubic yards of material.

Sea Level Rise: Low-lying coastal areas such as those in Morro Bay, Oceano, Cayucos, and portions of Avila Beach are more susceptible to wave run-up and flooding in combination with sea level rise than structures atop coastal cliffs; however, such bluff top structures may be threatened by accelerated bluff erosion induced by projected sea level rise. Projected sea level rise in Morro Bay may increase threats to low-lying habitats or development relative to current sea level conditions. Further, as noted above, sea level rise may lead to accelerated coastal bluff retreat and erosion that may exacerbate threats to communities located along the cliffs and close to the coast, such as Pismo Beach, Shell Beach, Avila Beach, Morro Bay, and Cambria. Projected sea level rise may exacerbate saltwater intrusion into coastal aquifers, potentially affecting the water supply of some communities. Sea level rise may also increase the frequency and depth of inundation of coastal marshland, leading to its conversion to open water or mudflat habitat. This, in turn, can increase the concentrations of brackish water (a mixture of freshwater and saltwater with salinity levels between 0.5 to 30 parts per thousand), which can compromise coastal marshland habitat integrity

Sea level rise is measured using two primary methods:

Tide Gauges: Installed along coastlines or on ocean platforms, tide gauges rely on sensors to make continuous records of water height relative to a specific point on land. These records, which can span over a century, provide valuable long-term data on sea level changes (NASA, 2024).

Satellite Altimetry: Satellites equipped with altimeters measure sea surface height by sending radar pulses toward the ocean surface and recording the time it takes for the signals to return. This method allows for precise, global measurements of sea level changes (NASA, 2024).

Scientists monitor sea level trends and assess the impacts of climate change on coastal regions by combining data from tide gauges and satellite altimetry (NASA 2024).

Specific to sea level rise, the extent of anticipated rise for the purposes of this plan is modeled for three different scenarios generally ranging from 1 ft, 3 ft, and 10 ft; this is described in more detail in the Vulnerability subsection; maps showing potential inundation from the three sea level rise scenarios are included in the jurisdictional annexes.

5.3.7.5 Previous Occurrences

Coastal Storm: As sea levels rise, coastal storms and water levels will extend farther inland and lead to increased occurrences of coastal flooding. Increased coastal erosion and flooding from intense storm activity along the California coast occurred during major El Niño events of 1982/83 and 1997/98 (Bromierski 2003). High tides and severe storm waves during the El Niño storm in March 1983 damaged the concrete seawall in Port San Luis as well as development within the community of Avila Beach (the wide sandy beach eroded and was not sufficient to protect urban development from severe storm waves). Housing developments in this area experienced landslide activity as well as cracking of foundations and roads. The Union Oil Pier at Avila Beach was also severely damaged, as well as the Avila Beach Pier (Figure 5-38) (San Luis Obispo County 1999). Historic storms have resulted in substantial damage to coastal regions and demonstrated susceptibility of the coastline to swells originating in both the northwest and southwest.

More recently, San Luis Obispo County experienced severe coastal storm impacts during 2022 and 2023 winter seasons, particularly river events. These storms brought high surf conditions, flooding, and coastal erosion, prompting federal disaster declarations in early 2023. Damage included the closure of South Bay Boulevard due to flooding, significant erosion in the Morro Bay watershed, and destruction of coastal infrastructure in Pismo Beach, including pier access points and recreational amenities.

Figure 5-38 Union Oil Pier in Avila Beach Collapses Following Severe 1983 Storm



A severe coastal storm in March 1983 brought high winds and powerful surf that damaged coastal pier and infrastructure including sections of Highway 1 and destroyed the wooden Union Oil Pier in Avila Beach. Source: San Luis Obispo Tribune 2018.

El Niño-related storms cause increased damage to the coastline with heavy rainfall, energetic wave conditions, and accelerated dune and bluff erosion. Such storms are also correlated with increased coastal flooding magnitudes (Andrews et al. 2004). Wave height, sea level, and precipitation, which are the primary external forcing parameters in seacliff erosion, further increase with storm intensity. Significant cliff erosion and storm damage occurred along the central coast of California during the 1982/1983, 1997/1998 and 2015/16 El Niño winters (Table 5-43) (Storlazzi & Griggs 2000). Further data on previous storm occurrences and related impacts to the county are provided in subsection 5.3.1, *Adverse Weather*.

Table 5-43 Recorded El Niño related coastal storms and flooding in coastal communities within the County of San Luis Obispo

STORM EVENT (YEAR)	PRIMARY AREA(S) AFFECTED	EXTENT OF DAMAGE
El Niño, Winter 1982/83	Entire County Coastline	Heavy rainfall increased coastal flooding and accelerated dune and cliff erosion. Classified as one of the three strongest El Niño storms since 1950[2].
March 1983	Avila Beach, Port San Luis	High intensity storm which brought 6-8 inches of rain; high energy surf over a 7-day period destroyed the Union Oil Pier in Avila Beach and seawall in Port San Luis[1].
El Niño, Winter 1997/98	Entire County Coastline	High intensity storm that impacted the coastline with high energy wave conditions, substantial rainfall, and accelerated beach and bluff erosion Classified as one of the three strongest El Niño storms since 1950[2].
El Niño, Winter 2015/2016	Entire County Coastline	High wind, rainfall, and energetic waves that accelerated beach and bluff erosion. Classified as one of the three strongest El Niño storms since 1950[2].
El Niño Conditions, Winter 2023	Western Coastline	Severe winter storms and flooding that caused El Niño conditions throughout the western coast.
El Nino Conditions, Winter 2024	Central Coastline	A warmer-than-average winter with reduced snowfall across the northern U.S. is a key indicator of El Niño, as seen in 2024 with record-breaking warm temperatures in December and January and minimal snow accumulation, a trend continuing into February. At the same time, El Niño conditions shift the jet stream south, leading to a wetter-than-average winter for the southern U.S., bringing

STORM EVENT (YEAR)	PRIMARY AREA(S) AFFECTED	EXTENT OF DAMAGE
		frequent storms and increased rainfall. This pattern significantly alleviated drought conditions in parts of the South, where repeated storm systems have replenished water supplies and improved soil moisture.

Source: County of San Luis Obispo Public Works Department, 2024

Coastal Erosion: **Coastal erosion within San Luis Obispo County** has primarily occurred during periods of intense wave action coinciding with high tides and coastal storms. Local annual beach erosion rates from 1942 to 2002 (Hapke et al. 2006) range from three inches to over one foot (Table 5.44) (San Luis Obispo County 1999; USACE 2016). Beach erosion of up to 3 feet per year has occurred in areas including Cayucos, Morro Strand State Beach, Morro Bay State Park, Montaña de Oro State Park, Shell Beach, Pismo Beach, and Oceano Dunes.

Historical rates may not accurately predict future erosion, however, as substantial erosion can occur during individual severe storms that are expected to be exacerbated by climate change and associated sea level rise. This can result in bluff and cliff collapse (Griggs 2003). Major historical erosion events coincide with heavy storm years including: Piedras Blancas in 2001, the general county coastline in 2010, and Shell Beach and Montaña de Oro in 2017 (Protsman 2018). Reliable estimates of retreat are difficult to obtain because the historical record and the quality of the information is limited relative to ongoing coastal processes (City of Pismo Beach 2002).

More recent storm activity, particularly during the 2022–2023 winter season, has resulted in documented bluff failures, beach erosion, and damage to shoreline infrastructure in multiple parts of the county. While detailed erosion rate updates post-2019 remain limited, observed impacts from these events reinforce the continued vulnerability of the coastline and may warrant further monitoring and integration into future updates.

Dune erosion can either be short term where large coastal storm events and severe wave attack result in loss of sand or cliff failure, or long term with the gradual erosion of the shoreline over time due to onshore winds and high tides. Dune-backed shorelines may also change over time as dunes expand and recede (Hapke, 2006). Specific locations within the County experience differing rates of shoreline change. Long-term shorelines change in the northern section of the County has historically been approximately 0.1 meters (0.32 feet / 3.84 inches) of erosion per year, and short-term change averaged 0.7 meters (2.30 feet / 27.6 inches) of erosion per year. Short-term shoreline changes averaged 3.4 meters (11.5 feet / 138 inches) of erosion per year in the short-term but was relatively stable in the long-term.

Pismo Beach is an example of an area vulnerable to cliff erosion, where low bluffs consist of relatively weak sedimentary rock susceptible to wave erosion and undercutting of the cliff. The City of Pismo Beach conducted a Bluff Erosion Study in order to quantify historic erosion rates and evaluate impacts to coastal resources and development (Fugro West, Inc. 2002). Bluff retreat typically occurs episodically with several feet to several tens of feet of the bluff top eroded during a single season or storm event, while the bluff top in adjacent areas may remain unchanged. This bluff study estimates an approximate average retreat of 4 inches per year over the last 50 years (City of Pismo Beach 2002). Retreat rates of only 2 inches per year were observed at relatively resistant south-facing bluffs. Retreat rate of 6 to 12 inches per year, however, were observed in areas with higher instability where there has been sea cave collapse (City of Pismo Beach 2002). Rapid bluff collapse that contributes to higher bluff erosion rates are difficult to predict and projected to increase with sea level rise. For example, an approximate 100-foot section of the Pismo Beach bluff collapsed following the winter storm season in March 2011, a much more rapid erosion rate than those reflected in historical records

(Table 5-44). The historic bluff retreat rates determined in this study did not consider increasing wave energy and sea level rise. Existing rates of annual erosion may only approximate future coastal erosion rates and associated hazard vulnerability. Figure 5-39, below, shows an approximate 100-foot section of cliff collapsed in Pismo Beach due to erosion of the bluff following winter storms in March 2011, demonstrating the severe impacts of coastal hazards on weak bluff sediments

Table 5-44 Historic Rates of Erosion at Specific Sections of the Coastline

LOCATION	HISTORIC EROSION[1] RATE (INCHES/YEAR)	SHORELINE CHARACTERISTICS
Cambria	2-3	Narrow beaches backed by low cliffs approximately 20 feet high with urban development and public parkland
Cayucos	6-10	Wider beaches backed by low cliffs approximately 20 feet high
Morro Bay	+60[2]	Large sand dunes backed by elevated terraces along a bay protected by a sandspit
Los Osos	4-6	Large sand dunes backed by developed areas
Port San Luis	Not Available	Sandy beach backed by cliffs up to 100 feet high, protected from northwesterly swells by the Port San Luis Breakwater
Pirates Cove	4-7	Offshore rocks and sea stacks backed by eroding cliffs approximately 30-100 feet high
Grover Beach	Not Available	Sandy beaches backed by low active dunes covered with vegetation, a golf course, and residential development
Oceano	Not Available	Wide sandy beaches backed by low active dunes
South County	Not Available	Sandy beaches backed by active dunes with sparse vegetative cover, high intermediate established dunes with vegetative cover, marshes and lakes.
Pismo Bluffs[3]	2-12 (Average of 4 inches/year)	Relatively steep bluffs approximately 20 to 110 feet high fronted by narrow and steep beaches formed by bluff erosion.

[1] Historic rates of erosion describe the approximated change in shoreline position and/or bluff retreat calculated over the period from 1942 to 2002, and vary depending on geologic composition and exposure to wave energy (Hapke et. al 2006).
[2] Due to the construction of the Morro Bay Harbor Breakwater and the presence of Morro Rock, the littoral drift north of Morro Bay has been interrupted and the coast has extended seaward with increased beach width (San Luis Obispo County 1999).
[3] Historical erosion rates of the Pismo Bluffs are based on evaluation of approximately 5 miles of coastline between Harloe Avenue and The Bluffs Drive in Pismo Beach (City of Pismo Beach 2002).

Figure 5-39 Bluff Erosion at Pismo Beach, March 2011



An approximate 100-foot section of cliff collapsed in Pismo Beach due to erosion of the bluff following winter storms in March 2011, demonstrating the severe impacts of coastal hazards on weak bluff sediments. Source: San Luis Obispo Tribune 2011

Hard shoreline protective structures (i.e., seawalls, revetments) are implemented in some areas to slow erosion; however, such structures become less effective during severe storms and high tide events. The efficacy of existing protection devices and natural barriers such as typically stable serpentine rock is expected to decrease with projected sea level rise. Substantial beach erosion and cliff collapse resulting from severe storms has occurred along the bluffs adjacent to Pacific Avenue and Studio Drive in Cayucos. Extensive blocks of sheared serpentine that normally serve to slow erosion were breached by intense storm waves during a coastal storm event in March 1983. The bluff receded as much as 20 feet, causing severe beach and bluff erosion along the coast and irreparably damaged to coastal infrastructure (San Luis Obispo County 1999).

Severe coastal erosion also occurred at low-lying portions of Highway 1 near Piedras Blancas; from just north of the Piedras Blancas Lighthouse to the Arroyo de la Cruz Bridge. The temporary rock revetment armoring the road was not sufficient to protect the road from coastal storm and flood damage, and coastal erosion compromised the safety and structural integrity of the Highway. Approximately 2.8 miles of Highway 1 was relocated up to 475 feet landward in order to prevent coastal bluff erosion from adversely affecting future operation of the highway for the next 100 years (Caltrans 2010). Figure 5-40 , below, shows low-lying portions of Highway 1 near are threatened by severe coastal erosion due to wave damage and insufficient protection from hard structures. In response, an approximate 2.8 mile-long segment of Highway 1 near Piedras Blancas was realigned 475 feet inland to protect the roadway from future erosion.

Figure 5-40 Vulnerable Portions of Highway 1 and Realignment near Piedras Blancas

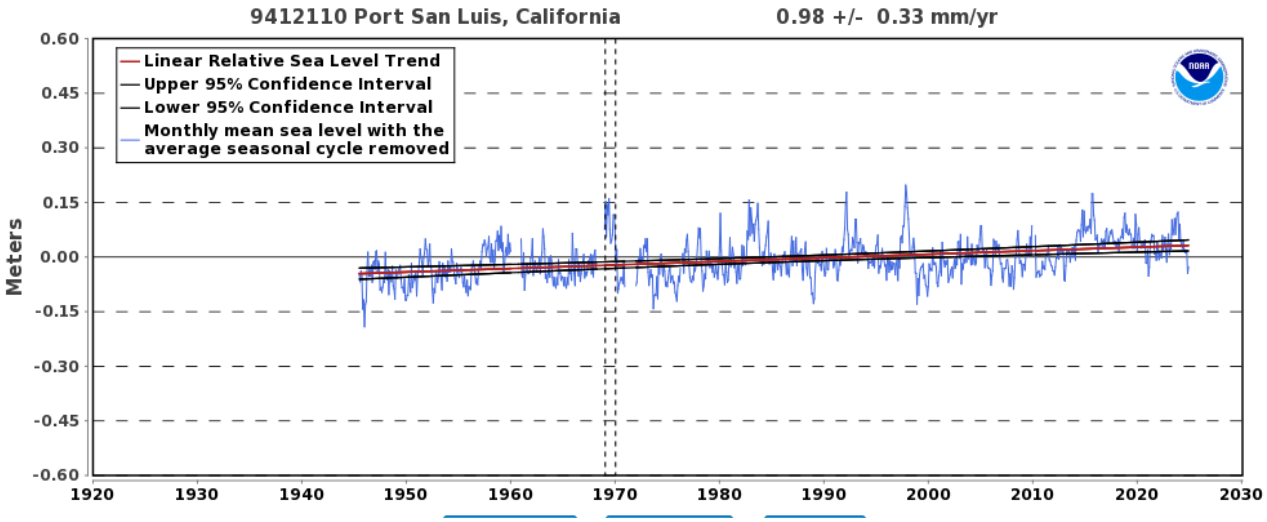


Low-lying portions of Highway 1 are threatened by severe coastal erosion due to wave damage and insufficient protection from hard structures (pictured left). In response, an approximate 2.8 mile-long segment of Highway 1 near Piedras Blancas was realigned 475 feet inland to protect the roadway from future erosion (new roadway completed in 2017, pictured right) (Caltrans 2010).
Photo Source: San Luis Obispo Tribune 2014 (left); AP Photo/Danial Dreifuss (right)

Sea Level Rise: Sea levels are rising at different rates in different regions of the California Coast due to local differences in tectonic uplift/subsidence and other factors such as nearshore bathymetry. Typically, the highest sea level readings along California's coastline occur during periods of heavy rain that coincide with high tides, causing coastal flooding, coastal bluff erosion, and cliff collapses such as those experienced during the 1982/83 and 1997/98 El Niño events.

The Port San Luis Tide Gauge located on the Hartford Pier reports the local sea level rise rate at approximately 0.93 (+/-0.38) millimeters per year (mm/year) since 1948 (NOAA 2017) (Figure 5-41). This rate compares to the global average annual rate of 3.2mm/year (Griggs et. al. 2017) and near the mouth of San Francisco Bay that has recorded approximately 7 inches in sea level rise variation over the past 100 years. The monthly sea level tide gauge record at Port San Luis was at its lowest recorded level (-0.2 meters or -0.66 feet) in the 1940s and reached its highest measured monthly average in the late 1990s at approximately 0.2 meters (0.66 feet). The growth trend is projected to increase in future years (NOAA 2017).

Figure 5-41 Tide Record and Sea Level Rise Trend from Port San Luis Tide Gauge (NOAA Station 9412110)



Source: NOAA 2025

5.3.7.6 Probability of Future Occurrences

Coastal Storm: Highly Likely. Coastal storms typically occur every winter season between the months of November and March. Coastal storms vary in frequency and severity and will be exacerbated by rising sea levels and future increase in variation in climate. The FEMA estimates and maps future coastal storms based on the 1-percent probability of an extreme storm occurring during any given year (FEMA 2019). Thus, extreme coastal storms occur less frequently. Increasing trends in coastal storm frequency and severity based on climate-related variables have also been identified by studies of cyclone frequency and wave height (see subsection 5.1.3 Climate Change Considerations of the base plan). The future occurrence of coastal storms is projected to increase; however, the projected frequency and intensity is difficult to quantify with current climate science and coastal storm modeling.

Coastal Erosion: Highly Likely. Average rates of historic beach and cliff erosion and shoreline retreat and are expected to continue and accelerate, but future erosion rates are difficult to project due to variable coastal processes and uncertainty in sea level rise projections. Increased frequency of coastal storms and wave run-up due to sea level rise increases the irreversible bluff erosion and cliff collapse that may occur.

Dunes and cliffs will exhibit differential responses to rising sea levels. The Pacific Institute models projected rates of coastal dune and cliff erosion in its "Erosion hazard with a 1.4-meter (4.6 foot) sea level rise, 2100" dataset, which represents the areas vulnerable to erosion with a sea level rise of 1.4 meters (4.6 feet) by 2100. This data is utilized in a larger study: *The Impacts of Sea-Level Rise on the California Coast,* which quantifies the projected impacts of coastal dune and bluff erosion (Heberger et. al 2009). This study projects a total dune and cliff erosion of 2.9 square miles (80.8 million square feet) with 1.4 meters (4.6 feet) of sea level rise by 2100. Projected rates of average and maximum dune and cliff retreat, which incorporate sea level rise projections, inform the severity of future erosion and its impact on existing coastal development in close proximity to the shoreline (Table 5-45). These values project the total amount of erosion and average landward retreat of the county by 2100, and do not consider short-term responses of sandy beaches, dunes, and cliffs as a result of coastal storms (e.g., cliff failure due to severe wave attack). Dune and cliff erosion rates vary significantly throughout due to geological composition and the physical forces acting on the coastline; therefore, actual erosion and shoreline retreat distance will not be uniform throughout the county. Further, areas protected by hard structures such as seawalls (i.e., Avila Beach) will also experience lesser impacts of cliff erosion than unaltered natural coastlines.

Actual future rates of erosion are relative to future coastal processes and difficult to project with certainty. Projected rates of erosion are naturally varied and will likely accelerate by 2100; thus, most erosion will occur towards the end of the century (Heberger et. al 2009).

Table 5-45 Coastal Erosion Projections with 1.4-meter (4.6 foot) Sea Level Rise by 2100

SAN LUIS OBISPO	TOTAL EROSION AREA[1]	AVERAGE RETREAT DISTANCE[2]	MAXIMUM RETREAT DISTANCE
Dune Erosion	1.4 square miles	150 meters / 492 feet	330 meters / 1083 feet
Cliff Erosion	1.5 square miles	78 meters / 256 feet	280 meters / 918 feet

[1] Total Erosion Area refers to the total area of dunes or cliff loss due to erosion projected to occur by 2100.
[2] Retreat Distance refers to the landward retreat of dunes or cliffs as a result of coastal erosion projected to occur by 2100.
Source: (Heberger et. al 2009).

Sea Level Rise: Likely. Scientific understanding of sea level rise is advancing at a rapid pace; projections of future sea level rise continue to change as new studies become available. Future

climate change is projected to particularly affect sea levels as the glaciers, polar ice packs, and ice sheets retreat. The predicted sea level rise over the course of this century varies widely. Since 1992, trends in sea level rise have been monitored by satellites and recorded by tide gauges. Given the variables involved, it is not yet possible to determine the actual rate of sea level increase.

The Ocean Protection Council (OPC) suggests that sea level rise along the coast of California could occur on the order of 0.5-1.0 foot by 2030, 1.0-2.6 feet by 2050, and 3.1-10 feet by 2100 (Table 5-46). These sea level rise scenarios are based on various projections of global greenhouse gas (GHG) emissions. The probabilities take into account uncertainties related to each of these scenarios. In addition, *Rising Seas in California: An Update on Sea-Level Rise Science* identifies an extreme sea level rise scenario (H++) that projects 10 feet of sea level rise by 2100 based on an accelerated rate of Arctic and Antarctic ice sheet loss (Griggs et. al. 2017). The H++ scenario assumes a trajectory of high GHG emissions and an accelerated rate of Arctic and Antarctic ice sheet loss. Note that there is a high level of uncertainty associated with the H++ scenario (as well as all seal level rise projections and projected timing) and given the emerging nature of seal level rise science, these estimates are intended to be used as a guide only and are subject to refinement over time. If this extreme sea level rise scenario were to occur, the modeled elevations of sea level rise and associated hazards could be experienced substantially sooner than the projected horizon year.

Table 5-46 Sea Level Rise Projections by Projected Horizon Year and Scenario

PROJECTED HORIZON YEAR	INTERMEDIATE SCENARIO	INTERMEDIATE-HIGH SCENARIO	HIGH SCENARIO
2030	0.4 ft	0.4 ft	1.0 ft
2050	0.8 ft	1.0 ft	2.6 ft
2100	3.1 ft	4.9 ft	10 ft

Note: These projections are based on the OPC's 2024 guidance and reflect updated scientific understanding. The previous H++ scenario has been replaced by the Intermediate-High and High scenarios. Climate Change Considerations
Source:: California OPC 2024.

5.3.7.7 Climate Change Considerations

Climate change is a major driver of sea level rise due to two primary mechanisms:

Thermal Expansion – As ocean temperatures increase, seawater expands, occupying more volume and contributing to rising sea levels.

Melting Ice Masses – The melting of mountain glaciers and polar ice sheets adds additional water to the oceans, further elevating sea levels.

The rate of sea level rise is largely dependent on the rate of ice melting, which is influenced by feedback mechanisms. As reflective ice surfaces are replaced by open ocean water, the ocean absorbs more solar energy, further accelerating ice melt. The uncertainty in ice melt rates contributes to the wide variation in sea level rise projections, particularly in the latter half of this century (2050–2100).

According to the 2024 OPC Sea Level Rise Guidance, the previous H++ scenario has been replaced by the Intermediate-High and High Scenarios, which reflect the latest understanding of extreme sea level rise risks. These projections account for potential rapid acceleration of ice loss and associated feedback loops. The higher the GHG emissions, the higher the global temperatures, the faster the ice melt, and the more extreme the rate of sea level rise.

The Intergovernmental Panel on Climate Change (IPCC) has also published scientific evidence demonstrating that sea levels will continue rising for thousands of years due to GHGs already

released into the atmosphere. Recent advances in climate science have improved our understanding of the contribution of ice sheet melt to global sea levels, revealing the potential for more extreme outcomes if warming continues unabated.

Beyond sea level rise, climate change is also increasing the frequency and intensity of coastal storms. A study examining storm variability in California—using historical records and tide gauge data from San Francisco—identified an increasing trend in coastal storm intensity and frequency over the past 50 years (Bromierski et. al 2003). Additional research has noted increasing trends in cyclone frequency (Graham & Diaz 2001)and wave height (Allan & Komar 2000), both of which have been substantially affected by climate-driven increases in storm frequency and intensity over the past two decades. If these trends continue, they could have serious consequences for coastal structures, ecosystems, and infrastructure along the West Coast. However, the future frequency and intensity of coastal storms remains difficult to quantify with confidence (Bromierski et. al 2003).

The Fourth Climate Assessment includes reports for the nine regions in California. According to the Central Coast Summary Report projected flooding over the next century, including erosion and cliff retreat hazards will threaten many Central Coast communities (California Natural Resource Agency 2018b).

For more details, refer to the Flood and Adverse Weather sections, which provide additional context on California's Fourth Climate Assessment and the role of ARs in influencing sea level rise and climate change.

5.3.7.8 Vulnerability

The assessment of vulnerabilities to coastal storms, coastal erosion, and sea level rise within the county relies on the best available science and modeling and methodology from a range of sources including FEMA and OPC planning guidance. Data was derived from several sources, including NOAA sea level rise viewer and previous studies that quantify historic rates of coastal erosion and frequency/severity of coastal storms and provide evidence for future trends (NOAA 2019b; USGS 2018). This assessment is further guided by FEMA's *Local Mitigation Planning Handbook* (2023), which provides strategies to describe and quantify hazards risk in the context of individual jurisdictions.

A San Luis Obispo California Polytechnic State University graduate study titled *A Sea Level Rise Vulnerability Assessment and Adaptation Strategies for the County of San Luis Obispo* was completed to inform future updates of the Safety Element of the County's General Plan analyzed the potential impacts of coastal hazards and sea level rise to identify vulnerabilities along the coast (Protsman 2018). This study provides site-specific erosion rates and detailed maps of site-specific shoreline change and coastal hazards that utilizes USGS and Pacific Institute data (Protsman 2018; USGS 2018). USGS data provides information on coastal change hazards during storms, beach morphology during extreme storms, short-term and long-term shoreline change rates, a coastal vulnerability index, and probabilities of coastal shoreline retreat on a regional scale. USGS has a more localized and accurate model called the Coastal Storms Modeling System (CoSMoS), and this model had not yet been applied to San Luis Obispo County until mid-2019. As this modeling represents more current sea level rise science it was integrated into the 2019 MJHMP before it was finalized and then updated as part of the current plan update. This was also done to reflect the most recent update of California sea level rise guidance, as provided in the California *OPC 2024 State of California Sea-Level Rise Guidance 2024 Science and Policy Update* (California OPC 2024).

The California Coastal Commission (CCC) requires sea level rise analysis and bluff retreat studies for new coastal development permits, which provide site-specific research on historic and projected rates of sea level rise and bluff erosion. Individual jurisdictions, such as the city of Pismo Beach, have also conducted sea level rise and bluff erosion studies to evaluate

vulnerability and establish policies for reviewing proposed coastal development. Sea level rise studies and adaptation reports conducted for smaller jurisdictions include site-specific coastal modeling including the Morro Bay *Sea Level Rise Adaptation Strategy Report* (Moffat & Nichol 2018) and the City of Pismo Beach *Sea Level Rise Adaptation Plan* (Moffat & Nichol 2020).

Structures

Public and private property vulnerable to coastal storms, coastal erosion, and sea level rise generally include low-lying coastal structures and those built close to the edge of eroding bluffs. Vulnerable private development primarily includes residential and commercial buildings in cities and unincorporated communities, as well as agricultural buildings in rural areas. Parcels located in close proximity to the coastline include agriculture and residential structures, commercial structures, industrial structures, agriculture and residential parcels, commercial parcels, and industrial parcels. (County of San Luis Obispo 2018; Protsman 2018). A property risk assessment conducted by Protsman (2018) determined that the buildings and parcels with the highest vulnerability are located within the central and northern regions of the coast due to health, safety, and displacement concerns of damaged or destroyed structures and parcels (Protsman 2018). Figure 5-42, below, depicts low-lying commercial and residential development in Morro Bay, which has little protection from coastal flooding and sea level rise, though the strand and dunes across the bay provide some defense against strong offshore swells.

Coastal hazard impacts on coastal property are dependent on several factors including the elevation and composition of the shoreline (i.e., wide sandy beach versus a rocky intertidal beach fronting coastal bluffs). For example, structures built adjacent to eroding bluffs are vulnerable to bluff erosion and coastal storms. Public and private property susceptible coastal storms and projected sea level rise may be protected through shoreline adaptation measures including hard structures such as seawalls or rock revetments or softer approaches such as beach nourishment that slow the landward retreat of the shoreline (USACE 2016). Natural features such as dune fields and coastal cliffs exist over much of the county coastline that are subject to irreversible beach and bluff erosion. However, less than 5 percent of the San Luis Obispo County coastline is estimated to be protected from coastal hazards with hard structures such as revetments or seawalls as of 2016 (USACE 2016).

Figure 5-42 Residential and Commercial Coastal Development in Morro Bay



Low-lying commercial and residential coastal development in Morro Bay has little protection from coastal flooding and sea level rise; however, the strand and dunes across the bay provide some protection from strong offshore swells. Photo Source: San Luis Obispo Tribune 2014.

Sea Level Rise Impact Analysis

A GIS overlay analysis was conducted to assess parcels and critical facilities that may be impacted by future sea level rise. The GIS methodology follows the same approach used for other hazard layers, where critical facility points and developed parcel centroids are intersected with hazard zones to determine exposure levels.

For this analysis, the latest State of California Sea Level Rise Guidance: 2024 Science & Policy Update was used to integrate the best available science. This report, developed by the OPC) in partnership with the California Ocean Science Trust (OST), provides updated sea level rise projections based on the Intergovernmental Panel on Climate Change's Sixth Assessment Report (IPCC AR6) and the 2022 Federal Sea Level Rise Technical Report. The new projections offer refined risk assessments that incorporate localized vertical land motion, updated ice sheet loss modeling, and the combined impacts of sea level rise with coastal storms and groundwater rise.

The analysis evaluates two primary flooding conditions under projected sea level rise:

Maximum Tidal Inundation: Represents areas that will experience regular tidal flooding under future sea level rise conditions.

100-Year Coastal Flood Event: Models the extent of flooding during an extreme storm event (1% annual chance flood) under projected sea level rise, incorporating storm surge and wave impacts.

To align with the 2024 OPC guidance, two representative sea level rise scenarios were selected for analysis, each evaluated under three sea level rise increments (25 cm, 75 cm, and 300 cm):

Scenario 1: Maximum Tidal Inundation: These hazard zones represent the maximum projected extent of areas subject to regular tidal flooding under each sea level rise scenario:

25 cm (≈1.0 ft) increase in sea level rise. Early-stage impacts, affecting low-lying coastal infrastructure.

75 cm (≈2.6 ft) increase in sea level rise. Mid-century flooding projections with significant implications for urban and ecological systems.

300 cm (≈10 ft) increase in sea level rise. High-end risk scenario with widespread inundation of critical infrastructure and natural habitats.

Scenario 2: 100-Year Coastal Flood Event with Sea Level Rise. This analysis incorporates the same sea level rise increments but models their impact under extreme coastal flood conditions (1% annual chance storm event), which exacerbate flooding due to storm surge, wave action, and coastal erosion:

25 cm (≈1.0 ft) increase with 100-year coastal flood event

75 cm (≈2.6 ft) increase with 100-year coastal flood event

300 cm (≈10 ft) increase with 100-year coastal flood event

These scenarios provide a risk-based framework for evaluating long-term infrastructure vulnerabilities, emergency preparedness, and adaptation strategies. The combined effects of sea level rise and extreme coastal events highlight areas that may require proactive adaptation measures, particularly in regions experiencing subsidence, storm-driven erosion, and groundwater rise.

This overlay analysis integrates the best available sea level rise science and modeling to assess future coastal flood risks. Two primary sources were used for this evaluation:

State of California Sea Level Rise Guidance: 2024 Science & Policy Update. A policy guidance document that provides California-specific sea level rise projections based on IPCC AR6 and updated coastal hazard assessments. The projections account for localized vertical land motion, regional oceanographic conditions, and combined coastal hazard risks.

USGS Coastal Storm Modeling System Version 3.1 (CoSMoS 3.1). A detailed modeling system that projects tidal inundation and coastal flood hazards from the Golden Gate Bridge in San Francisco Bay to Point Conception in Santa Barbara County. The model evaluates ten possible future sea level rise scenarios, ranging from 25 cm to 500 cm, incorporating factors such as shoreline evolution, river drainage, wind patterns, and seasonal ocean variability.

The analysis prioritizes worst-case scenarios (maximum uncertainty projections) from both sources to ensure a precautionary approach in identifying infrastructure vulnerabilities. The OPC 2024 guidance replaces the previously used H++ extreme scenario with updated Intermediate-High and High Scenarios, reflecting the latest scientific consensus on ice sheet dynamics and regional sea level trends.

Several methodological improvements were implemented based on the 2024 OPC guidance:

Revised Projections: The H++ extreme scenario used in prior analyses has been replaced with updated Intermediate-High and High Scenarios, reflecting improved ice sheet modeling and risk framing.

Localized Land Motion: Projections now incorporate vertical land motion (VLM), which accounts for regional subsidence or uplift that may accelerate or mitigate local sea level rise.

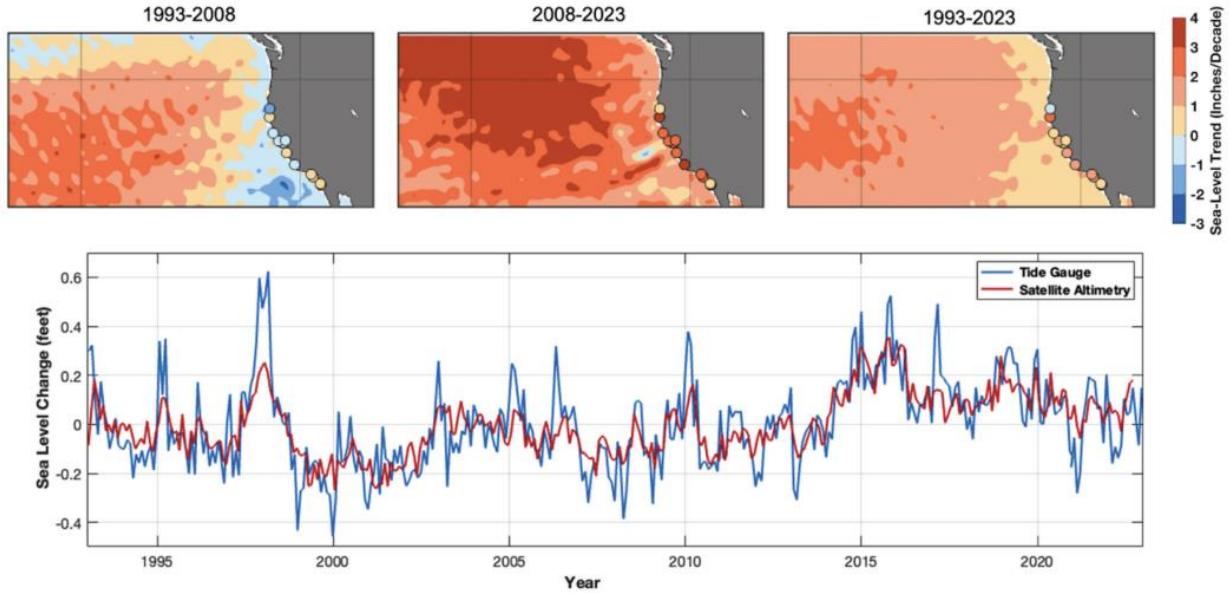
Compound Flooding Considerations**:** The analysis now includes groundwater rise and extreme coastal storm effects, recognizing their role in exacerbating infrastructure vulnerabilities.

These refinements ensure that state, local, and regional adaptation planning aligns with the best available science and regulatory requirements, including California SB 1 (2021) and SB 272 (2023), which mandate local sea level rise planning and prioritization of adaptation funding.

This plan update allows the HMPC to enact the latest science and policy guidance, providing a comprehensive assessment of exposure risks for critical infrastructure, public safety, and environmental resources under future sea level rise conditions.

Figure 5-43, below, shows the rate of sea level rise, in inches per decade, for California estimated from both tide gauges and satellite altimetry over three different time periods: 1993-2008, 2008-2023, and 1993-2023. The bottom graph shows sea level variations in feet averaged along the California coastline from both tide gauges and altimetry

Figure 5-43 Rate and Variations in Feet of Sea Level Rise in California 1992-2023



Source: OPC 2024

An exposure analysis was conducted to assess the number of improved properties, their values, and critical facilities located within six sea level rise scenarios. The results, summarized in the following tables, provide an overview of the most vulnerable areas within the County, including jurisdictional breakdowns and impacts on CSDs. This analysis highlights the increasing extent of inundation as sea levels rise, with properties impacted under lower sea level rise scenarios (25cm and 75cm) also included in the higher-impact 300cm scenario. The results also incorporate sea level rise in combination with a 100-year coastal flood event, further illustrating how extreme coastal flooding exacerbates property exposure.

Table 5-47 outlines the number of structures exposed to sea level rise by jurisdiction, with the greatest impacts occurring in unincorporated areas, which account for most of the exposed properties across all scenarios. At the 300cm scenario without additional flooding, unincorporated areas have 776 structures at risk, which increases to 1,015 when combined with a 100-year flood. Morro Bay and Pismo Beach also experience significant increases in exposure, with Pismo Beach facing 156 structures at risk in the 300cm scenario, rising to 183 with a 100-year flood. Grover Beach has the lowest exposure, with just 15 structures impacted under the worst-case scenario. The overall total for the county at 300cm with a 100-year flood event reaches 1,334 structures, underscoring the substantial increase in vulnerability as conditions worsen.

The property type analysis, as detailed in Table 5-58, indicates that residential structures make up the majority of at-risk properties. At the 300cm level, 703 residential structures are vulnerable, increasing to 990 with a 100-year flood. Commercial properties are the second most impacted category, with 103 structures affected at 300cm, rising to 122 under combined flood conditions. Multi-family residential and mixed-use properties also see significant exposure, with 56 and 78 structures at risk at 300cm, respectively. Within CSDs, Table 5-48 shows similar trends, with residential properties experiencing the highest exposure, totaling 483 at 300cm and increasing to 631 when including a 100-year flood event.

Table 5-47 San Luis Obispo County Structures Exposed to Sea Level Rise Scenario Hazards by Jurisdiction Summary

JURISDICTION	STRUCTURE TOTAL – SLR @ 25CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 75CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 300CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 25CM (WITH 100-YR FLOOD)	STRUCTURE TOTAL – SLR @ 75CM (WITH 100-YR FLOOD)	STRUCTURE TOTAL – SLR @ 300CM (WITH 100-YR FLOOD)
Grover Beach	-	-	15	-	-	38
Morro Bay	-	1	32	2	4	98
Pismo Beach	1	4	156	6	22	183
Unincorporated	27	61	776	93	216	1,015
Total	**28**	**66**	**979**	**101**	**242**	**1,334**

Source: San Luis Obispo County Assessor Data November 15, 2024, USGS CoSMoS v3.1, WSP GIS Analysis

Table 5-48 San Luis Obispo County Structures Exposed to Sea Level Rise Scenario Hazards by Community Service District Summary

COMMUNITY SERVICE DISTRICT	STRUCTURE TOTAL – SLR @ 25CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 75CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 300CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 25CM (WITH 100-YR FLOOD)	STRUCTURE TOTAL – SLR @ 75CM (WITH 100-YR FLOOD)	STRUCTURE TOTAL – SLR @ 300CM (WITH 100-YR FLOOD)
Avila Beach	-	-	85	-	58	102
Cambria	1	1	12	1	1	41
Los Osos	6	30	253	54	101	332
Oceano	-	-	265	-	-	296
San Simeon	-	-	1	2	2	25
Total	**7**	**31**	**616**	**57**	**162**	**796**

Source: San Luis Obispo County Assessor Data November 15, 2024, USGS CoSMoS v3.1, WSP GIS Analysis

Table 5-49 and Table 5-50 provide a breakdown of improved property counts exposed to sea level rise by property type, distinguishing between countywide exposure and exposure within CSDs. Across all scenarios, residential properties account for the largest share of exposure, with 703 structures impacted at 300cm without flooding, increasing to 990 when combined with a 100-year flood. Commercial properties also see significant impacts, with 103 structures exposed at 300cm, rising to 122 under flood conditions. Multi-family and mixed-use properties follow, with 56 and 78 structures at risk at 300cm, respectively.

Within CSDs, Table 5-50 shows that residential properties again have high exposure, with 483 structures at risk under the 300cm scenario, increasing to 631 with additional flooding. Commercial properties also face notable exposure, with 42 structures at 300cm, growing to 52 with a 100-year flood. Among CSDs, Los Osos and Oceano have the highest concentration of impacted properties, reinforcing their status as some of the most vulnerable areas in the county. These findings emphasize that housing and commercial centers are disproportionately

affected by rising sea levels and coastal flooding, highlighting the need for strategic adaptation and mitigation measures.

Table 5-49 San Luis Obispo County Structures Exposed to Sea Level Rise Scenario Hazards by Property Types for Jurisdictions Summary

PROPERTY TYPE	STRUCTURE TOTAL – SLR @ 25CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 75CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 300CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 25CM (WITH 100-YR FLOOD)	STRUCTURE TOTAL – SLR @ 75CM (WITH 100-YR FLOOD)	STRUCTURE TOTAL – SLR @ 300CM (WITH 100-YR FLOOD)
Agricultural	-	-	3	2	2	3
Commercial	1	7	103	12	30	122
Exempt	2	2	12	4	5	15
Industrial	-	-	10	-	-	15
Mixed Use	-	-	78	4	24	94
Mobile/Manufactured Homes	-	-	6	-	2	7
Multi-Family Residential	-	-	56	-	3	76
Residential	25	57	703	80	172	990
Vacant Improved	-	-	8	1	4	12
Total	**28**	**66**	**979**	**103**	**242**	**1,334**

Source: San Luis Obispo County Assessor Data November 15, 2024, USGS CoSMoS v3.1, WSP GIS Analysis

Table 5-50 San Luis Obispo County Structures Exposed to Sea Level Rise Scenario Hazards by Property Type for CSDs Summary

PROPERTY TYPE	STRUCTURE TOTAL – SLR @ 25CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 75CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 300CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 25CM (WITH 100-YR FLOOD)	STRUCTURE TOTAL – SLR @ 75CM (WITH 100-YR FLOOD)	STRUCTURE TOTAL – SLR @ 300CM (WITH 100-YR FLOOD)
Agricultural	-	-	1	-	-	1
Commercial	1	4	42	6	18	52
Exempt	2	2	8	4	5	9
Industrial	-	-	5	-	-	7
Mixed Use	-	-	50	1	19	58
Mobile/Manufactured Homes	-	-	2	-	-	2
Multi-Family Residential	-	-	20	-	-	29
Residential	4	25	483	45	116	631
Vacant Improved	-	-	5	1	4	7
Total	**7**	**31**	**616**	**57**	**162**	**796**

Source: San Luis Obispo County Assessor Data November 15, 2024, USGS CoSMoS v3.1, WSP GIS Analysis

Next, the financial impact of sea level rise is substantial, with Table 5-51 showing that jurisdictions collectively have $593,399,405 in improved property value at risk under the worst-case scenario. Unincorporated areas account for the highest exposure, with $264,289,238 in at-risk value at 300cm, increasing to $350,050,000 with a 100-year flood. Pismo Beach is the most affected municipality, with an estimated $150,484,417 in exposed property value at 300cm, increasing to $159,159,374 under flood conditions. Morro Bay and Grover Beach face lower total losses, but their vulnerability increases significantly under extreme flooding.

Table 5-52 focuses on CSDs, where Los Osos, Oceano, and Avila Beach again show the highest financial exposure. Los Osos has the most property value at risk, with $70,839,234 at 300cm, increasing to $89,611,293 under flood conditions. Oceano follows with $54,442,751 in the 300cm scenario and $64,932,693 when combined with a 100-year flood. Avila Beach faces similar impacts, with $71,453,912 at 300cm and $80,773,938 when accounting for flooding. Collectively, CSDs have $264,661,081 in exposed property value, reinforcing the need for mitigation efforts in these areas.

Table 5-51 San Luis Obispo County Improved Property Values Exposed to Sea Level Rise Scenario Hazards by Jurisdiction Summary

JURISDICTION	IMPROVED VALUE SUM – SLR @ 25CM (NO FLOOD)	IMPROVED VALUE SUM – SLR @ 75CM (NO FLOOD)	IMPROVED VALUE SUM – SLR @ 300CM (NO FLOOD)	IMPROVED VALUE SUM – SLR @ 25CM (WITH 100-YR FLOOD)	IMPROVED VALUE SUM – SLR @ 75CM (WITH 100-YR FLOOD)	IMPROVED VALUE SUM – SLR @ 300CM (WITH 100-YR FLOOD)
Grover Beach	$0	$0	$6,771,984	$0	$0	$13,396,246
Morro Bay	$0	$431,766	$29,227,106	$733,471	$9,800,801	$70,793,785
Pismo Beach	$194,149	$3,245,361	$150,484,417	$4,306,568	$32,141,727	$159,159,374
Unincorporated	$12,466,066	$25,048,519	$264,289,238	$35,180,912	$92,627,108	$350,050,000
Total	**$12,660,215**	**$28,725,646**	**$450,772,745**	**$40,220,951**	**$134,569,636**	**$593,399,405**

Source: San Luis Obispo County Assessor Data November 15, 2024, USGS CoSMoS v3.1, WSP GIS Analysis

Table 5-52 San Luis Obispo County Improved Property Values Exposed to Sea Level Rise Scenario Hazards by Community Service District Summary

COMMUNITY SERVICE DISTRICT	IMPROVED VALUE SUM – SLR @ 25CM (NO FLOOD)	IMPROVED VALUE SUM – SLR @ 75CM (NO FLOOD)	IMPROVED VALUE SUM – SLR @ 300CM (NO FLOOD)	IMPROVED VALUE SUM – SLR @ 25CM (WITH 100-YR FLOOD)	IMPROVED VALUE SUM – SLR @ 75CM (WITH 100-YR FLOOD)	IMPROVED VALUE SUM – SLR @ 300CM (WITH 100-YR FLOOD)
Avila Beach	-	-	$71,453,912	-	$35,640,665	$80,773,938
Cambria	-	-	$4,592,333	-	-	$21,910,963
Los Osos	$1,919,282	$10,123,353	$70,839,234	$18,320,922	$30,320,035	$89,611,293
Oceano	-	-	$54,442,751	-	-	$64,932,693
San Simeon	-	-	$0	-	-	$7,432,194
Total	**$1,919,282**	**$10,123,353**	**$201,328,230**	**$18,320,922**	**$65,960,700**	**$264,661,081**

Source: San Luis Obispo County Assessor Data November 15, 2024, USGS CoSMoS v3.1, WSP GIS Analysis

Finally, Table 5-53 and Table 5-54 break down exposure by property type, showing that residential structures represent the largest financial losses. At 300cm, residential properties account for $193,792,314 in improved value, increasing to $300,472,931 with flooding. Commercial properties are also significantly affected, with losses arising from $148,930,916 at 300cm to $160,730,304 with a 100-year flood. Within CSDs, residential structures again dominate, with $125,454,098 at risk at 300cm, increasing to $174,973,366 with flooding. Commercial properties in CSDs account for $40,769,416 at 300cm, rising to $45,238,268 under combined conditions.

Table 5-53 San Luis Obispo County Improved Property Values Exposed to Sea Level Rise Scenario Hazards by Property Type for Jurisdictions Summary

PROPERTY TYPE	IMPROVED VALUE SUM – SLR @ 25CM (NO FLOOD)	IMPROVED VALUE SUM – SLR @ 75CM (NO FLOOD)	IMPROVED VALUE SUM – SLR @ 300CM (NO FLOOD)	IMPROVED VALUE SUM – SLR @ 25CM (WITH 100-YR FLOOD)	IMPROVED VALUE SUM – SLR @ 75CM (WITH 100-YR FLOOD)	IMPROVED VALUE SUM – SLR @ 300CM (WITH 100-YR FLOOD)
Agricultural	-	-	$225,968	$41,127	$41,127	$225,968
Commercial	$109,242	$7,553,131	$148,930,916	$10,657,107	$31,715,634	$160,730,304
Exempt	$3,444	$3,444	$72,374	$3,444	$72,374	$7,021,638
Industrial	-	-	$11,167,704	-	-	$12,274,097
Mixed Use	-	-	$32,777,348	$1,291,727	$13,143,687	$38,813,829
Mobile Manufactured Homes	-	-	$24,588,435	-	$23,098,527	$24,929,047
Multi-Family Residential	-	-	$28,422,723	-	$3,544,710	$37,329,181
Residential	$12,547,529	$21,169,071	$193,792,314	$28,215,942	$59,549,301	$300,472,931
Vacant Improved	-	-	$10,794,963	$11,604	$3,404,276	$11,602,410
Total	**$12,660,215**	**$28,725,646**	**$450,772,745**	**$40,220,951**	**$134,569,636**	**$593,399,405**

Source: San Luis Obispo County Assessor Data November 15, 2024, USGS CoSMoS v3.1, WSP GIS Analysis

Table 5-54 San Luis Obispo County Improved Property Values Exposed to Sea Level Rise Scenario Hazards by Property Type for Community Service Districts Summary

PROPERTY TYPE	IMPROVED VALUE SUM – SLR @ 25CM (NO FLOOD)	IMPROVED VALUE SUM – SLR @ 75CM (NO FLOOD)	IMPROVED VALUE SUM – SLR @ 300CM (NO FLOOD)	IMPROVED VALUE SUM – SLR @ 25CM (WITH 100-YR FLOOD)	IMPROVED VALUE SUM – SLR @ 75CM (WITH 100-YR FLOOD)	IMPROVED VALUE SUM – SLR @ 300CM (WITH 100-YR FLOOD)
Agricultural	-	-	$184,841	-	-	$184,841
Commercial	$109,242	$2,655,266	$40,769,416	$4,434,554	$14,735,095	$45,238,268
Exempt	$3,444	$3,444	$72,374	$3,444	$72,374	$72,374
Industrial	-	-	$1,783,655	-	-	$2,363,655
Mixed Use	-	-	$18,880,409	$637,500	$12,326,486	$22,073,368
Mobile Manufactured Homes	-	-	$388,698	-	-	$388,698
Multi-Family Residential	-	-	$8,362,307	-	-	$13,177,454
Residential	$1,806,596	$7,464,643	$125,454,098	$13,233,820	$35,422,469	$174,973,366
Vacant Improved	-	-	$5,432,432	$11,604	$3,404,276	$6,189,057
Total	**$1,919,282**	**$10,123,353**	**$201,328,230**	**$18,320,922**	**$65,960,700**	**$264,661,081**

Source: San Luis Obispo County Assessor Data November 15, 2024, USGS CoSMoS v3.1, WSP GIS Analysis

The results of this analysis highlight the increasing vulnerability of the County to sea level rise and coastal flooding. Unincorporated areas, along with Los Osos, Oceano, and Avila Beach, face the most significant risks in terms of structure count and financial exposure. The findings emphasize the need for strategic planning and proactive mitigation efforts, particularly in highly affected jurisdictions and CSDs. With projected losses exceeding $850 million across all scenarios, incorporating sea level rise projections into land use planning, zoning regulations,

and infrastructure investments is essential to minimizing future economic impacts and protecting at-risk properties.

Since the previous plan update, exposure in the 300cm sea level rise scenario with the 100-year flood has increased significantly. More properties and residents are now at risk, highlighting a growing vulnerability to extreme coastal flooding. This trend underscores the escalating impacts of sea level rise and reinforces the need for proactive mitigation and adaptation efforts.

People

The analysis of population exposure to sea level rise is presented in Table 5-55 and Table 5-56, which show the number of individuals at risk within jurisdictions and CSDs. The total number of people exposed across all jurisdictions is 2,550, with the highest concentration in unincorporated areas. Table 5-54 further refines this exposure, showing that within CSDs, Los Osos and Oceano have the most significant populations at risk, with 748 and 588 people exposed under the worst-case scenario, respectively.

Unincorporated areas account for the greatest exposure overall, with 2,040 people at risk in the 300cm with 100-year flood scenario. Among incorporated jurisdictions, Pismo Beach and Morro Bay are the most affected, with 294 and 161 residents exposed, respectively. Grover Beach remains the least impacted in all scenarios, with only 54 residents exposed in the worst case.

Within CSDs, Los Osos and Oceano face the most significant population exposure, reinforcing their status as some of the most vulnerable areas in the county. Los Osos sees 568 residents at risk at 300cm, increasing to 748 under flood conditions, while Oceano has 534 at 300cm, rising to 588 with additional flooding. Other CSDs, including Avila Beach, Cambria, and San Simeon, have fewer residents exposed, but remain vulnerable to localized risks associated with coastal hazards.

These findings highlight the importance of targeted adaptation strategies in unincorporated coastal areas, particularly within Los Osos, Oceano, and Pismo Beach. Vulnerable populations, including lower-income households and individuals with mobility or health-related challenges, may require additional planning efforts to enhance resilience, reduce exposure, and protect against long-term coastal impacts.

Table 5-55 San Luis Obispo County Population Exposed to Sea Level Rise Scenario Hazards by Jurisdiction Summary

JURISDICTION	POPULATION – SLR @ 25CM (NO FLOOD)	POPULATION – SLR @ 75CM (NO FLOOD)	POPULATION – SLR @ 300CM (NO FLOOD)	POPULATION – SLR @ 25CM (WITH 100-YR FLOOD)	POPULATION – SLR @ 75CM (WITH 100-YR FLOOD)	POPULATION – SLR @ 300CM (WITH 100-YR FLOOD)
Grover Beach	-	-	12	-	-	54
Morro Bay	-	-	22	2	2	161
Pismo Beach	2	6	254	6	29	294
Unincorporated	59	133	1,531	188	398	2,040
Total	**61**	**139**	**1,819**	**196**	**429**	**2,550**

Source: San Luis Obispo County Assessor Data November 15, 2024, USGS CoSMoS v3.1, WSP GIS Analysis

Table 5-56 San Luis Obispo County Population Exposed to Sea Level Rise Scenario Hazards by Community Service District Summary

COMMUNITY SERVICE DISTRICT	POPULATION – SLR @ 25CM (NO FLOOD)	POPULATION – SLR @ 75CM (NO FLOOD)	POPULATION – SLR @ 300CM (NO FLOOD)	POPULATION – SLR @ 25CM (WITH 100-YR FLOOD)	POPULATION – SLR @ 75CM (WITH 100-YR FLOOD)	POPULATION – SLR @ 300CM (WITH 100-YR FLOOD)
Avila Beach	-	-	119	-	67	146
Cambria	-	-	27	-	-	99
Los Osos	10	62	568	111	220	748
Oceano	-	-	534	-	-	588
San Simeon	-	-	-	-	-	54
Total	10	62	1,247	111	287	1,635

Source: San Luis Obispo County Assessor Data November 15, 2024, USGS CoSMoS v3.1, WSP GIS Analysis

Some populations are more vulnerable to coastal erosion, coastal flooding, and sea level rise impacts due to having certain sensitivities, an increased likelihood of exposure, or a lower adaptive capacity (Public Health Institute Center for Climate Change and Health 2024). Demographic characteristics including health conditions that affect physical ability and health, or socioeconomic factors that amplify risk factors for poor health conditions, may affect the abilities of individuals or households to prepare for, respond to, and recover from coastal hazards (EPA 2017). Specific attributes may create additional stresses on individuals and communities resulting in reduced resiliency in the event of a coastal hazard event. Many of these factors may also be exacerbated by the specific, localized nature of flooding, erosion, and other impacts associated with sea level rise.

Social Vulnerability

Coastal areas with a high social vulnerability index inform which communities are more susceptible to adverse impacts of coastal storms, flooding, and sea level rise.

A San Luis Obispo California Polytechnic State University graduate study titled *A Geospatial Assessment of Social Vulnerability to Sea-Level Rise in Coastal San Luis Obispo County* was also referenced as another source for a preliminary assessment of social vulnerability exposure (Carpentier 2017). This study focused on the unincorporated areas only, and suggests higher social vulnerability in San Simeon, Cambria, and Avila Beach.

Changes in development patterns and land use since the previous plan update indicate a growing exposure to sea level rise and extreme flooding. Coastal areas continue to see shifts in population density and infrastructure investment, contributing to increased risk in vulnerable locations. While specific impacts vary across jurisdictions, the overall trend points to heightened susceptibility, reinforcing the need for adaptive planning and mitigation strategies to address evolving coastal hazards..

Critical Facilities and Lifelines

Critical facilities that are vulnerable to coastal hazards and sea level rise may include public transportation, wastewater treatment and water supply infrastructure, schools, law enforcement facilities, and community centers. Essential education facilities such as the Morro Bay High School and Coast Union High School may be subject to coastal storms and flooding exacerbated by future sea level rise. Coastal erosion also threatens the structural foundation of schools built close to the shoreline such as Shell Beach Elementary School. Law Enforcement Facilities that are in close proximity to the shoreline such as in Pismo Beach and Oceano are

also vulnerable to coastal storms and flooding. Additional vulnerable facilities include the Cambria wastewater treatment plant and municipal wells in Santa Rosa and San Simeon Creeks, the Children's Center and the Avila Beach Community Center, each of which is located within a low-lying area subject to potential inundation during a coastal storm.

Regional and local-serving public and utility infrastructure vulnerable to coastal hazards and sea level rise include roads, bridges, railroad lines and crossings, wastewater treatment plants, culverts, water lines, communication line and towers, stormwater outlets, bike lanes, bike facilities, airports, and fiber optic lines. Utility infrastructure containing hazardous materials that are vulnerable to coastal hazards and sea level rise include hazardous material facilities, the Diablo Canyon Nuclear Power Plant, underground tanks, and Regional Water Quality Control Board clean-up sites (Protsman 2018). Facilities that are impacted by coastal hazards could also result in a release of hazardous materials or deteriorating water or air quality, as well as disruption to key public and utility services to the wider community. Such vulnerable facilities include: The Diablo Canyon Power Plant, San Simeon Wastewater Treatment Plant, San Simeon Wastewater Treatment Plant, Cayucos Sanitary District, Cambria Community Services District Municipal Water Wells, Cambria Community Services District Wastewater Treatment Plant, Oceano Wastewater Treatment Plant, City of Morro Bay Wastewater Treatment Plant, and the Oceano County Airport

Low-lying transportation infrastructure is vulnerable to the impacts of coastal hazards, including roads in Cayucos, Avila Beach, portions of the Southern Pacific Railroad, and sections of Highway 1 and Highway 101 (Caltrans 2018a). Highway 1 was found to be potentially vulnerable to inundation, flooding, and bluff erosion hazards as a result of sea level rise (Figure 5-44), as existing shore protection is either absent or easily overwhelmed by overtopping waves (Moffat & Nichol 2018). Approximately 2.8 miles of Highway 1 at Piedras Blancas north of San Simeon was recently relocated inland due to past and future threatened damage from coastal bluff erosion.

Figure 5-44 Low-lying Portions of Highway 1 in San Luis Obispo County



Currently, low-lying sections of Highway 1 in San Luis Obispo County are vulnerable to coastal hazards such as erosion and inundation from coastal storms and sea level rise; a segment. Source: (Caltrans 2018b)

Wastewater treatment plants for coastal communities located in low-lying areas along coastal streams may be vulnerable to coastal hazards and projected sea level rise. For example, while the Cambria CSD and Oceano wastewater treatment plants are both located more than 1,500 feet from the shoreline, their location in low-lying coastal stream valleys may make them vulnerable to the combination of fluvial flooding and tidal inundation associated with projected sea level rise. In addition, coastal community municipal wells, such as CCSD wells along San Simeon and Santa Rosa Creeks are located near the coast and may be vulnerable to sea level rise-related inundation or possible future salt water intrusion. Hazardous materials facilities such as underground gas tanks and known hazardous cleanup sites equate to higher potential losses because damage to such structures may implicate leaked chemicals that pose impacts to health and safety (Protsman 2018).

Sea Level Rise Analysis on Critical Facilities

Below, Table 5-57 summarizes critical facilities based on sea level rise inundation type and jurisdiction, while Table 5-58 includes a breakdown of critical facilities and CSDs. The analysis of critical facility exposure to sea level rise highlights significant increases in vulnerability when comparing scenarios of SLR with no flood event against SLR combined with a 100-year flood event. Impacts are observed across both incorporated jurisdictions (Morro Bay, Pismo Beach, Grover Beach, and Unincorporated Areas) and CSDs such as Avila Beach, Cambria, Oceano, and San Simeon. As sea levels rise, exposure increases progressively, with the combined effects of SLR and flooding amplifying risks to critical facilities, particularly within the transportation and safety and security lifelines.

Jurisdictions (Morro Bay, Pismo Beach, Grover Beach, and Unincorporated Areas)

At 25cm seal level rise with no flood event, exposure is limited to 15 critical facilities, with unincorporated areas experiencing the greatest impact, where 11 facilities are exposed, including 9 transportation facilities and 2 safety and security facilities. Morro Bay and Pismo Beach each face exposure to 2 transportation facilities, while Grover Beach is unaffected at this level. However, when combined with a 100-year flood event, exposure rises to 25 facilities, with significant increases in transportation vulnerabilities in unincorporated areas, where the number of exposed transportation facilities grows from 9 to 17, accompanied by the first instances of exposure to water system facilities.

Under the 75cm sea level rise scenario, exposure patterns are similar, with 15 facilities impacted under no flood conditions, again dominated by unincorporated areas, which face exposure to 10 transportation facilities and 2 safety and security facilities. Morro Bay experiences exposure to 1 transportation facility, while Pismo Beach maintains exposure to 2 transportation facilities. However, when combined with a 100-year flood event, exposure increases to 29 facilities, driven by further expansion of transportation risks in unincorporated areas, where the number of exposed transportation facilities increases from 10 to 18, along with additional exposure to safety and security facilities, which increases from 2 to 5 facilities.

The most significant impacts are observed at 300cm scenario, where no flood conditions result in exposure to 52 facilities, representing a sharp increase from lower scenarios. Unincorporated areas continue to bear the greatest burden, with 36 facilities exposed, including 24 transportation facilities, 7 safety and security facilities, and 3 communication facilities. Morro Bay faces exposure to 12 facilities, with 7 transportation facilities, 2 energy facilities, and 1 food, hydration, and shelter facility impacted. Pismo Beach experiences exposure to 3 transportation facilities, while Grover Beach, which was previously unaffected at lower seal level rise levels, becomes vulnerable, with 1 transportation facility exposed. When 300cm sea level rise is combined with a 100-year flood event, exposure increases to 58 facilities, driven primarily by increased transportation vulnerability in unincorporated areas, where exposure rises from 24 to 26 transportation facilities, alongside increases in safety and security and water system exposures.

CSDs (Avila Beach, Cambria, Oceano, and San Simeon)

CSDs show more limited exposure under lower sea level rise scenarios but experience sharp increases under the 300cm scenario, especially when combined with a 100-year flood event. At 25cm and 75cm sea level rise with no flood event, only Cambria is impacted, with exposure limited to 4 transportation facilities, while Avila Beach, Oceano, and San Simeon remain unaffected. However, when combined with a 100-year flood event, Avila Beach and San Simeon experience their first exposures, with Avila Beach facing impacts to 1 safety and security facility and San Simeon to 1 water system facility.

At 300cm sea level rise with no flood event, total exposure within CSDs rises sharply to 16 facilities, driven primarily by impacts in Oceano, which faces exposure to 8 facilities, including 4 transportation facilities, 2 communication facilities, 1 hazardous material facility, and 1 water system facility. Cambria's exposure increases to 5 facilities, continuing to experience risks to 4 transportation facilities alongside one additional facility in another lifeline category. Avila Beach, which was unaffected at lower sea level rise levels, experiences new risks, with 2 facilities exposed, including 1 communication facility and 1 safety and security facility, while San Simeon faces exposure to 1 water system facility. When combined with a 100-year flood event, exposure across CSDs increases to 22 facilities, with the most significant increases observed in Oceano and Cambria, where vulnerabilities to transportation and safety and security facilities expand further.

The comparison between sea level rise-only scenarios and sea level rise combined with 100-year flood events highlights the substantial increase of risk when coastal flooding coincides with sea level rise. Across all scenarios, unincorporated areas emerge as the most vulnerable,

consistently experiencing the highest exposure, primarily within the transportation and safety and security lifelines. Morro Bay and Pismo Beach show steady increases in exposure with rising sea levels, with notable impacts on transportation and energy facilities. Among CSDs, Oceano becomes the most vulnerable under 300cm sea level rise, facing significant risks to multiple lifeline categories, including transportation, communications, and hazardous materials. Cambria, which experiences exposure earlier at lower sea level rise levels, continues to see increased risks under higher sea level rise levels. Avila Beach and San Simeon, while unaffected in lower scenarios, become increasingly vulnerable under 300cm sea level rise, especially when compounded by flood events.

Table 5-57 Critical Facilities in Sea Level Rise Areas Exposure by Facility Category and Jurisdiction

FACILITY LOCATION	FACILITY CATEGORY/FEMA LIFELINE	FACILITIES – SLR OF 25CM	TOTAL FACILITIES – SLR OF 75CM	TOTAL FACILITIES – SLR OF 300CM	TOTAL FACILITIES – SLR OF 25CM + 100-YEAR FLOOD	TOTAL FACILITIES – SLR OF 75CM + 100-YEAR FLOOD	TOTAL FACILITIES – SLR OF 300CM + 100-YEAR FLOOD
Morro Bay	Transportation	2	1	7	2	2	8
	Energy	--	--	2	--	--	2
	Food, Hydration, Shelter	--	--	1	--	--	1
	Safety and Security	--	--	1	--	--	1
	Water Systems	--	--	1	--	--	1
TOTAL		2	1	12	2	2	13
Pismo Beach	Transportation	2	2	3	2	2	5
TOTAL		2	2	3	2	2	5
Grover Beach	Transportation	--	--	1	--	--	1
TOTAL		0	0	1	0	0	1
Unincorporated	Communications	--	--	3	--	1	3
	Hazardous Material	--	--	1	--	--	1
	Safety and Security	2	2	7	3	5	7
	Transportation	9	10	24	17	18	26
	Water Systems	--	--	1	1	1	2
TOTAL		11	12	36	21	25	39
GRAND TOTAL		**15**	**15**	**52**	**25**	**29**	**58**

Source: Source: San Luis Obispo County, USGS CoSMoS v3.1, CalARP, HIFLD, NBI, NID, WSP Analysis

Table 5-58 Critical Facilities in Sea Level Rise Areas Exposure by Facility Category and Community Service District

FACILITY LOCATION	FACILITY CATEGORY/ FEMA LIFELINE	FACILITIES – SLR OF 25CM	TOTAL FACILITIES – SLR OF 75CM	TOTAL FACILITIES – SLR OF 300CM	TOTAL FACILITIES – SLR OF 25CM + 100-YEAR FLOOD	TOTAL FACILITIES – SLR OF 75CM + 100-YEAR FLOOD	TOTAL FACILITIES – SLR OF 300CM + 100-YEAR FLOOD
Avila Beach	Communication	--	--	1	--	1	1

FACILITY LOCATION	FACILITY CATEGORY/ FEMA LIFELINE	FACILITIES – SLR OF 25CM	TOTAL FACILITIES – SLR OF 75CM	TOTAL FACILITIES – SLR OF 300CM	TOTAL FACILITIES – SLR OF 25CM + 100-YEAR FLOOD	TOTAL FACILITIES – SLR OF 75CM + 100-YEAR FLOOD	TOTAL FACILITIES – SLR OF 300CM + 100-YEAR FLOOD
	Safety and Security	--	--	1	--	1	1
TOTAL		0	0	2	0	2	2
Cambria	Transportation	4	4	4	4	4	5
TOTAL		4	4	4	4	4	5
Oceano	Communications	--	--	2	--	1	2
	Hazardous Material	--	--	1	--	--	1
	Transportation	--	--	4	--	--	4
	Water Systems	--	--	1	--	--	1
TOTAL		0	0	8	0	0	8
San Simeon	Water System	--	--	--	1	1	1
TOTAL		0	0	0	1	1	1
GRAND TOTAL		4	4	14	5	7	16

Source: San Luis Obispo County, USGS CoSMoS v3.1, CalARP, HIFLD, NBI, NID, WSP Analysis

Economy and Community Values

The major economic industries in San Luis Obispo County by employment include tourism, retail, service industries, government, and agriculture (Moser, Ekstrom 2012). Developed areas of the San Luis Obispo coast that are important to tourism include Cambria/Moonstone Beach, Cayucos, Morro Bay, Port San Luis/Avila Beach, and Pismo Beach (USACE 2016). Although the most popular beaches are located in the southern part of the county, beach tourism is important throughout the county (USACE 2016). However, projected climate change and sea level rise could cause an overall reduction of economic value in beach visitation. Some beaches may potentially lose attendance and associated earnings due to loss of beach resulting from beach erosion, while others may experience increased attendance and beach-related earnings as beaches elsewhere become less usable for recreation (Moser and Ekstrom 2012). Vertical and lateral beach access points may also be affected by coastal erosion and inundation due to sea level rise, which would prevent residents and visitors from accessing the beach and may increase the risk of injuries (Protsman 2018).

Beach tourism is important to the county economy and generates significant revenue as many visitors rent hotels or other accommodations, dine out or shop at area stores. Visitor-serving areas such as those in Oceano, Cambria, and Avila Beach include local businesses and hotels that benefit the local economy (Protsman 2018). These businesses depend on tourism, and cities and communities within San Luis Obispo benefit from sales tax revenues. Disruption of these areas due to impacts of coastal hazards and projected sea level rise could decrease economic activity and affect the local economy.

Future coastal beach and bluff erosion in the county may also negatively impact coastal businesses and households and decrease coastal real estate opportunities. Coastal bluff failure due to coastal erosion can create hazardous conditions due to roadway collapse, undermined

home foundations and damage to utilities (Russell & Griggs 2012). Natural resources with recreational and economic value may also be adversely affected. The county supports some of the largest dune habitats in the State including Morro Bay State Park, Oceano Dunes Natural Preserve, and the Guadalupe-Nipomo Dunes, which are vulnerable to damages from coastal storms and erosion. As this vulnerability increases over time, damages may impact the economy of the area and impact viable coastal land uses. Coastal storms can also cause erosion impacts and severe flooding and inundation of economically important infrastructure such as harbors and buildings related to commercial and recreational fisheries (Moser and Ekstrom 2012).

Historic, Cultural, and Natural Resources

Historic resources along the coast include designated historic sites and points, county-designated Sensitive Resource Areas and Archeological Resource Areas, county and State Parks, and other important habitat resource areas (Protsman 2018). Historic resources close to the coastline include museums such as the Morro Bay Maritime Museum, Museum of Natural History, and the Oceano Depot Museum. Historic resources also include coastal features such as recreational piers in Cayucos, Pismo, Avila and the Point San Luis Lighthouse, and the restored historic warehouse at the foot of Harford Pier in Port San Luis Harbor (Port San Luis Harbor District 2007). Cayucos Pier is considered a historic property in the VE coastal 100-year flood zone.

One of the most visually prominent historic natural landmarks immediately vulnerable to coastal hazards and sea level rise is Morro Rock. Morro Rock stands approximately 576 feet tall and was created from a volcanic plug. The area is a significant cultural and religious monument, as it was once the site of Chumash sacred rituals (City of Morro Bay 2018). Morro Rock is a protected State Historic Landmark (#821) that also provides nesting habitat for peregrine falcons, a previously endangered and currently fully protected species (Department of Fish and Wildlife 2019).

Figure 5-45 Morro Bay and Morro Rock



Morro Rock is a historical, cultural, and natural landmark at the mouth of Morro Bay that also provides nesting habitat for Peregrine Falcons. Photo Source: Morrobay.org 2019

The County's coastline includes a variety of natural habitats including sandy beaches, subtidal soft-bottom, rocky tide pools, offshore reefs, bays, estuaries, and harbors (USACE 2016). These include several managed areas and protected habitats, including the State Marine Conservation Areas (SMCA), State Marine Reserves (SMR), State Marine Recreational Management Area (SMRMA), state parks and beaches, and state game refuges. These areas support ecologically significant habitats where endangered or threatened species occur, including designated critical habitat and nesting and foraging sites for shorebirds. State parks and beaches within the San Luis Obispo County coastline include Cayucos State Beach, Estero Bluffs State Park, Los Osos Oaks State Reserve, Montaña de Oro State Park, Morro Bay State Park, Morro Strand State Beach, Harmony Headlands State Park, Hearst San Simeon State Park, and the W.R. Hearst Memorial State Beach (Department of Parks and Recreation 2019).

Figure 5-46 Estero Bluffs State Park, Cayucos



The Estero Bluffs State Park has a variety of natural resources including intertidal areas, native grasslands, wetlands, low bluffs, and coastal terraces with hiking trails and 3 miles of beach, which is vulnerable to coastal hazards (Department of Parks and Recreation 2019).

The combined influence of sea level rise and coastal hazards may result in a migration of habitat inland and to higher elevations, or a transition to a different habitat type. With this consideration, there may be development or other impediments to inland migration that may result in the net loss of habitat. For example, accelerated erosion of the Oceano Dunes may cause this habitat may migrate inland. If a freshwater wetland is exposed to rising tides, it will transition to a saline estuarine wetland. The faster the climate changes, the more difficult it will be for animal species to migrate and for floral habitats to re-establish elsewhere. Nevertheless, some of the more resilient species may adapt in place.

Table 5-59 shows the historical sites exposed to sea level rise under both the "no flood" and 1% (100-year) annual chance flood scenarios. This GIS analysis of historical sites in the County reveals varying levels of exposure to sea level rise, both with and without additional flooding. Under flood conditions, the number of affected sites increases across all sea level rise scenarios. At 25 cm of sea level rise, three historical sites in unincorporated areas are exposed, increasing to four sites at 75 cm and remaining at four sites at 300 cm. In contrast, without flood influence, the number of exposed sites is lower at smaller increments, with two sites impacted at both 25 cm and 75 cm of sea level rise. However, at 300 cm, the exposure remains at four sites, matching the flood scenario. These findings highlight the vulnerability of historical

resources to rising sea levels, emphasizing the increased risk when flood conditions are factored in.

Table 5-59 Historical Sites Exposed to Sea Level Rise

FACILITY LOCATION	HISTORICAL SITES EXPOSED– SLR OF 25CM	HISTORICAL SITES EXPOSED – SLR OF 75CM	HISTORICAL SITES EXPOSED – SLR OF 300CM	HISTORICAL SITES EXPOSED – SLR OF 25CM + 100-YEAR FLOOD	HISTORICAL SITES EXPOSED – SLR OF 75CM + 100-YEAR FLOOD	HISTORICAL SITES EXPOSED – SLR OF 300CM + 100-YEAR FLOOD
Unincorporated	2	2	4	3	4	4
Total	2	2	4	3	4	4

Source: San Luis Obispo County, USGS CoSMoS v3.1, WSP Analysis

Development Trends

Land use and development along the county's shoreline is governed by the California Coastal Act. Regulations under the Coastal Act are typically administered by the county and local cities through adopted Local Coastal Plans, overseen by the California Coastal Commission (California Coastal Commission 2019; County of San Luis Obispo 2018). The California Coastal Commission mandates that a site-specific sea level rise analysis and bluff retreat study are performed to obtain a coastal development permit for new development. Planning for proposed bluff-top development must assess the average long-term beach and bluff retreat rate, erosion rate due to various sea level rise scenarios, and erosion potential from 100-year storms and other extreme events. Bluff retreat studies must establish a "development setback" that creates a buffer behind which development would be protected from bluff erosion for a minimum of 75 years.

The county and each incorporated city's certified Local Coastal Plans govern land use planning and development permitting. The county's General Plan, including the *Framework for Planning- Coastal Zone* guides development in unincorporated areas. The Estero Area Plan, North Coast Area Plan, San Luis Bay Coastal Area Plan, Port San Luis Harbor District Port Master Plan, and the South County Coastal Area Plan provide area specific guidance (County of San Luis Obispo 2019c). Each city also as a certified Local Coastal Plan which governs land use and permitting with the coastal areas of the cities.

Table 5-60 and Table 5-61 show sea level rise areas exposure by jurisdiction and structure count as well as improved values built for properties built between 2019-2024.

Table 5-60 Sea Level Rise Exposure by Jurisdiction and Structures Built between 2019-2024

JURISDICTION	STRUCTURE TOTAL – SLR @ 25CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 75CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 300CM (NO FLOOD)	STRUCTURE TOTAL – SLR @ 25CM (WITH 100-YR FLOOD)	STRUCTURE TOTAL – SLR @ 75CM (WITH 100-YR FLOOD)	STRUCTURE TOTAL – SLR @ 300CM (WITH 100-YR FLOOD)
Morro Bay	-	-	-	-	-	1
Pismo Beach	-	1	1	1	1	5
Unincorporated	-	1	1	3	6	28
Total	**0**	**2**	**2**	**4**	**7**	**34**

Source: San Luis Obispo County Assessor Data November 15, 2024, USGS CoSMoS v3.1, WSP GIS Analysis

Table 5-61 Sea Level Rise Exposure by Jurisdiction and Improved Values between 2019-2024

JURISDICTION	IMPROVED VALUE – SLR @ 25CM (NO FLOOD)	IMPROVED VALUE – SLR @ 75CM (NO FLOOD)	IMPROVED VALUE – SLR @ 300CM (NO FLOOD)	IMPROVED VALUE – SLR @ 25CM (WITH 100-YR FLOOD)	IMPROVED VALUE – SLR @ 75CM (WITH 100-YR FLOOD)	IMPROVED VALUE – SLR @ 300CM (WITH 100-YR FLOOD)
Morro Bay	-	-	-	-	-	$299,296
Pismo Beach	-	$577,422	$577,422	$577,422	$577,422	$63,446,059
Unincorporated	-	$1,934,290	$1,934,290	$3,925,091	$6,178,592	$24,432,807
Total	**$0**	**$2,511,712**	**$2,511,712**	**$4,502,513**	**$6,756,014**	**$88,178,162**

Source: San Luis Obispo County Assessor Data November 15, 2024, USGS CoSMoS v3.1, WSP GIS Analysis

Recent development between 2019 and November 2024 was evaluated using GIS overlays on sea level rise projections from USGS CoSMoS v3.1. This analysis estimates development exposure under 25 cm, 75 cm, and 300 cm sea level rise scenarios, both with and without 100-year flood events, highlighting trends in structure counts and improved values across impacted jurisdictions.

A total of 2 structures were built within areas projected to experience 25 cm sea level rise, increasing to 7 structures under the 75 cm sea level rise scenario and 34 structures under the 300 cm sea level rise projection. The majority of new development is concentrated in unincorporated areas, with limited construction in coastal cities. Pismo Beach saw 1 structure built under both the 75 cm and 300 cm sea level rise projections. Unincorporated areas experienced the highest growth, with 1 structure under 75 cm sea level rise and 1 structure under 300 cm sea level rise, totaling approximately $1.93 million in improved value. The total improved value for structures built within sea level rise areas without flooding is approximately $2.51 million, with unincorporated areas accounting for the majority of this value.

The exposure of structures significantly increases when 100-year flood events are overlaid with sea level rise projections. Under the 25 cm sea level rise with 100-year flood, 4 structures were developed, with 3 in unincorporated areas and 1 in Pismo Beach, totaling approximately $4.5 million in improved value. Under the 75 cm sea level rise with 100-year flood, 7 structures were built, concentrated in unincorporated areas (6 structures, valued at approximately $6.18 million) and Pismo Beach (1 structure, valued at approximately $577,422). Under the 300 cm sea level rise with 100-year flood, development increases sharply, with 34 structures exposed, representing a total improved value of approximately $88.2 million. The highest-value exposure occurs in Pismo Beach, where 5 structures account for approximately $63.4 million in improved value, highlighting the significant economic risk posed by coastal flooding and sea level rise.

The analysis highlights an increasing trend in development exposure to sea level rise, particularly under extreme scenarios combined with 100-year flooding. The concentration of high-value development in Pismo Beach and continuous expansion in unincorporated areas underscore the importance of integrating sea level rise projections into future land use planning, adopting resilient design standards, and implementing coastal protection measures to mitigate future risks.

Risk Summary

Coastal storms are a recurring hazard for the County that impact the entire coastline. Wave run-up erodes the coastline at varying rates depending upon geological composition. Development located in proximity to the shoreline is most vulnerable to coastal hazards and sea level rise; however, impacts are variable. Residential development is most susceptible to

damage from coastal bluff erosion due to cliff collapse and shoreline retreat. Low-lying development and infrastructure fronted by sandy beaches, however, are most vulnerable to dune erosion and impacts of sea level rise.

Coastal Storms:

- Coastal storms impact the entire coastline, causing beach and bluff erosion and coastal flooding of low-lying areas.
- Proximity of structures to the coastline increases vulnerability to the effects of coastal storms, coastal erosion, and sea level rise.

Coastal Erosion:

- The County of San Luis Obispo coastline's geologic composition and exposure to wave energy is quite varied. Sections of the coast range from rocky coastline to sandy beaches backed by cliffs, to sandy beaches backed by sand dunes. These differing characteristics affect erosion characteristics as well.
- Short-term coastal erosion (e.g., cliff failure) occurs episodically, mainly during periods of intense wave action that coincides with high tides and coastal storms.
- Annual rates of coastal erosion range from about three inches a year to more than one foot a year depending on coastline composition and exposure to coastal hazards.
- Some of the potentially most vulnerable structures in the county are bluff top homes and business that are exposed to bluff erosion in the communities of San Simeon, Cayucos, Cambria and Pismo Beach. Public streets that border the coastal bluffs can also be subject of erosion damage.
- Portions of communities are low-lying which can expose public facilities such as wastewater treatments plans to costal flood hazards.
- Both bluff erosion and coastal flooding are exacerbated during major El Niño events such as the 2015-2016 El Niño event.
- Coastal storm flooding hazards are limited throughout much of the county, while those from bluff erosion range from moderate to significant for bluff top homes and facilities.

Sea Level Rise:

- Future projected sea level rise may affect potential hazards in the county and is projected based on the best available science and modeling.
- Rising sea levels alone are not anticipated to be the primary cause of vulnerabilities and potential damages to resources, property and infrastructure within San Luis Obispo County.
- Impacts may instead be caused by existing severe storm coastal process-related hazards increasing in frequency and duration as a result of sea level rise.
- If sea levels continue to rise at higher projected rates, episodic coastal erosion and coastal flooding impacts that already occur during large storm wave events could become more frequent, as predictable high tides may regularly inundate public beaches and low-lying coastal infrastructure.
- *Effects on People:* Historically, there has been little or no loss of life or injury in the County due to coastal storms. The primary impacts have been economic in nature. The analysis reveals that 2,550 people across all jurisdictions are at risk from sea level rise, with unincorporated areas facing the greatest exposure (2,040 at 300cm with a 100-year flood), while Los Osos and Oceano are the most vulnerable CSDs, emphasizing the need for targeted adaptation strategies to protect at-risk populations.

- *Effects on Property:* The analysis highlights the increasing vulnerability of San Luis Obispo County to sea level rise and coastal flooding, with unincorporated areas, Los Osos, Oceano, and Avila Beach facing the highest risks in terms of property exposure and financial losses, exceeding $850 million in worst-case scenarios,
- *Effects on Critical Facilities and Lifelines:* The combination of sea level rise and 100-year flood events significantly increases risk, with unincorporated areas facing the highest exposure, Morro Bay and Pismo Beach experiencing steady increases in transportation and energy impacts, and Oceano, Cambria, Avila Beach, and San Simeon becoming increasingly vulnerable under 300cm sea level rise, particularly when compounded by flooding.
- *Effects on Historic, Cultural, and Natural Resources*: As beaches erode, the amount of recreational beach available to the public is substantially reduced. Changes in beach geometry can alter the wave characteristics of a particular site. Beach erosion results in the loss of sand from coastal areas. This hazard can accelerate the rate of erosion of coastal bluffs and can also contribute to increased wave-related damage to coastal structures. Erosion of beach sand removes the natural barrier that protects landforms and structures from the potentially destructive wave action. The end result can be the direct destruction of roads, homes, and other structures by waves whose force is no longer dissipated by wide beaches.
- *Effects on Economy and Community Values:* Sea level rise and coastal storms threaten the economy by damaging infrastructure, reducing property values, and disrupting key industries, while also eroding community identity through displacement and loss of cultural landmarks, emphasizing the need for proactive adaptation.
- Related Hazards: Adverse Weather, Dam Incidents, Flooding

Table 5-62 Hazard Risk Summary – Coastal Storm/Coastal Erosion/Sea Level Rise

JURISDICTION	GEOGRAPHIC EXTENT	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY	OVERALL SIGNIFICANCE
San Luis Obispo County	Limited	Likely	Limited	Medium
City of Arroyo Grande	N/A	N/A	N/A	N/A
City of Atascadero	N/A	N/A	N/A	N/A
City of Grover Beach	Limited	Occasional	Limited	Low
City of Morro Bay	Extensive	Likely	Critical	High
City of Paso Robles	N/A	N/A	N/A	N/A
City of Pismo Beach	Significant	Occasional	Limited	Medium
City of San Luis Obispo	N/A	N/A	N/A	N/A
Avila Beach CSD	Significant	Likely	Limited	Medium
Cambria CSD	Significant	Occasional	Limited	Medium
Ground Squirrel Hollow CSD	N/A	N/A	N/A	N/A
Heritage Ranch CSD	N/A	N/A	N/A	N/A
Los Osos CSD	Significant	Likely	Limited	Low
Nipomo CSD	N/A	N/A	N/A	N/A
Oceano CSD	Significant	Occasional	Limited	Medium
San Miguel CSD	N/A	N/A	N/A	N/A
San Simeon CSD	Significant	Likely	Limited	Low

JURISDICTION	GEOGRAPHIC EXTENT	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY	OVERALL SIGNIFICANCE
Templeton CSD	N/A			
Cayucos Sanitary District	Significant	Likely	Limited	Medium
Port San Luis Harbor District	Significant	Highly Likely	Limited	High
San Luis Obispo FCWCD	Limited	Likely	Limited	Medium
South San Luis Obispo Sanitation District	Limited	Likely	Critical	Medium

5.3.8 Dam Incidents

5.3.8.1 Hazard/Problem Description

Dams are manmade structures built for a variety of uses, including flood protection, power generation, agriculture, water supply, and recreation. When dams are constructed for flood protection, they usually are engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If prolonged periods of rainfall and flooding occur that exceed the design requirements, that structure may be overtopped and fail. Overtopping is the primary cause of earthen dam failure in the United States. Dam failures can also result from any one or a combination of the following causes:

- Earthquake
- Inadequate spillway capacity resulting in excess overtopping flows
- Internal erosion caused by embankment or foundation leakage or piping or rodent activity
- Improper design
- Improper maintenance
- Negligent operation
- Failure of upstream dams on the same waterway

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result as well as potentially catastrophic effects to roads, bridges, and homes. Associated water quality and health concerns could also be issues. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

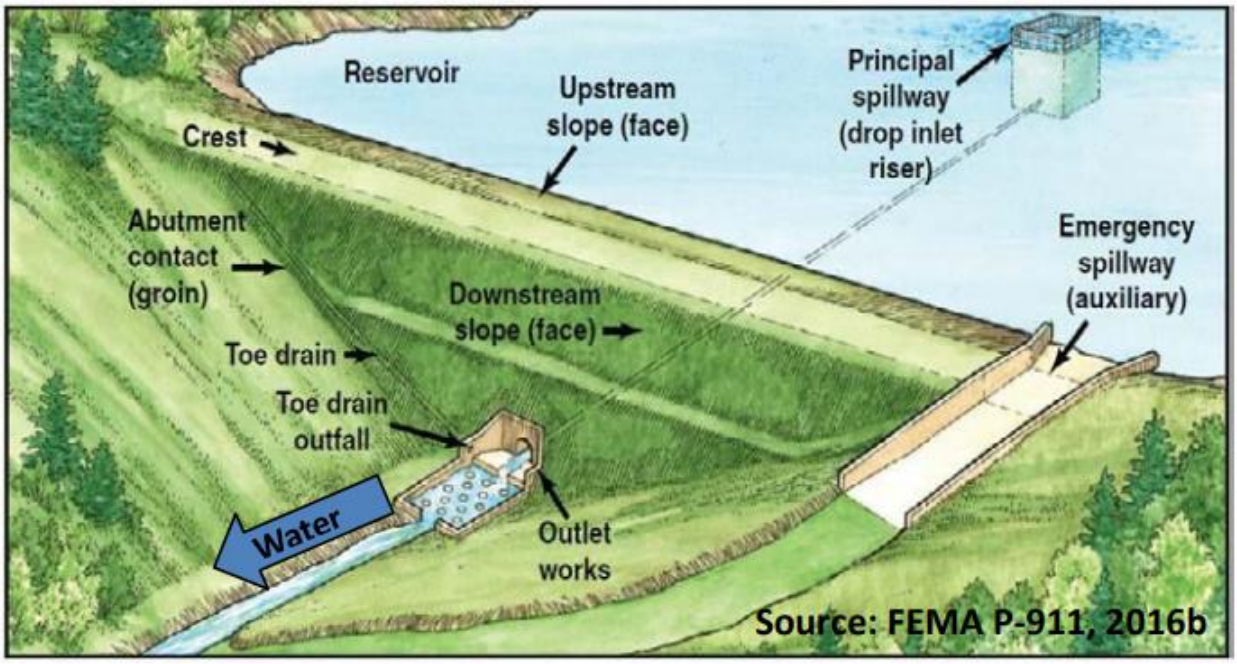
Next, controlled release or spillway flooding occurs when inadequate spillway capacity leads to excess overtopping flows, with the potential for flooding from dam outlet structures or spillways during excessive rain events. However, managing water releases from dams is a key measure to prevent or minimize spillway flooding and structural failure by regulating capacity in a controlled manner. Despite this, even controlled releases can result in unintended or unpredictable flooding due to environmental conditions, severe weather, or human error.

In general, there are three types of dams: concrete arch or hydraulic fill, earth-rockfill, and concrete gravity. Each type of dam has different failure characteristics. A concrete arch or hydraulic fill dam can fail almost instantaneously: the flood wave builds up rapidly to a peak

then gradually declines. An earth-rockfill dam fails gradually due to erosion of the breach: a flood wave will build gradually to a peak and then decline until the reservoir is empty. And a concrete gravity dam can fail instantaneously or gradually with a corresponding buildup and decline of the flood wave.

Figure 5-47 depicts the components of a typical earthen dam, consistent with FEMA P-911 (2016b). While dams vary in type, construction, and purpose, most share fundamental components, including abutments, spillways, and outlet works. The abutments serve as the structural connection between the dam and the adjoining valley slopes, with right and left abutments designated based on a downstream view. Spillways help regulate reservoir water levels and release excess floodwater that cannot be contained, reducing the risk of overtopping. Outlet works, typically a combination of structures, control the release of water from the reservoir to downstream areas.

Figure 5-47 Components of a typical earthen dam (example shows earthen dam)



Source: FEMA Dam Safety Awareness Fact Sheet, 2020

5.3.8.2 Geographic Area

The County has multiple dams constructed for flood control, irrigation, recreation, and water supply, with some located outside the county but still presenting a flooding risk due to their position along major watersheds. According to the California Department of Water Resources' (DWR) Jurisdictional Dams database and the National Inventory of Dams (NID), there are 15 dams located in or upstream of the county that could pose an inundation risk in the event of failure.

Of these dams, the majority are concentrated in the Salinas and Central Coastal watersheds, with one located in the Cuyama watershed. The dams range in hazard classifications, with some categorized as high hazard, meaning that failure would likely result in loss of life and significant property damage, while others are significant or low hazard, presenting varying degrees of risk to infrastructure and the environment.

Although most of the identified dams are within county limits, two major upstream dams, San Antonio Dam in Monterey County and Twitchell Dam along the San Luis Obispo-Santa Barbara

County border, pose significant potential threats to downstream areas within San Luis Obispo County. These dams control large water storage volumes, meaning failure could result in widespread flooding impacts.

Larger dams such as Lopez, Nacimiento, Twitchell, and Salinas Dams play a crucial role in water supply and flood control but also present significant risks in the event of failure. Some of these dams have EOPs in place, which can improve response capabilities, while others, particularly smaller or privately owned structures, lack formal emergency preparedness measures, increasing the risk of uncoordinated response efforts.

With climate change contributing to extreme precipitation events, increased runoff, and the potential for dam stress or overtopping, maintaining ongoing dam safety monitoring, structural reinforcements, and emergency preparedness planning is critical. The county must continue to assess inundation risks, flood control capabilities, and emergency response measures to ensure resilience against dam-related flooding. Table 5-63 shows the County dams of concern and their characteristics.

Table 5-63 County of San Luis Obispo Dams of Concern Characteristics

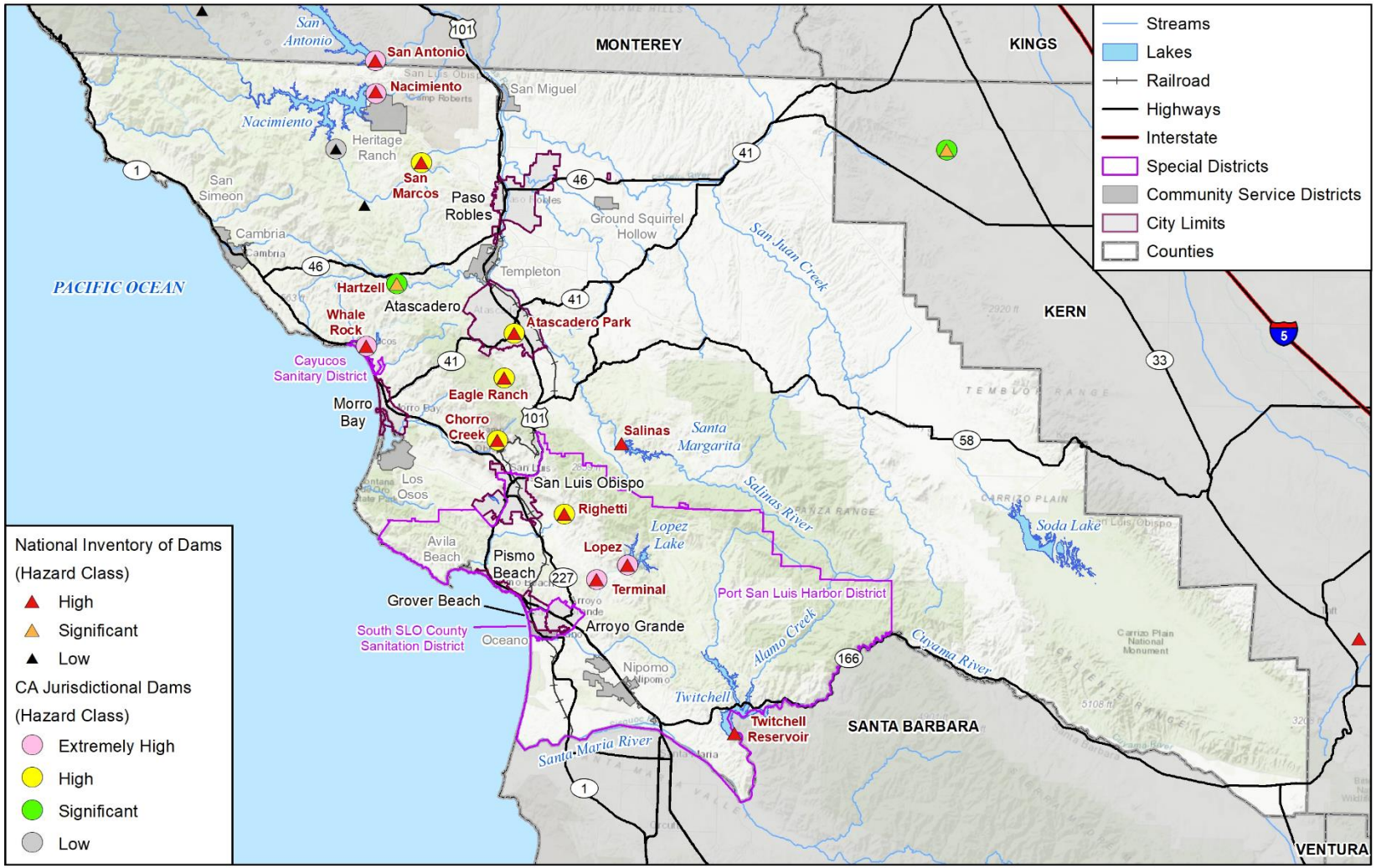
DAM NAME	OWNER NAME	HAZARD CLASS	OWNER TYPE	DAM HEIGHT (IN FEET)	STORAGE CAPACITY (ACRE-FEET)	EMERGENCY OPERATIONS PLAN?
Atascadero Park	City of Atascadero	High	Local Government	18	250	No
Chorro Creek	California Department of Corrections and Rehabilitation	High	State	77	90	Yes
Eagle Ranch	Eagle Ranch, LLC	High	Private	55	300	No
Hartzell	Land Conservancy of SLO County	Significant	Private	50	300	No
Klau Dam (BLM)	DOI BLM	Low	Federal	N/A	50	No
Las Tablas Creek	Mechanics Bank	Low	Private	39.8	180	Not Required
Lopez	San Luis Obispo County Flood Control and Water Conservation District	High	Local Government	166	52500	Yes
Nacimiento	Monterey County Water Resources Agency	High	Local Government	210	470000	Yes
Righetti	Private Entity	High	Private	83	735	No

DAM NAME	OWNER NAME	HAZARD CLASS	OWNER TYPE	DAM HEIGHT (IN FEET)	STORAGE CAPACITY (ACRE-FEET)	EMERGENCY OPERATIONS PLAN?
Salinas Dam	USACE – Los Angeles District	High	Federal	135	43200	Yes
San Antonio	Monterey County Water Resources Agency	High	Public Utility	202	350000	Yes
San Marcos	Private Entity	High	Private	42	325	Yes
Terminal	San Luis Obispo County Flood Control and Water Conservation District	High	Local Government	53	844	Yes
Twitchell	RECLAMATION	High	Federal	241	398120	Yes
Whale Rock	Whale Rock Commission	High	Public Utility	193	40662	Yes

Source: National Inventory of Dams, 2024; California Department of Water Resources – Jurisdictional Sized Dams, 2024
Note: 1 acre-foot = 325,851 gallons

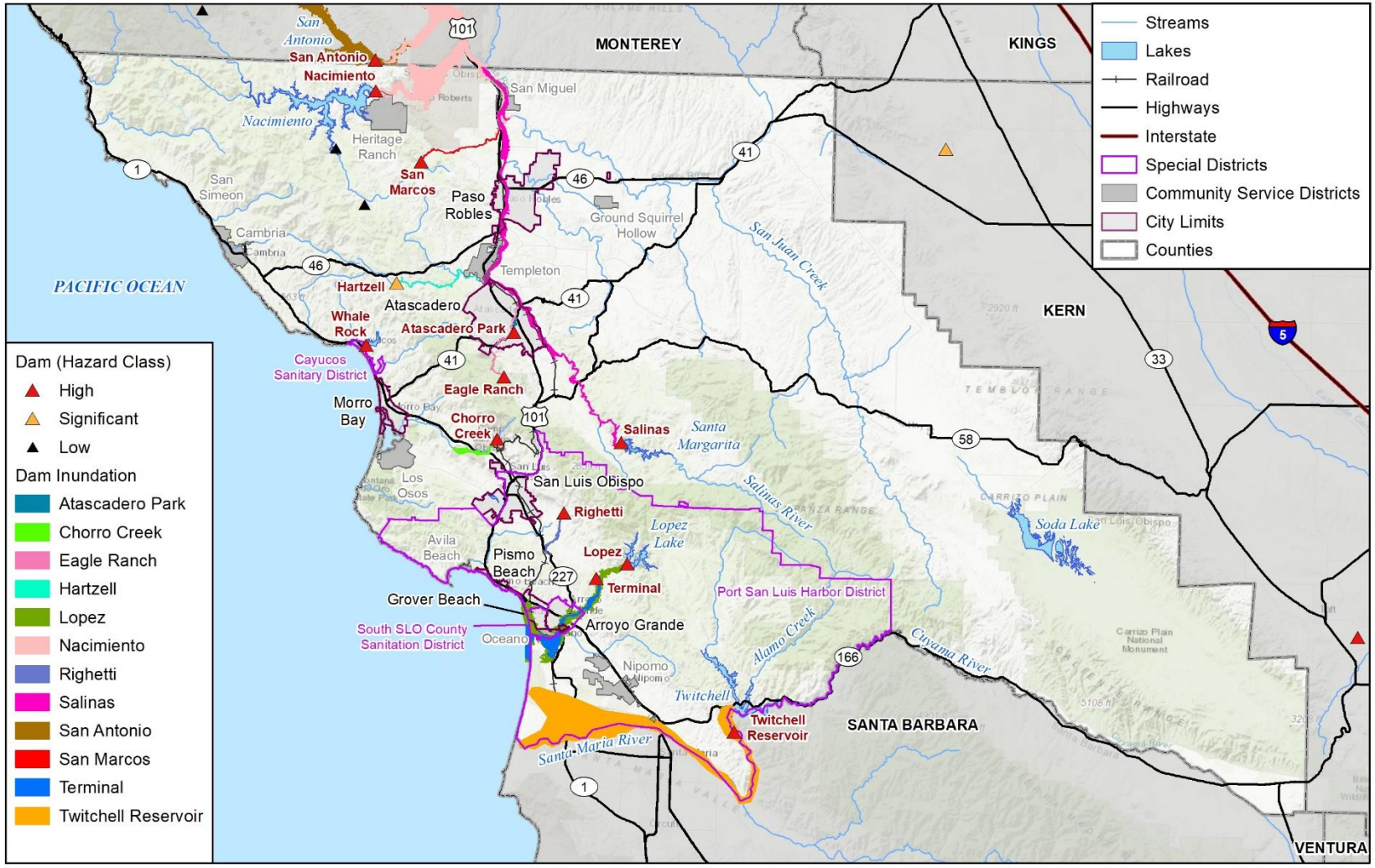
Figure 5-48 illustrates the locations of identified dams of concern within the County, including their hazard class, while Figure 5-49 displays the dam inundation areas within the County.

Figure 5-48 Dams of Concern to San Luis Obispo County



Data Source: San Luis Obispo County, NID 2024, Department of Water Resources (DWR), Division of Safety of Dams (DSOD)

Figure 5-49 Dam Inundation Areas in San Luis Obispo County



Map compiled 1/2025;
Intended for planning purposes only.
Data Source: San Luis Obispo County,
NID 2024, Department of Water Resources (DWR),
Division of Safety of Dams (DSOD)

5.3.8.3 Extent (Magnitude/Severity)

Standard practice among federal and state dam safety offices is to classify a dam according to the potential impact a dam failure (breach) or mis-operation (unscheduled release) would have on downstream areas. The hazard potential classification system categorizes dams based on the probable loss of human life and the impacts on economic, environmental and lifeline facilities. Dams are classified in three categories that identify the potential hazard to life and property:

- High hazard indicates that a failure would most probably result in the loss of life;
- Significant hazard indicates that a failure could result in appreciable property damage;
- Low hazard indicates that failure would result in only minimal property damage and loss of life is unlikely.
- Undetermined hazard dams have not been rated or their hazard rating is not known
- Section III of FEMA 333, Federal Guidelines for Dam Safety: Hazard Potential Classification System for Dams (2004), provides more information on this classification system.
- In addition to the federal hazard potential classification system outlined in FEMA 333, the California Division of Safety of Dams (DSOD) employs a similar framework with an additional category to address the state's specific needs. The DSOD classifies dams into four categories based on the potential downstream impacts in the event of a failure:
- Low Hazard: Failure is unlikely to result in loss of human life and is expected to cause low economic and environmental losses, primarily limited to the owner's property.
- Significant Hazard: Failure is unlikely to cause loss of human life but could lead to economic loss, environmental damage, impacts to critical facilities, or other significant consequences.
- High Hazard: Failure is expected to cause loss of at least one human life.
- Extremely High Hazard: Failure is anticipated to result in considerable loss of human life or would inundate an area with a population of 1,000 or more.
- It is important to note that the downstream hazard classification is based solely on potential impacts to life and property should the dam fail when operating with a full reservoir. This assessment does not reflect the current condition of the dam or its appurtenant structures.
- By incorporating the California-specific hazard classification system, we can better understand and manage the risks associated with dams within the state, ensuring that appropriate safety measures are in place to protect downstream communities (DSOD 2021).

Since the County has several High and Significant hazard dams, there is potential for loss of life and property damage. Both unincorporated and incorporated areas of the County are identified on dam failure inundation maps included in the County's Dam and Annex C of Emergency Operations Plan, last updated in 2025 and also displayed in Figure 5-49. The inundation areas for each of the dams are generally downstream and include large rural and urban areas on the valley floor below the dams. Adjacent jurisdictions could also be affected by a dam failure in County. These include, depending on the dam involved and to a limited extent, the Counties of Monterey and Santa Barbara.

The extent of impacts depends on the nature of failure and location of the dam. The largest populations potentially at risk would be in Arroyo Grande, Grover Beach, Pismo Beach, Paso Robles, and Atascadero. Unincorporated areas across the county, particularly running through the Salinas River, east of the Nacimiento Reservoir, and west of the Twitchell Reservoir, would also be impacted were a dam to fail and flood downstream.

Figure 5-50, below, depicts the Salinas Dam as water pours through. This 135-foot-tall concrete dam was built to handle double the capacity it does now.

Figure 5-50 Salinas Dam Spillway



Source: Tribune News, 2017

5.3.8.4 Past Occurrences

There is no history of dam failure affecting the county, but there have been recurring issues with flooding due to high flows released below dams in the area.

Nacimiento Area / Heritage Ranch Community Services District (HRCSD):
Heavy rains in 1969, 1983, 1995, 2006, 2011, 2017, and 2023 have caused repeated flooding in the Nacimiento area, leading to the Nacimiento Reservoir reaching capacity. In response, the Monterey County Water Resources Agency (MCWRA) has carried out high-volume water releases from the dam to relieve pressure. These releases have repeatedly impacted HRCSD's only potable water system, located just a quarter mile downstream.

The 1969 release caused extensive downstream damage before HRCSD facilities were constructed. Since then, high flow releases have destroyed the Gallery Wells (the District's

intake system) once—in 2011—and caused significant damage during at least two other events (2006 and 2017). These impacts have required costly infrastructure repair and replacement, temporary intake systems, and additional water treatment to offset reduced efficiency during reconstruction periods. Scouring and filter media loss have also been reported during multiple high-flow events.

The current replacement value of HRCSD's water treatment and distribution system is estimated at $18.1 million (HRCSD 2019 HMP Update Workbook).

5.3.8.5 Probability of Future Occurrences

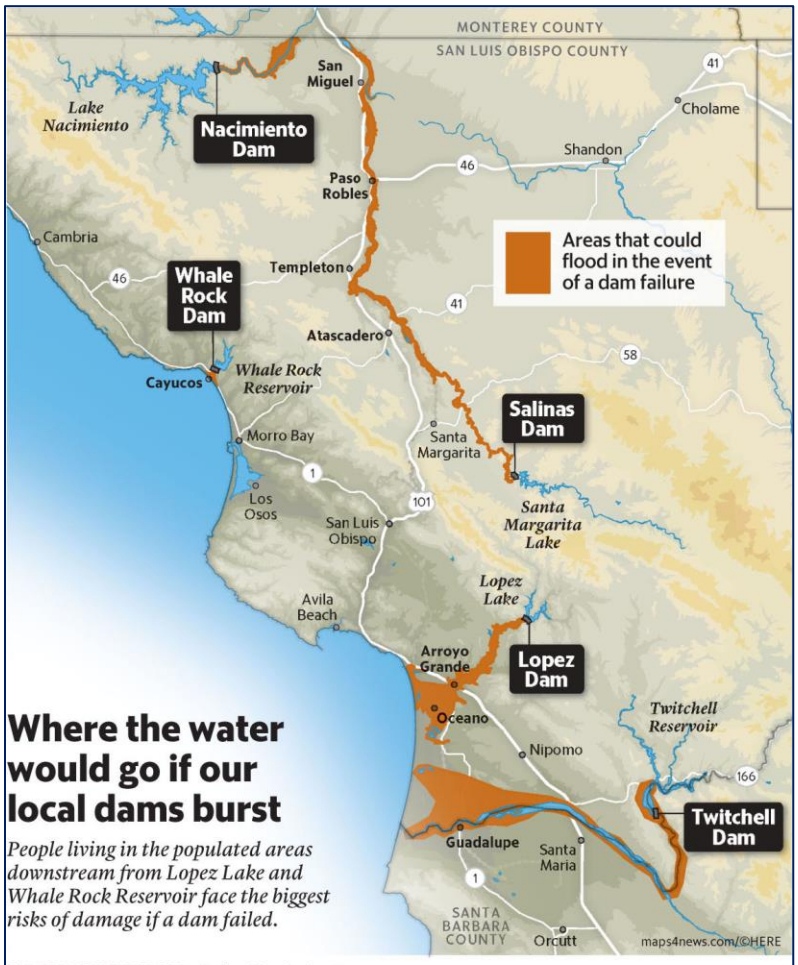
Unlikely—The County remains at risk to dam failures from numerous dams under a variety of ownership and control and of varying ages and conditions. However, based on historical experience and HMPC input, dam failure is unlikely in the area. Nevertheless, given the number of dams of concern in the County the potential exists for future dam failures in San Luis Obispo County, but the likelihood of this is low. Uncontrolled or controlled release flooding as well as spillway flooding below dams due to excessive rain or runoff are more likely to occur than failures.

5.3.8.6 Climate Change Considerations

The potential effects of climate change on dam failure risks are not yet fully understood. However, more frequent and extreme precipitation events could increase inflows to reservoirs, raising the likelihood of overtopping or spillway flooding. At the same time, prolonged drought, declining snowpack, and increased water demand could lead to lower reservoir levels, potentially reducing structural stress but also limiting available water resources. These competing factors make it essential to integrate climate resilience and adaptive management strategies into dam operations and emergency planning.

Figure 5-51 illustrates the potential dam inundation impacts on downstream communities in the County, showing areas that could be affected in the event of dam failures. As climate change continues to alter precipitation patterns, storm intensity, and water availability, proactive planning will be crucial to mitigate risks and protect infrastructure, ecosystems, and communities.

Figure 5-51 Dam Inundation Impacts to Downstream Communities in San Luis Obispo County



NACIMIENTO DAM • Lake Nacimiento
Earth-filled dam, 377,900 acre-feet capacity. Most flooding would flow north along the Salinas River in Monterey County; some water would flow south toward San Miguel. During a major flood, Highway 101 would flood from Camp Roberts through San Ardo.

WHALE ROCK DAM • Whale Rock Reservoir
Earth-filled dam, 40,600 acre feet capacity. In a dam failure, water would flow southwest along Old Creek, about 1,000 feet on each side of the creek's center line, reaching 13th Street and Ocean Avenue in Cayucos. About 1,500 people would be affected, as would the Cayucos Water Treatment Plant. Highway 1 may flood.

SALINAS DAM • Santa Margarita Lake
Concrete dam, 23,000 acre feet capacity. In a dam failure, water would flow north along the Salinas River about 300 to 500 feet on each side of the centerline of the river and into fingers in low-lying areas up to Atascadero. Significant water rise is not expected. About 1,000 to 2,000 people could be affected. Major roads flooded may include Las Pilitas Road; Highways 41, 46, 58, 101; Indian Valley Road; North River Road near Paso Robles; and Main Street in Templeton.

LOPEZ DAM • Lopez Lake
Earth-filled dam, 49,000 acre feet capacity. In a dam failure, water would flow west following Arroyo Grande Creek and could flood about 3,000 feet — or more than half a mile — on each side of the creek's center line. About 10,000 to 12,000 people could be affected in Arroyo Grande, Grover Beach, Halcyon, Oceano and Pismo Beach. Floodwaters could reach Huasna Road in 30 minutes and Highway 101 in 40 minutes.

TWITCHELL DAM • Twitchell Reservoir
Earth-filled dam, 240,100 acre feet capacity. In a dam and levee failure, most flooding would occur in Santa Barbara County. About 100 to 160 people could be affected in the Oso Flaco area. Major roads flooded could include Highway 1 near the SLO County line.

SOURCE: San Luis Obispo County Office of Emergency Services

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Vulnerability

A dam incident can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to dam failures is confined to the areas and populations subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the dam itself and associated revenues that accompany those functions.

A GIS overlay analysis of each dam inundation layer with the parcels was conducted to arrive at total parcels exposed, loss estimates, and populations at risk. The results of the parcel analysis explained in more detail in the sections below.

Structures

In general, communities located below a high or significant hazard dam and along a waterway are potentially exposed to the impacts of a dam failure. For reference, high hazard dams threaten lives and property, significant hazard dams threaten property only. Inundation maps that identify anticipated flooded areas (which may not coincide with known floodplains) are produced for all high hazard dams and are contained in the Emergency Action Plan (EAP) required for each dam.

Table 5-64, Table 5-65, and Table 5-66 provide a comprehensive analysis of exposure to dam inundation across jurisdictions, property types, and dam sources within the County.

Exposure by Jurisdiction

As shown in Table 5-64, a total of 3,729 structures and 7,336 people are exposed to dam inundation across the County. The unincorporated areas have the highest exposure, with 1,758 structures and 3,505 people at risk. Among incorporated jurisdictions, Arroyo Grande has the greatest exposure, with 1,507 structures and an estimated 3,110 people, followed by Atascadero with 298 structures and 607 people. Paso Robles, Grover Beach, and Pismo Beach have comparatively lower levels of exposure, while Morro Bay and City of San Luis Obispo have no identified structures at risk.

Exposure by Property Type

Table 5-65 further categorizes exposure by property type. Residential structures account for most of the exposure, with 2,850 structures and 6,986 people at risk. Commercial properties are the next most exposed, with 286 structures, followed by mixed-use properties (208 structures) and multi-family residential buildings (101 structures, 248 people). Mobile and manufactured homes also represent a vulnerable group, with 42 structures and 102 people exposed. Other property types, including industrial, agricultural, mining, and exempt properties, have lower levels of exposure.

Exposure by Dam Source

Table 5-66 identifies exposure by specific dams, with Lopez Dam posing the greatest risk, affecting 2,442 structures and 4,627 people. Other high-risk areas include Whale Rock Dam (313 structures, 766 people), Salinas Dam (324 structures, 677 people), and Nacimiento Dam (312 structures, 753 people). Several smaller dams, including Atascadero Park, Eagle Ranch, and Righetti, also contribute to localized exposure.

Table 5-64 Structures and Population Exposed to Dam Inundation by Jurisdiction Summary

JURISDICTION	STRUCTURE COUNT	POPULATION ESTIMATE
Arroyo Grande	1,507	3,110
Atascadero	298	607
Grover Beach	101	35
Morro Bay	-	-
Paso Robles	50	60
Pismo Beach	15	20
San Luis Obispo City	-	-
Unincorporated	1,758	3,505
Total	**3,729**	**7,336**

Source: San Luis Obispo Assessor Data November 15, 2024, Division of Safety of Dams, Department of Water Resources, WSP GIS Analysis

Table 5-65 Structures Exposed to Dam Inundation by Property Type Summary

PROPERTY TYPE	STRUCTURE COUNT
Agricultural	84
Commercial	286
Exempt	34
Industrial	55
Mining	1
Mixed Use	208
Mobile/Manufactured Homes	42
Multi-Family Residential	101
Residential	2,850
Vacant Improved	68
Total	**3,729**

Source: San Luis Obispo Assessor Data November 15, 2024, Division of Safety of Dams, Department of Water Resources, WSP GIS Analysis

Table 5-66 Structures and Population Exposed to Dam Inundation by Dam Name Summary

DAM NAME	STRUCTURE COUNT	POPULATION
Atascadero Park	105	171
Eagle Ranch	27	43
Lopez	2,442	4,627
Nacimiento	312	753
Righetti	15	35
Salinas	324	677
San Marcos	1	2

DAM NAME	STRUCTURE COUNT	POPULATION
Terminal	199	262
Twitchell	199	262
Whale Rock	313	766

Note: This summary of structures by Dam name cannot be totaled as some are overlapping models. This table is more representative if a single dam failed vs the summary tables of everything at once. This table does not include all non-jurisdictional dams.
Source: San Luis Obispo Assessor Data November 15, 2024, Division of Safety of Dams, Department of Water Resources, WSP GIS Analysis

Table 5-67, below, provides an overview of structure and population exposure to dam inundation within the CSDs. A total of 1,030 structures and 2,092 people are at risk across the analyzed CSDs.

Exposure by CSD

Oceano CSD has the highest exposure, with 680 structures and 1,235 people exposed.

San Miguel CSD follows, with 301 structures and 736 people exposed.

Nipomo CSD ranks third, with 44 structures and 109 people exposed.

Templeton CSD has the lowest exposure, with 5 structures and 12 people identified in the inundation area.

These findings highlight Oceano and San Miguel as the most vulnerable CSDs, with significantly higher exposure levels compared to other districts. This underscores the need for dam failure response and evacuation planning, evacuation strategies, and infrastructure resilience measures within these communities

Table 5-67 Structures and Population Exposed to Dam Inundation by Community Service District Summary

COMMUNITY SERVICE DISTRICT	STRUCTURE COUNT	POPULATION
Nipomo CSD	44	109
Oceano CSD	680	1,235
San Miguel CSD	301	736
Templeton CSD	5	12
Total	**1,030**	**2,092**

Source: San Luis Obispo Assessor Data November 15, 2024, Division of Safety of Dams, Department of Water Resources, WSP GIS Analysis

Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding. Based on the risk assessment, it is apparent that a major dam failure could have a devastating impact on the planning area. Dam failure flooding presents a threat to life and property, including buildings, their contents, and their use. Large flood events can affect crops and livestock as well as lifeline utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, and the local and regional economies.

People

Persons located downstream of a dam face significant risks in the event of a dam failure (breach) or misoperation (unscheduled release). The severity of impact depends on multiple

factors, including reservoir volume, topography, and the timing of the breach. Inundation from a dam failure can result in injuries and fatalities due to debris impact, bodily harm, and drowning, while standing water post-event presents additional risks similar to those caused by other flood sources. In some cases, entire communities may require evacuation, emergency response support, and even permanent relocation, depending on the scale of flooding and structural damage. Please reference the above tables in the previous section for population exposure estimates analyzed, below:

Population Exposure by Jurisdiction

Across the county's jurisdictions, the highest concentration of people at risk is in unincorporated areas, where more than 3,500 residents could be impacted. Among incorporated areas, Arroyo Grande has the largest exposure, with over 3,100 residents at risk, followed by Atascadero, Grover Beach, and Paso Robles, though to a lesser extent. Meanwhile, Morro Bay and City of San Luis Obispo have no identified populations at risk, as they are not within mapped dam failure inundation zones.

Population Exposure by Dam Source

The degree of risk varies significantly by dam, with Lopez Dam posing the greatest threat, impacting over 4,600 people in the event of failure. Other high-risk dams include Whale Rock, Salinas, and Nacimiento, each of which could displace several hundred to over 700 residents. Smaller dams such as Atascadero Park, Eagle Ranch, and Righetti contribute to localized flooding risks, but their population exposure is lower compared to larger reservoirs. Notably, some areas are affected by overlapping dam failure models, meaning certain residents could be impacted by multiple dam failures, compounding risks during a cascading event.

Population Exposure by CSD

Among CSDs, Oceano CSD faces the highest population exposure, with over 1,200 people at risk, followed by San Miguel CSD, which could see over 700 people impacted in a worst-case scenario. Nipomo CSD and Templeton CSD have lower exposure levels, with fewer than 150 people at risk combined. These findings underscore the need for CSD-specific evacuation planning, emergency response coordination, and long-term resilience strategies to mitigate the potential consequences of dam failure flooding.

Considerations Beyond Resident Population

While these estimates reflect the resident population within mapped inundation zones, they likely underestimate total exposure, as they do not account for individuals who work, travel through, or visit areas within potential flood zones. The presence of businesses, schools, and transportation routes in these areas means that daytime populations could be significantly higher than nighttime residential estimates. As a result, emergency preparedness and evacuation planning must incorporate transient populations to ensure a comprehensive approach to risk reduction and public safety.

Social Vulnerability

The inundation paths of Lopez and Salinas Dams pose the greatest population risk in the county, with Grover Beach (Lopez Dam) and Paso Robles (Salinas Dam) among the most socially vulnerable communities. Both areas rank high in overall social vulnerability, indicating that certain populations may face greater challenges during a dam failure event.

Individuals who are elderly, have disabilities, or lack access to a vehicle may require additional assistance during an evacuation, particularly if transportation options are limited or warning systems are ineffective in reaching them. Low-income households may also experience greater barriers to evacuation and post-disaster recovery, especially if they lack the resources to secure temporary housing or essential supplies. Additionally, non-English-speaking communities may

require language-accessible emergency communications to ensure they receive and understand critical evacuation instructions.

To reduce risk, public outreach and education on dam failure preparedness should be prioritized in these areas, ensuring that alert and warning systems are functional, accessible, and capable of reaching all at-risk populations. Community-based approaches, such as partnering with local organizations and service providers, can help ensure that vulnerable populations receive the necessary support before, during, and after a dam-related emergency.

Critical Facilities and Lifelines

The following analysis summarizes the number and types of critical facilities at risk from dam inundation based on updated exposure data from key dams in the County. The results were derived from overlay analysis of critical facility locations and dam inundation extents using GIS. This analysis identifies exposure patterns by jurisdiction and dam source, highlighting vulnerabilities within essential lifelines such as transportation, safety and security, communications, and water systems.

Jurisdictional Exposure to Dam Inundation

Table 5-68 shows critical facility assets exposed to dam inundation by jurisdictions and FEMA lifelines. A total of 110 critical facilities are at risk from dam inundation across jurisdictions in the County. Unincorporated areas have the highest exposure, with 67 critical facilities impacted, predominantly affecting transportation lifelines, with 39 facilities exposed, followed by risks to hazardous materials facilities (7) and water systems (6). Arroyo Grande faces the highest exposure among incorporated jurisdictions, with 22 facilities at risk, including 12 transportation facilities, 6 safety and security facilities, and 2 health and medical facilities, indicating significant potential for disruption to emergency services and regional mobility.

Atascadero has 11 facilities at risk, all within the transportation lifeline, highlighting the city's vulnerability to regional transportation disruptions. In contrast, Paso Robles, with 6 facilities at risk, faces impacts to multiple lifelines, including communications, energy, and transportation, which could compromise regional connectivity and power systems. Grover Beach and Pismo Beach each have 2 facilities exposed, primarily within the transportation and water system categories, indicating localized but critical vulnerabilities to essential services.

Exposure by Dam Source

Table 5-68 shows critical facility assets exposed to dam inundation by dam name and FEMA Lifelines. Exposure varies significantly by dam, with the Lopez Dam and Salinas Dam presenting the most substantial risks to critical facilities. Lopez Dam impacts 51 facilities, representing the highest exposure among all dams, with 28 transportation facilities at risk, alongside notable impacts to communications (5), safety and security (7), and water systems (4). This concentration highlights the importance of transportation corridors and emergency services within the Lopez Dam inundation area.

The Salinas Dam impacts 22 facilities, with 19 transportation facilities exposed, making it a major risk to regional mobility. Additionally, 1 communication facility and 1 hazardous material facility are at risk, indicating multi-sector vulnerabilities.

Nacimiento Lake Dam, which impacts 10 facilities, poses significant risks to transportation lifelines (7 facilities) and water systems (2 facilities), with additional exposure to 1 hazardous material facility, underlining potential environmental hazards.

Among other dams, the Eagle Ranch Dam inundation area impacts 9 transportation facilities, emphasizing a local but critical risk to transportation networks. Terminal Dam impacts 14 facilities, almost entirely in the transportation lifeline (13 facilities), highlighting its importance for transportation continuity. Twitchell Dam affects 10 facilities, with exposure to 4

transportation facilities, 2 hazardous material facilities, and 1 water system, representing multi-sector vulnerabilities.

Smaller dams such as Chorro Creek Dam, Whale Rock Dam, Hartzell Dam, and Righetti Dam impact fewer facilities but still represent localized risks, primarily to transportation and safety and security lifelines. Specifically, Chorro Creek Dam impacts 4 facilities, including communications, health and medical, and transportation assets, while Whale Rock Dam affects 3 transportation facilities, and Hartzell and Righetti Dams each impact 1 transportation facility.

San Antonio and San Marcos Dams show no exposure to critical facilities within their inundation zones under the current analysis.

Summary of Lifelines Vulnerabilities

The analysis highlights that transportation facilities are the most frequently exposed across all dams and jurisdictions, indicating that dam failures could severely disrupt regional mobility and emergency response capabilities. Unincorporated areas consistently face the highest risk due to their extensive coverage of transportation networks and essential services. Among individual dams, Lopez Dam and Salinas Dam pose the greatest threats to critical infrastructure, with widespread impacts across multiple lifelines. Additionally, facilities exposed under Nacimiento and Twitchell Dam inundation areas present significant multi-sector vulnerabilities.

This assessment highlights the importance of prioritizing mitigation measures that protect transportation routes, safety and security facilities, and water systems, especially within the highest-risk jurisdictions of Arroyo Grande, Atascadero, Paso Robles, and unincorporated areas of the County.

Table 5-68 Critical Facility Assets Exposed to Dam Inundation by Jurisdictions and FEMA Lifelines

JURISDICTION	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Arroyo Grande	1	-	1	-	2	6	12	-	22
Atascadero	-	-	-	-	-	-	11	-	11
Grover Beach	-	-	-	-	-	-	1	1	2
Paso Robles	1	1	-	-	-	-	4	-	6
Pismo Beach	-	-	-	-	-	-	2	-	2
Unincorporated	9	2	-	7	1	3	39	6	67
Total	**11**	**3**	**1**	**7**	**3**	**9**	**69**	**7**	**110**

Source: San Luis Obispo County, Division of Safety of Dams, Department of Water Resources, CalARP, HIFLD, NBI, NID, FCWCD, WSP Analysis, 2025.

Table 5-69 Critical Facility Assets Exposed to Dam Inundation by Dam Name and FEMA Lifelines

DAM NAME	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Atascadero Park	-	-	-	-	-	-	2	-	2
Chorro Creek	-	1	-	-	1	1	1	-	4
Eagle Ranch	-	-	-	-	-	-	9	-	9
Hartzell	-	-	-	-	-	-	1	-	1
Lopez	5	1	1	3	2	7	28	4	51
Nacimiento	-	-	-	1	-	-	7	2	10
Righetti	-	-	-	-	-	-	1	-	1
Salinas	1	1	-	1	-	-	19	-	22
San Antonio	-	-	-	-	-	-	-	-	0
San Marcos	-	-	-	-	-	-	-	-	0
Terminal	1	-	-	-	-	-	13	-	14
Twitchell	3	-	-	2	-	-	4	1	10
Whale Rock	2	-	-	-	-	-	1	-	3

Source: San Luis Obispo County, Division of Safety of Dams, Department of Water Resources, CalARP, HIFLD, NBI, NID, FCWCD, WSP Analysis, 2025.
Note: This table by cannot be summed as it would double count assets.

Risk to Dams from Other Hazards

Dams themselves are considered critical infrastructure and several dams in the county are vulnerable to other natural hazards, including seismic activity, landslides, wildfires, and flooding, which can impact their structural integrity and increase downstream risks. Nacimiento and San Antonio Dams, both high-hazard structures, are located in areas with elevated seismic risk due to their proximity to the San Andreas Fault system. In the event of a major earthquake, these dams could experience structural stress or failure, endangering downstream communities. Additionally, Twitchell Reservoir, Lopez Dam, and Salinas Dam are located in regions with very high wildfire risk, which increases the potential for post-fire sedimentation and debris flows, reducing reservoir capacity and potentially compromising dam operations. Lopez and Salinas Dams, in particular, are also in areas prone to landslides, which could be triggered by heavy rainfall or seismic events, further impacting their stability.

All dams in San Luis Obispo County may be impacted by flooding, whether from extreme precipitation events, prolonged storm activity, or upstream runoff accumulation. While reservoirs help regulate floodwaters, consecutive or intense storm systems, especially those associated with ARs, can push reservoirs to their maximum capacity, increasing the risk of overtopping, emergency spillway use, or, in extreme cases, structural failure. Dams, like traditional floodplains, have their own flooding thresholds, referred to as dam inundation levels, which determine the extent of downstream flooding in the event of failure or a controlled release (FEMA, 2020). Unlike FEMA flood zones, which estimate flooding based on storm recurrence probabilities (such as the 1% annual chance flood), dam inundation maps

model worst-case failure scenarios, often showing rapid, deep flooding over large areas, even beyond FEMA-mapped floodplains.

These models account for factors such as dam height, storage capacity, reservoir inflows, and downstream topography, making them a critical tool for emergency response planning. Twitchell, Lopez, and Salinas Dams play key roles in flood control but are susceptible to high inflows during major storms, which can overwhelm spillways and contribute to downstream flooding hazards. Additionally, sedimentation from post-flood debris can reduce reservoir storage capacity over time, decreasing the effectiveness of these dams in mitigating future flood events. Prolonged high-water events can also increase erosion risks around embankments, potentially compromising dam integrity. Compounding this risk, coastal and low-lying areas downstream of major reservoirs could experience amplified flood impacts if dam releases coincide with riverine or coastal flooding. While dams serve as an essential flood management tool, they also introduce unique risks that must be considered in emergency planning.

Climate change is expected to increase these hazards, with more intense atmospheric river storms, longer droughts leading to increased wildfire activity, and sudden heavy precipitation events that could overwhelm aging infrastructure. Given these risks, continuous dam safety evaluations, sediment management, and emergency response planning are critical to ensuring the long-term resilience of these structures and the protection of downstream populations.

Economy and Community Values

A major dam failure could have severe and lasting economic consequences, including direct damages to businesses, homes, and infrastructure, as well as indirect disruptions to the local economy. Flooding from a failure event could destroy roads, utilities, and transportation networks, cutting off access to essential services and supply chains. Businesses reliant on local infrastructure, such as agriculture, manufacturing, and tourism, could experience prolonged closures and financial losses, leading to job displacement and economic downturns.

The long-term loss of water from the reservoir would further compound economic challenges, particularly for agriculture, energy production, and municipal water supplies. Farmers could suffer from crop failures and livestock losses, while industries and municipalities dependent on stable water sources may face increased costs and operational disruptions. Hydroelectric facilities could experience significant revenue losses, affecting regional power availability and driving up energy costs.

Beyond financial impacts, a dam failure could erode community values by displacing residents, damaging historic and cultural sites, and reducing trust in local infrastructure. Property values in flood-prone areas may decline, and communities could face long-term economic stagnation as businesses and residents relocate to safer areas. Investing in dam safety, emergency preparedness, and resilient infrastructure is essential to minimizing these risks and ensuring the long-term stability of affected regions.

Historic, Cultural, and Natural Resources

Dam failure effects on the environment would be similar to those caused by flooding from other causes. Water could erode stream channels and topsoil and cover the environment with debris. For the most part the environment is resilient and would be able to rebound from whatever damages occurred, though this process could take years. However, historic and cultural resources could be affected just as housing or critical infrastructures would, were a dam to fail and cause downstream inundation that could further erode surfaces or cause scouring of structural foundations. A GIS analysis did not reveal that any historic properties are potentially at risk to dam inundation.

Development Trends

Future development planning should carefully consider dam failure risks by overlaying existing dam inundation maps with proposed development areas to assess potential impacts. In the event of a dam failure, flooding would likely follow some existing FEMA-mapped floodplains, which already contain development restrictions in areas within the 1% annual chance floodplain. However, dam failure could exceed these mapped flood zones, impacting areas that are not currently regulated for flood hazards, increasing overall risk exposure. Development patterns can also influence dam hazard classifications. Specifically, Eagle Dam and San Marcos Dam were reclassified from significant hazard to high hazard within the past five years, likely due to increased downstream development.

This shift represents an increase in vulnerability, as more structures and people are now at risk in the event of a failure. While the majority of the county's dams are already classified as high or significant hazard, future development downstream of low or undetermined hazard dams could result in similar upgrades in hazard classification over time. Additionally, new development can impact dam-related resources, particularly in communities that rely on reservoirs for potable water. For example, the Nacimiento Reservoir serves as the only source of potable water for the Heritage Ranch Community Services District. If the Nacimiento Dam were to fail, the growing residential population in the area could be affected by dam inundation, damage to water infrastructure, and a loss of potable water supply. As populations increase, demand for water resources and resilience planning must be incorporated into future development strategies. Table 5-70 shows properties exposed to dam inundation areas built between 2019-2024

Table 5-70 Properties Exposed to Dam Inundation Areas Built between 2019-2024

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE
Arroyo Grande	72	$45,472,437
Atascadero	9	$3,170,318
Paso Robles	3	$2,707,757
Pismo Beach	1	$577,422
Unincorporated	106	$46,192,271
Total	191	$98,120,205

Source: San Luis Obispo Assessor Data November 15, 2024, Division of Safety of Dams, Department of Water Resources, WSP GIS Analysis

Recent development between 2019 and November 2024 was analyzed using GIS overlays on dam inundation areas from the Division of Safety of Dams. The analysis identifies development trends within potential flood zones resulting from dam failures and provides an estimate of structures and their improved values exposed to this hazard.

A total of 191 properties, valued at approximately $98.1 million, were developed within dam inundation areas between 2019 and 2024, with the highest concentration in unincorporated areas, totaling 106 structures and approximately $46.2 million in improved value. This reflects continued development pressure in rural areas, which may face significant risk from dam-related flooding events.

Arroyo Grande experienced notable development, with 72 properties constructed, representing approximately $45.5 million in improved value. This marks the highest development within a single jurisdiction, underscoring the area's vulnerability to potential dam inundation impacts. Atascadero recorded 9 new structures, valued at approximately $3.2 million, while Paso Robles saw limited but high-value development with 3 properties totaling

approximately $2.7 million. Pismo Beach, although having only one new structure, represents a valuable coastal addition with an improved value of approximately $577,000, highlighting the economic risk of even minimal development in coastal inundation zones.

The results indicate that development within dam inundation areas is most prominent in unincorporated areas and Arroyo Grande, which together account for over 92% of new structures and improved value. These trends highlight the importance of integrating dam failure scenarios into future planning and emergency response strategies. Enhanced evacuation planning, flood control infrastructure improvements, and resilient building standards are critical to mitigating the potential impacts of a catastrophic dam failure.

Risk Summary

The overall significance of dam inundation in the County is Medium.

- Based on historical evidence dam failures can happen and flood downstream communities in the county, though not frequently.
- *Effects on Property:* There are nearly 4,000 structures at risk to dam inundation in the study area. This hazard poses complex issues in the event of a disaster, including a complete destruction of homes and infrastructure, significant damage to buildings and belongings, reduced property values, and potential displacement of residents.

    Unincorporated areas and Arroyo Grande face the highest exposure to dam inundation.

    Residential properties account for the majority of at-risk structures and population.

    Lopez Dam poses the highest threat, affecting thousands of structures and residents.

    Multi-family and mobile home units represent particularly vulnerable housing type
- *Effects on People:* There is just over 7,000 people living in dam inundation zones. The effect this hazard can have on people is significant causing forced displacement from their homes and communities, disrupting farming, impacting access to basic necessities like water and healthcare, and leading to social and economic disruption due to the loss of land and cultural heritage, often with inadequate compensation for those displaced; additionally, changes in water flow can contribute to the spread of waterborne diseases in affected areas
- *Effects on Critical Facilities and Lifelines:* Exposure varies significantly by dam, with the Lopez Dam and Salinas Dam presenting the most substantial risks to critical facilities. Lopez Dam impacts 51 facilities, representing the highest exposure among all dams, with 28 transportation facilities at risk, alongside notable impacts to communications (5), safety and security (7), and water systems (4). This concentration highlights the importance of transportation corridors and emergency services within the Lopez Dam inundation area.
- *Effects* on Historic, Cultural, and Natural Resources: Dams can permanently submerge archaeological sites, sacred lands, and historic landmarks, erasing cultural heritage and displacing communities. They also disrupt ecosystems, altering landscapes and degrading sites of historical and natural significance. While they provide benefits like flood control and energy, their impact on cultural and natural resources often requires mitigation to preserve what remains.
- *Effects on Economy and Community Values:* Dam inundation can disrupt transportation corridors, affecting the economy by impeding or reducing flows of goods, people, and resources.
- *Related Hazards:* Adverse weather, coastal storm, coastal erosion, sea level rise, flooding, earthquake/liquefaction, tsunami/seiches, land subsidence, landslide, drought.

- Table 5-71, below, provides a description of dam inundation risk summary by jurisdiction.

Table 5-71 Hazard Risk Summary - Dam Inundation

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY (EXTENT)	OVERALL SIGNIFICANCE
San Luis Obispo County	Limited	Occasional	Critical	Medium
City of Arroyo Grande	Extensive	Unlikely	Catastrophic	Medium
City of Atascadero	Limited	Unlikely	Limited	Low
City of Grover Beach	Extensive	Unlikely	Catastrophic	Medium
City of Morro Bay	N/A	N/A	N/A	N/A
City of Paso Robles	Significant	Occasional	Limited	Low
City of Pismo Beach	Limited	Occasional	Critical	Medium
City of San Luis Obispo	N/A			
Avila Beach CSD	Limited	Unlikely	Limited	Low
Cambria CSD	N/A	N/A	N/A	N/A
Ground Squirrel Hollow CSD	Limited	Unlikely	Limited	Low
Heritage Ranch CSD	Extensive	Likely	Catastrophic	High
Los Osos CSD	N/A			
Nipomo CSD	Limited	Unlikely	Limited	Low
Oceano CSD	Limited	Occasional	Critical	Medium
San Miguel CSD	Limited	Unlikely	Negligible	Medium
San Simeon CSD	N/A			
Templeton CSD	Significant	Occasional	Limited	Low
Cayucos Sanitary District	Limited	Unlikely	Limited	N/A
Port San Luis Harbor District	Limited	Unlikely	Negligible	N/A
San Luis Obispo FCWCD	Limited	Occasional	Critical	Medium
South San Luis Obispo Sanitary District	Extensive	Unlikely	Catastrophic	Medium

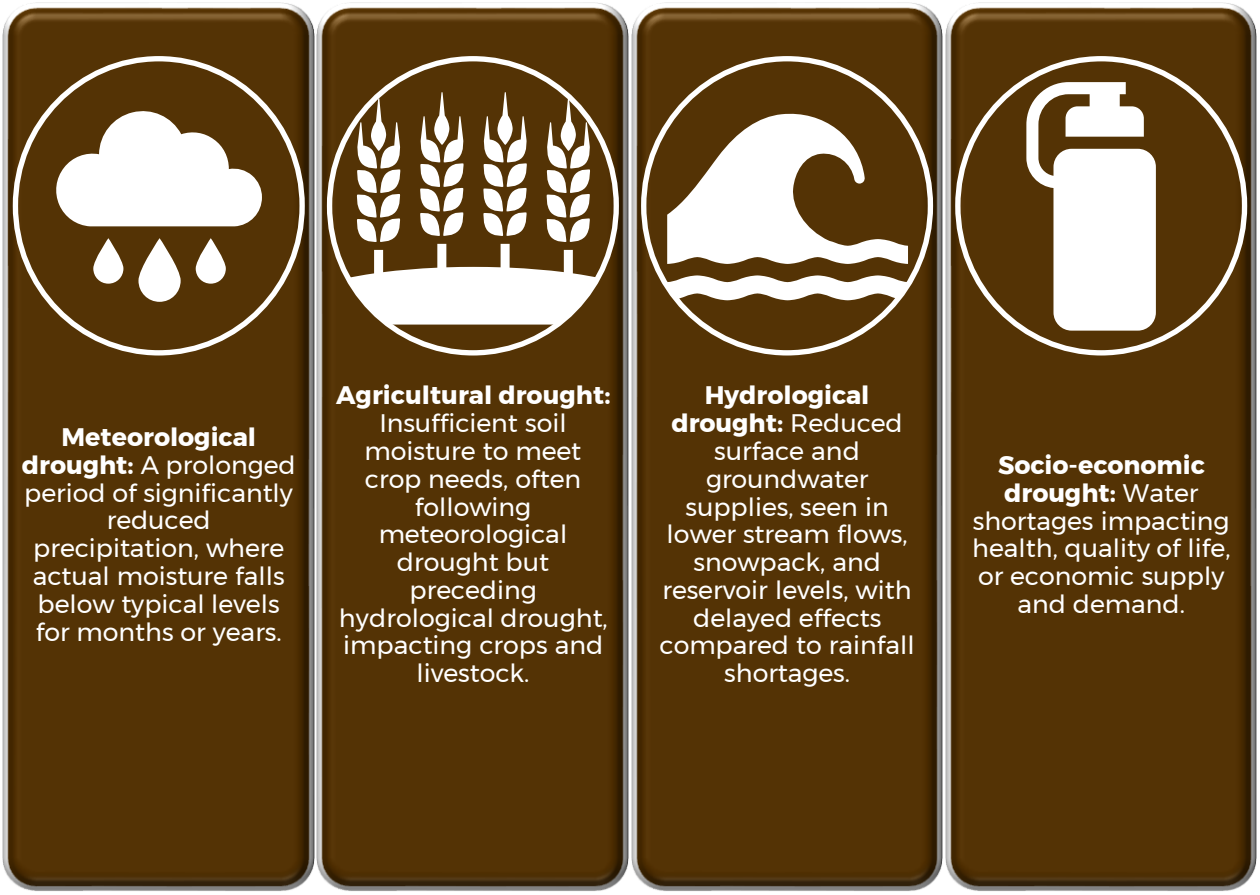
5.3.9 Drought and Water Shortage

5.3.9.1 Hazard/Problem Description

Drought is a gradual phenomenon – it is a significant decrease in water supply relative to what is typical in a given location Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends.

Drought is a complex issue involving many factors—it occurs when a normal amount of moisture is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects, as shown in Figure 5-52 below.

Figure 5-52 Types of Droughts



Source: https://www.weather.gov/safety/drought-types

The California Department of Water Resources (DWR) says the following about drought:

> *"One dry year does not normally constitute a drought in California. California's extensive system of water supply infrastructure—its reservoirs, groundwater basins, and inter-regional conveyance facilities—mitigates the effect of short-term dry periods for most water users. Defining when a*

drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users having a different water supply. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, or expected supply from a water wholesaler to define their water supply conditions."

Drought in California is further compounded by water-rights. Water rights in California are governed by a complex system combining riparian rights, appropriative rights, and groundwater regulations, while also accommodating federal tribal water rights. Riparian rights grant landowners adjacent to natural watercourses the right to reasonable use of water on their property. Appropriative rights, based on "first in time, first in right," allow diversion of water for beneficial use and are prioritized by seniority. These rights are subject to the Public Trust Doctrine, ensuring water resources serve the public's interest in ecological, navigational, and recreational uses.

Tribal water rights, distinct from this state framework, are governed by federal law under the Winters Doctrine, which reserves water sufficient to meet the purposes of a reservation. These rights are typically senior to state-granted rights, dating back to the establishment of the reservation. However, many tribal rights remain unquantified until addressed through litigation or settlement. In California, tribes may also hold state-recognized water rights and are considered stakeholders under the Sustainable Groundwater Management Act (SGMA), though SGMA does not regulate tribal lands. Despite their seniority, tribes often face practical challenges, such as limited infrastructure to fully utilize their rights.

Drought impacts are wide-reaching, affecting economic, environmental, and societal systems. The most significant impacts associated with drought in the planning area are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Reduced water allocations during droughts result in lower availability for these activities, often necessitating voluntary water conservation measures. Extended droughts may also lead to reduced electric power generation and water quality deterioration. Additionally, drought conditions can cause soil compaction, reducing its ability to absorb water, potentially increasing the risk of flooding when rain returns.

Sustainable Groundwater Management Act (SGMA) of 2014

In January 2014, Governor Brown declared an emergency proclamation due to multiple years of drought. The proclamation called on citizens to reduce water use by 20 percent, with a subsequent Executive Order in April 2015 that directed urban water agencies to reduce water use by 25 percent. In September 2014, the Governor signed a three-bill package (California Senate Bills 1168 and 1319, and Assembly Bill [AB] 1739), known as the Sustainable Groundwater Management Act of 2014 (SGMA). SGMA provides for the establishment of local Groundwater Sustainability Agencies (GSAs) to manage groundwater sustainably within the groundwater subbasins defined by the California DWR.

With the passage of SGMA, DWR reviewed and adjusted the boundaries of 54 groundwater basins based on local agency requests, classifying them into four priority levels: high, medium, low, and very low, to guide groundwater management strategies across the state. High or medium priority basins are subject to critical conditions of overdraft were required to submit a Groundwater Sustainability Plan (GSP) by January 31, 2020, to ensure a sustainable yield of groundwater. The deadline to submit a GSP for high or medium priority basin not subject to critical conditions of overdraft was January 31, 2022.

The roles of County, local agencies, and the state within SGMA are summarized in Figure 5-53 below.

Figure 5-53 Sustainable Groundwater Management Act Responsibilities



The State identified the groundwater basins in Table 5-72 within San Luis Obispo County.

Table 5-72 Groundwater Sub-basins Within San Luis Obispo County

BASIN – SUBBASIN NAME	PRIORITY	CRITICAL OVERDRAFT	GROUNDWATER SUSTAINABILITY AGENCY	GROUNDWATER SUSTAINABILITY PLAN
Arroyo De La Cruz Valley	Very Low	No	Not Required	Not Required
Big Spring	Very Low	No	Not Required	Not Required
Carrizo Plain	Very Low	No	Not Required	Not Required
Cayucos Valley*	Very Low	No	Not Required	Not Required
Cholame Valley	Very Low	No	Not Required	Not Required
Chorro Valley*	Very Low	No	Not Required	Not Required
Cuyama Valley	High	Yes	Cuyama Basin GSA	2024 Cuyama Valley Groundwater Basin Public Draft GSP
Huasna Valley	Very Low	No	Not Required	Not Required
Los Osos Valley – Los Osos Area*	Very Low	Yes	Not Required	Not Required
Los Osos Valley -Warden Creek	Very Low	No	County of SLO GSA – Los Osos Fringe Areas	Not Required
Morro Valley*	Very Low	No	Not Required	Not Required
Old Valley	Very Low	No	Not Required	Not Required
Pozo Valley	Very Low	No	Not Required	Not Required
Rafael Valley	Very Low	No	Not Required	Not Required

BASIN – SUBBASIN NAME	PRIORITY	CRITICAL OVERDRAFT	GROUNDWATER SUSTAINABILITY AGENCY	GROUNDWATER SUSTAINABILITY PLAN
Rinconada Valley	Very Low	No	Not Required	Not Required
Salinas Valley – Atascadero	Very Low	No	Atascadero Basin GSA	Not Required
Salinas Valley – Paso Robles	High	Yes	Paso Basin Cooperative Committee**	2019 Paso Robles Subbasin GSP
San Carpoforo Valley	Very Low	No	Not Required	Not Required
San Luis Obispo Valley	High	No	City of SLO Basin GSP, County of SLO GSA – San Luis Obispo Valley	2021 San Luis Obispo Valley Basin GSP
San Simeon Valley	Very Low	No	Not Required	Not Required
Santa Maria Valley - Arroyo Grande	Very Low	No	City of Arroyo Grande GSA, County of San Luis Obispo GSA – Santa Maria Basin Fringe Areas	Not Required
Santa Maria Valley - Santa Maria*	Very Low	No	County of SLO GSA – Santa Maria Basin Fringe Areas	Not Required
Santa Rosa Valley	Very Low	No	Not Required	Not Required
Toro Valley	Very Low	No	Not Required	Not Required
Villa Valley*	Very Low	No	Not Required	Not Required

Source: DWR, 2024, https://data.cnra.ca.gov/dataset/sgma-basin-prioritization
* indicates groundwater basins with known saltwater intrusion issues
** The Paso Robles Cooperative Committee is comprised of the San Miguel Community Services District GSA, the City of Paso Robles GSA, the County of San Luis Obispo GSA – Paso Robles Area, Estrella-El Pomar-Creston Water District GSA, San Miguel Community Services District GSA, and Shandon-San Juan GSA.

SB 552: Drought Planning for Small Water Suppliers and Rural Communities

In September 2021, Governor Gavin Newsom signed Senate Bill 552, Drought Planning for Small Water Suppliers and Rural Communities (SB 552), into law. Under the bill, the State, its counties, and small water suppliers have requirements to ensure shared responsibility in preparing and acting in case of a drought event. The requirements of the law are as follows:

- The State is required to maintain and update the Water Shortage Vulnerability Tool to assist small water providers and counties in accessing information about drought, water shortage vulnerabilities, and risks. Additionally, DWR will coordinate with other state agencies to establish a standing drought and water shortage task force for California.
- Counties are required to:

Have a standing Drought Task Force that facilitates drought and water shortage preparedness for domestic wells,[3] privately supplied homes within the county's jurisdiction(s), and small state water systems.[4]

Develop a plan that demonstrates potential drought and water shortage risks along with proposed short- and long-term solutions for small state and domestic wells within the county. Both requirements may be implemented as part of other existing committees and/or planning processes.

- Small water providers (those with fewer than 3,000 connections and serving fewer than 3,000-acre feet) are required to:

  Have an abridged water shortage contingency plan by July 1, 2023,

  Submit an annual report detailing their water supply conditions and usage by month,

  Upgrade their infrastructure to drought-resilient standards if necessary.

- SB 552 does not explicitly apply to

  Transient, non-community water systems or

  Non-Transient No-Community (NTNC) water systems that are not schools.

County Requirements

SB 552 places drought and water shortage planning responsibility on counties for state small water systems and domestic well communities within the county's jurisdiction. San Luis Obispo County is meeting these requirements through a combination of its MJHMP and a County Drought Resilience Plan drafted in 2025 with technical assistance from the California Department of Water Resources and Stantec. SB 552's language allows for flexibility in how the county implements these requirements and the County's approach ensures coordination across existing plans and relevant agency efforts including those of its GSAs.

Countywide Drought Task Force

San Luis Obispo County is meeting the Senate Bill 552 requirement for a County Drought and Water Shortage Task Force through its existing Water Resources Advisory Committee (WRAC). Led by the County Office of Emergency Services, WRAC serves as the coordinating body for drought and water shortage preparedness for all small water systems and domestic wells countywide. The committee includes advisory members who provide essential insights on drought conditions, the needs of small water systems, and appropriate response and mitigation strategies..

Countywide Drought and Water Shortage Risk Mitigation Plan

The County Drought and Water Shortage Risk Mitigation Plan, required by Water Code §10609.70, is designed to address potential drought and water shortage risks for state smalls and domestic wells within the County's jurisdiction. This plan can either be a stand-alone document or incorporated into existing county plans, such as a LHMP, emergency operations plan, climate action plan, or general plan.

The plan must identify potential drought, water shortage risks, and propose both interim and long-term solutions that considers all domestic wells and State Smalls in the County, listed in Table 1-1 of Appendix H Drought Risk Assessment. Additionally, it should consider consolidations of existing water systems and domestic wells, as well as domestic well drinking water mitigation programs. The plan must include provisions for emergency and interim drinking water solutions and provide an analysis of the steps necessary for implementation.

3 **Domestic Wells** are those serving one connection.

4 A **state small water system** is 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.

Finally, it should examine local, state, and federal funding sources available to support the implementation of the plan.

5.3.9.2 Geographic Area

Drought is a regional hazard, and at its worst can affect the entire state of California with varying levels of dryness and drought activity. It is safe to assume that unless the drought event is at its very beginning or very end, if any area of the County of San Luis Obispo is affected by any level of drought, the other areas of the county are will also experience varying effects.

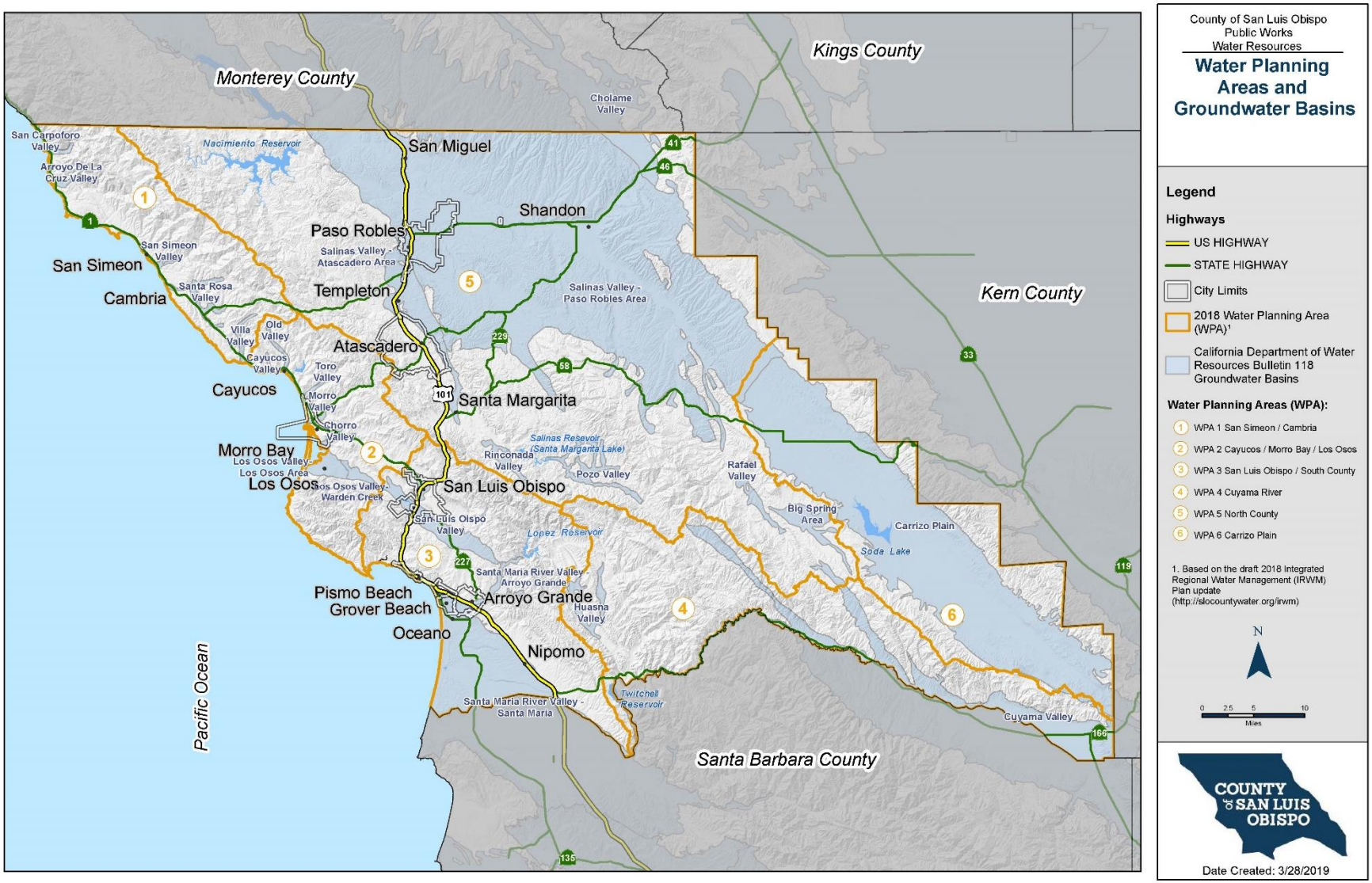
The County's 3,304 square mile area is divided into three sub-regions: the North Coast Sub-Region, the North County Sub-Region, and the South County Sub-Region. Within the sub-regions, there are 6 Water Planning Areas (WPAs) (whose boundaries considers watershed boundaries, groundwater basin boundaries, water supply systems, urban growth boundaries, and water supplies and management practices) and 25 watersheds. The boundaries of the WPAs are shown in Figure 5-54 below, and the WPAs and watersheds in each sub-region is detailed in Table 5-73 below.

Table 5-73 San Luis Obispo Sub-Regions, WPAs, and Watersheds

SUB-REGION	WPA (2018)	WATERSHEDS
North Coast	San Simeon/Cambria	San Carpoforo Creek
		San Simeon Area
		Santa Rosa Creek Area
	Cayucos/Morro Bay/Los Osos	Cayucos Creek – Whale Rock Area
		Morro Bay
		Coastal Irish Hills
South County	San Luis Obispo/South County	San Luis Obispo Creek
		Pismo Creek
		Arroyo Grande Creek
		Oso Flaco – Black Lake Area
		Nipomo Creek – Santa Maria River Area
	Cuyama River	Alamo Creek
		Huasna River
		Cuyama River
North County	North County	Upper San Juan Creek
		Lower San Juan Creek
		Cholame Creek
		Estrella River
		Upper Salinas River – Santa Margarita Area
		Mid Salinas River – Atascadero Area
		Huer Huero Creek
		Lower Salinas River – Paso Robles Area
		Nacimiento Area
	Carrizo Plain	Soda Lake
		Black Sulphur Spring

Source: https://www.slocounty.ca.gov/Departments/Public-Works/Forms-Documents/Committees-Programs/Integrated-Regional-Water-Management-(IRWM)/IRWM-Plan/2019-IRWM-Plan.aspx

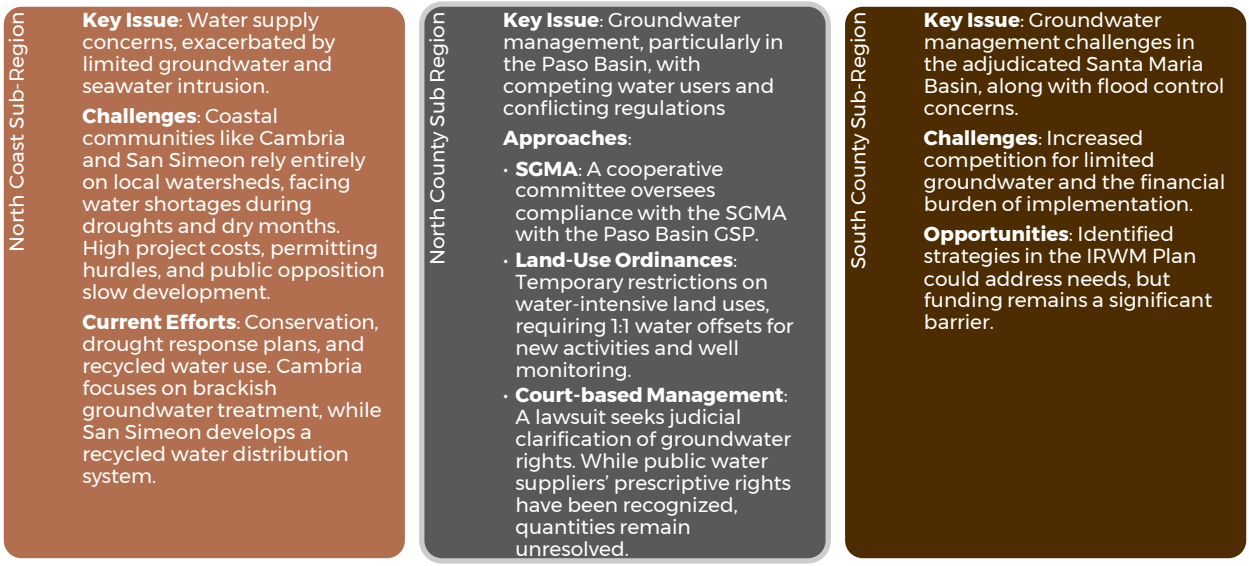
Figure 5-54 San Luis Obispo County Water Planning Areas



Source: San Luis Obispo Public Works, Water Resources Division

The major water supply for all of the WPA come from groundwater sources and minor supplies from surface water sources such as the Salinas and Estrella Rivers (IRWM 2019). During periods of drought there is an increased demand for groundwater resources. In addition to groundwater sources, most of the WPAs receive water supplies from other sources such as the State Water Project, Nacimiento Water Project, and reservoirs such as Whale Rock, Chorro, Lopez Lake, and Salina. Some communities have gone beyond groundwater and surface water supplies and have developed recycled water programs (City of San Luis Obispo and City of Pismo Beach) for the purposes of irrigating landscaping or control dust on construction sites. The City of Morro Bay has also implemented a desalination project. Drought impacts are an issue for all of the WPAs. Challenges specific to each WPA are described in Figure 5-55.

Figure 5-55 Critical Water Resource Issues by WPA



5.3.9.3 Extent (Magnitude/Severity)

Critical– The magnitude of a drought's impact is directly related to the severity and length of the drought. The severity of a drought depends on water availability and moisture deficiency, the time period, and the size and location of the affected area. The longer the drought persists and the larger the area effected, the more severe the potential impacts. Droughts can be a short-term event over several months or a long-term event that lasts for years or even decades.

The U.S. Drought Monitor (USDM) is a widely used site for obtaining and summarizing drought information, as it integrates data from several other sources including the Palmer Drought Index, Soil Moisture Models, U.S. Geological Survey Weekly Stream Flows, Standardized Precipitation Index, and the Satellite Vegetation Health Index. It includes five drought intensity categories for measuring dry conditions across counties, states, and regions of the U.S., so that drought can be quantified. These categories range from "abnormally dry" to "exceptional drought." Table 5-74 summarizes the historically observed impacts by USDM category for drought in the State.

Table 5-74 Historically Observed Impacts by Drought Monitor Category in California

CATEGORY	HISTORICALLY OBSERVED IMPACTS
D0 – Abnormally Dry	• Soil is dry; irrigation delivery begins early
	• Dryland crop germination is stunted
	• Active fire season begins

CATEGORY	HISTORICALLY OBSERVED IMPACTS
D1 – Moderate Drought	• Dryland pasture growth is stunted; producers give supplemental feed to cattle
	• Landscaping and gardens need irrigation earlier; wildlife patterns begin to change
	• Stock ponds and creeks are lower than usual
D2 – Severe Drought	• Grazing land is inadequate
	• Fire season is longer, with high burn intensity, dry fuels, and large fire spatial extent
	• Trees are stressed; plants increase reproductive mechanisms; wildlife diseases increase
D3 – Extreme Drought	• Livestock need expensive supplemental feed; cattle and horses are sold; little pasture remains; fruit trees bud early; producers begin irrigating in the winter
	• Fire season lasts year-round; fires occur in typically wet parts of the State; burn bans are implemented
	• Water is inadequate for agriculture, wildlife, and urban needs; reservoirs are extremely low; hydropower is restricted
D4 – Exceptional Drought	• Fields are left fallow; orchards are removed; vegetable yields are low; honey harvest is small
	• Fire season is very costly; number of fires and area burned are extensive
	• Fish rescue and relocation begins; pine beetle infestation occurs; forest mortality is high; wetlands dry up; survival of native plants and animals is low; fewer wildflowers bloom; wildlife death is widespread; algae blooms appear

Source: US Drought Monitor, https://droughtmonitor.unl.edu/

Drought in San Luis Obispo County can range from abnormally dry conditions (D0) to exceptional drought (D4) on the U.S. Drought Monitor (USDM) scale, with historical patterns demonstrating frequent periods of severe to exceptional drought. Based on the time series data from 2000 to 2023 in Figure 5-56, significant drought events include prolonged severe to exceptional drought conditions from 2014 to 2017, which prompted a local emergency declaration by the County Board of Supervisors and coincided with a State declaration, see Table 5-75. The County also experienced extreme drought (D3) and exceptional drought (D4) during the 2020-2022 period, reflecting the three driest years in California's recorded history. While federal disaster declarations for drought have been rare, with one occurring in 1977, these periods highlight the potential for extreme and sustained drought conditions in the region.

The severity and extent of drought in San Luis Obispo County are closely tied to larger climatic and hydrological trends. Prolonged droughts often exacerbate water shortages, strain groundwater basins, and reduce streamflows, as reflected in the County's Integrated Water Resources Management Plan and the California State Water Plan. The drought of 2014-2017 was marked by widespread impacts on agriculture, water supplies, and ecosystems, emphasizing the intensity of drought at the D4 level. Similarly, the 2020-2022 drought, discussed in further detail in Past Occurrences, represents an example of the worsening extent of droughts due to changing climate patterns.

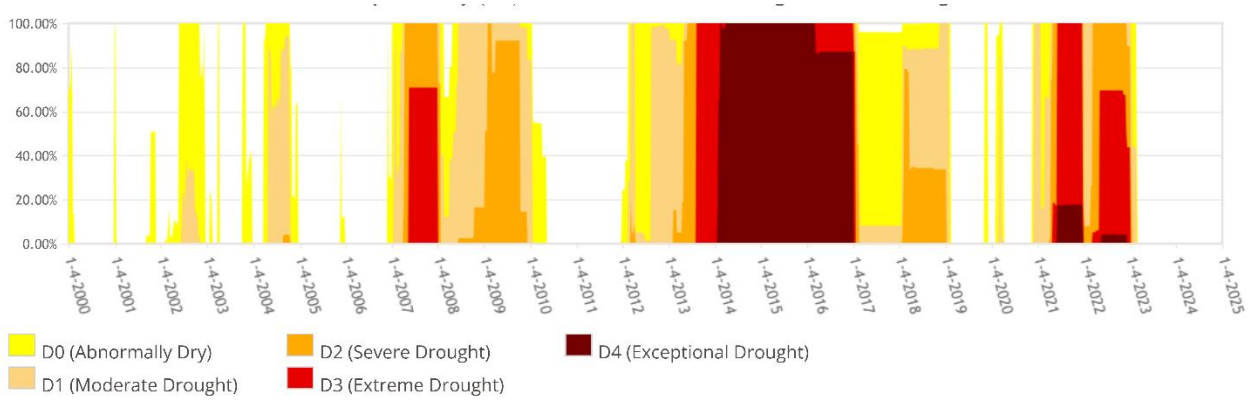
5.3.9.4 Past Occurrences

Figure 5-56 is a time series chart from the US Drought Monitor, displaying the percentage of total land area in San Luis Obispo County that falls into various drought categories from 2000

to late 2024. The chart uses different colors to represent drought severity levels, as defined in Table 5-74.

As shown in the figure, San Luis Obispo County has experienced significant drought conditions multiple times over the past two decades. Notable periods of extreme (D3) and exceptional (D4) drought include around 2014-2017, when the County faced long periods of exceptional drought, and 2020-2022, where extreme and exceptional drought affected nearly all areas. Drought conditions temporarily eased between 2017 and 2019 and again in 2023-2024, with less area in higher drought categories. However, even during these improving periods, much of the County still experienced abnormally dry (D0) or moderate drought conditions (D1), showing that drought is a persistent issue in the County.

Figure 5-56 Percent Area in US Drought Monitor Categories



Source: US Drought Monitor, https://droughtmonitor.unl.edu/

There has been one federal disaster declaration for drought in San Luis Obispo County. EM-3023-CA was declared on January 20, 1977, and closed out on December 20, 1987. A brief history of recent droughts and drought declarations that affected San Luis Obispo County are summarized below.

Table 5-75 County Summary of Secretarial and Governor Disaster Declarations for Drought

YEAR	FEMA DECLARATION NUMBER	USDA DECLARATION NUMBERS
2017	N/A	S4144
The SLO County Board of Supervisors declared a local emergency due to drought in March 2014, ending it in May 2017. The Governor's State of Emergency covered a similar period, from January 2014 to April 2017. Between 2012-2017, the County experienced 13 disaster declarations, though total financial losses across sectors are unclear.		
2018	N/A	S4467
July was the warmest month in the history of the State. A 120 ˚F temperature was recorded at the Chino Airport in San Bernardino County on July 6, 2018. Record-breaking temperatures across the State amplified already dangerous fire conditions where vegetation fuels were exceptionally dry and prone to ignition.		
2021	N/A	S4916, S4969
2022	N/A	S5146
California's three driest years of record were Water Years 2020 – 2022, characterized by extreme heat and a lack of precipitation. By the end of 2021, all 58 counties in California were under a drought emergency proclamation. The state experienced significant crop revenue losses due to this drought period, with direct economic impacts estimated at $1.3 billion in 2021 and $1.7 billion in 2022.		
2023	N/A	S5371

Source: Modified from 2023 State Hazard Mitigation Plan, https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/2023-California-SHMP_Volume-1_11.10.2023.pdf

The 2020 to 2022 drought had significant and multifaceted impacts on San Luis Obispo County, particularly in agriculture, water supply, and ecological health. 2022 marked the driest year in the County in 128 years, with average precipitation levels dropping over nine inches from historical averages. This drought was at times classified as severe, extreme, and exceptional by the USDM, as shown in Figure 5-56.

This drought impacted both small and large-scale farming operations. Farmers faced challenges in securing adequate water supplies, leading many to rely on groundwater extraction. This over-reliance on groundwater can lead to long-term implications such as decreased water quality and land subsidence due to compaction from depleted aquifers.

The cost of growing animal feed rose dramatically due to water shortages, which potentially led to higher food prices and lower quality of food available to consumers. The regional nature of drought means that this situation poses a risk to food security not only locally, but also across California, given that the Central Valley, where much of the State's food is produced, was also affected by these conditions.

Additionally, the drought negatively affected pollinator populations, particularly bees, as the lack of flowering plants diminished their food sources. This decline in bee health can further threaten agricultural productivity by reducing pollination rates for crops, further impacting food prices. While the County has since seen improvements following significant rainfall at the end of 2022, lingering effects of this drought may still be seen.

5.3.9.5 Probability of Future of Drought Occurrences

Likely—San Luis Obispo County has experienced several years-long droughts over the past century, including the historical droughts of 1928-1935, 1976-1977, 1986-1992, 2011-2017, and the more recent drought that occurred in 2020-2021 making drought have a high probability of occurrence. These events suggest the County experiences significant drought conditions approximately once every ten to twenty years, with some shorter but severe droughts, and others lasting several years.

Climate models indicate that they County will become hotter and drier by the end of the century. According to the 2012 Developing Adaptation Strategies for San Luis Obispo County, projections suggest that temperatures may increase by 2-4˚F by mid-century and 4-6˚F by 2075. These changes are expected to result in longer and drier summers, increased frequency and severity of droughts, and reduced groundwater recharge.

Based on this data, droughts will likely continue to affect the planning area. Given the historical occurrence of severe drought impacts throughout San Luis Obispo County and across the state, the HMPC understands that drought will continue to pose a high degree of risk to the entire planning area, potentially impacting crops, livestock, water resources, the natural environment at large, buildings and infrastructure (from cascading or compounding hazards), and local economies.

In addition, although drought affects the entire planning area equally, the potential impacts may be variable and specific to each jurisdiction, depending on contextual factors such as the degree of assets and activities historically impacted by drought within each jurisdiction, such as the agricultural and parks and tourism industries.

5.3.9.6 Climate Change Considerations

Drought conditions in California are likely to become more frequent and persistent over the next century due to climate change. Climate projections indicate significant shifts by 2050, including increased winter rainfall, decreased precipitation during spring and summer, and rising temperatures that affect maximum and minimum daily temperatures, evapotranspiration, runoff, and growing degree days. These changes will have far-reaching implications for water demand, agriculture, and ecosystem health.

According to California's Climate Adaptation Strategy, also referred to as "Safeguarding California Plan: 2018 Update," climate change is likely to significantly diminish California's future water supply. Additionally, existing stresses on water resources, such as population growth, poor water quality, groundwater overdraft, and aging water infrastructure, are being exacerbated.

Rising temperatures and longer growing seasons are expected to increase water demand while reduced precipitation and more frequent extreme droughts will exacerbate existing water supply challenges. Under a high emissions scenario, overall temperatures are projected to increase by 7 to 8 degrees by the end of the century (CNRA 2018). Precipitation is also projected to increase with more year-to-year variability with wetter days during periods of precipitation but fewer total days with precipitation (CNRA 2018). In an average year, approximately 40 percent of the state's total water supply comes from groundwater, and during a dry year this increases to more than half of the state's water supply, with groundwater acting as a critical buffer against the impacts of drought and climate change (California Natural Resources Agency 2018). However, groundwater overdraft

Climate Change Impacts On Water Resources

Sea Level 	**Sea level is rising and will continue to impact coastal groundwater basins like those in the North Coast Sub-basin.**
Soil Moisture 	Prolonged dry seasons can lead to decreases in soil moisture and drier vegetation impacting areas with irrigated agriculture.
Vegetation 	Longer and more intense fire season with increased extent of area burned.
Snowpack 	Increases in temperature will lead to decreases in snowpack and surface water availability throughout the year.
Runoff 	Warmer temperatures are likely to lead to a shift in peak runoff from spring to winter and a likely decrease in summer baseflow.
Hydropower 	Decreased summer flows resulting from earlier snowmelt and a shift in peak runoff could affect hydropower generation at the Gianelli Power Plant, during summer months.
Precipitation 	Warmer winter temperatures will result in a greater percentage of precipitation falling as rain rather than as snow, impacting water suppliers and consumers dependent on surface water.
Groundwater 	Reduction in snowpack and extended periods of drought are likely to increase dependency on groundwater in the County.

Source: http://frap.fire.ca.gov/data/assessment2010/pdfs/3.1water.pdf

and saltwater intrusion into coastal aquifers remain significant concerns, particularly for the Central Coast.

Sub-regional impacts are varied. The North Coast faces threats from sea level rise, affecting groundwater supplies and tourism economies. The North County sees challenges in agricultural water demand due to shifting precipitation patterns and temperatures, while the South County contends with ecosystem vulnerabilities, including impacts on the Guadalupe-Nipomo Dunes and agricultural industries.

5.3.9.7 Vulnerability to Drought (High)

High— Drought can affect a range of economic, environmental, and social activities in the County. The historical and potential impacts of drought on populations include agricultural sector job loss, secondary economic losses to local businesses and public recreational resources, increased costs to the local and state government for large-scale water acquisition and delivery, water rationing, and water wells running dry for individuals and families. Because drought affects a region larger than the County, all populations and property are considered vulnerable to drought. Climate change is expected to further exacerbate drought through water use restrictions as the timing and amount of precipitation shifts, which could change the levels of water demand and the water quality available to residents. As a related drought impact, tree mortality has resulted in potentially vulnerable critical infrastructure as these trees become more susceptible to falling with time and could affect properties in the County.

Structures

The drawdown of the groundwater table is one factor that occurs during repeated dry years in the County. Lowering of groundwater levels results in the need to deepen wells, which subsequently leads to increased pumping costs for small water suppliers. These costs are a major consideration for lower-income residents on properties relying on domestic wells and agricultural producers that irrigate with groundwater and/or use it for frost protection. Properties with older structures, including historic buildings, may also experience foundation issues associated with subsidence if there is a significant drawdown of their groundwater source. Figure 2-3 of Appendix H Drought Risk Assessment presents the physical vulnerability scores for communities in the County. These scores, ranging from 0 to 100, are based on indicators provided by the DWR Water Shortage Vulnerability Scoring and Tool. The figure highlights that the North County WPA in the North County Sub-basin, the San Simeon WPA in the North Coast Sub-region, and the San Luis Obispo WPA in the South County Sub-basin have a high concentration of wells with elevated vulnerability scores.

People

According to the California Department of Finance (DOF) the County population was 278,469 people in 2024. The County's population is projected to continue to increase through 2037 (DOF 2023). This projected population growth will further strain water supplies and increase vulnerability to drought.

The historical and potential impacts of drought on populations include agricultural sector job loss, secondary economic losses to local businesses and public recreational resources, increased cost to local and state government for large-scale water acquisition and delivery, and water rationing and water wells running dry for individuals and families. As drought is often accompanied by prolonged periods of extreme heat, negative health impacts such as dehydration can also occur, where children and elderly in the County are most susceptible. Air quality often declines in times of drought which can affect those with respiratory conditions. See Table 5-36 for additional cascading impacts of high heat and droughts.

Droughts can also lead to crop failures, food shortages, and rising food prices, resulting in malnutrition and undernutrition, especially in low-income populations. Several communities in

the County are experiencing poverty, defined as twice the federal poverty level by CalEnviroScreen due to California's high cost of living. These census tracts are shown in Figure 5-57 and further described in Table 5-76. These census tracts will be at the greatest risk of malnutrition and undernutrition due to drought, especially as warming temperatures and sporadic precipitation events will likely lead to increased food prices.

Figure 5-57 Census Tracts Experiencing Poverty

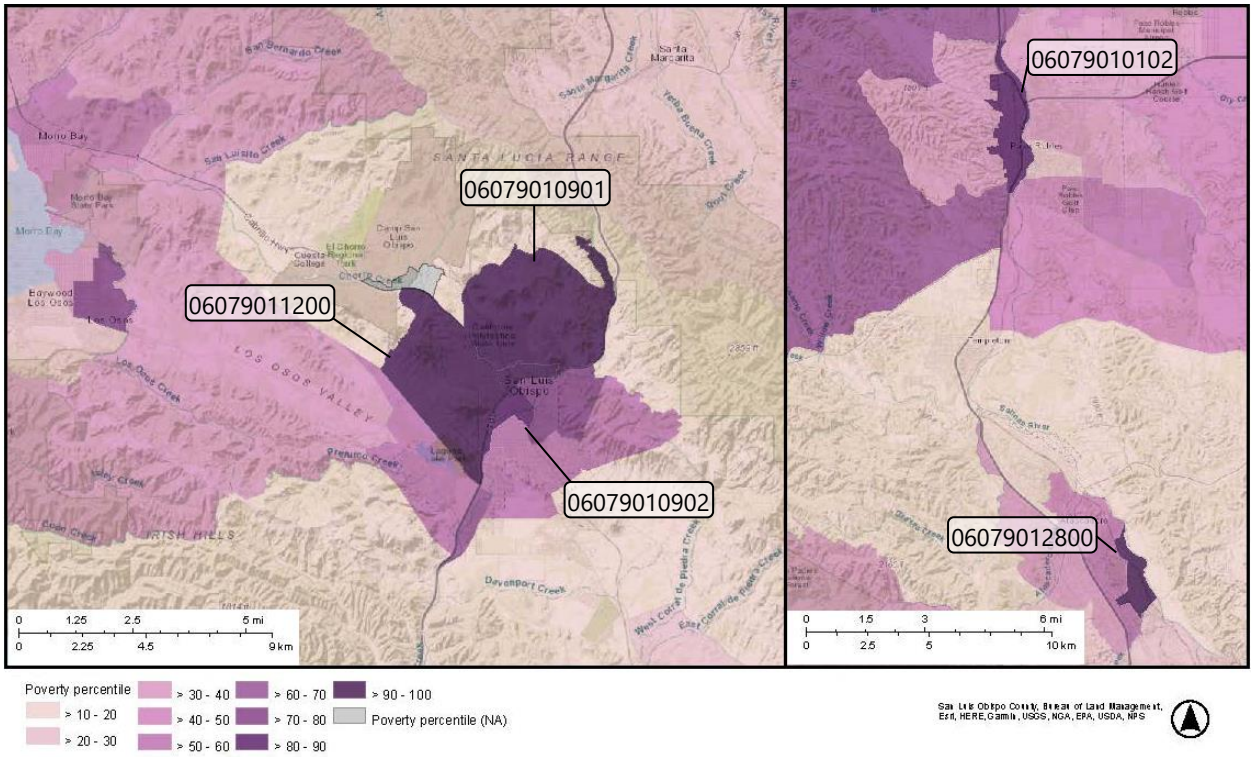


Table 5-76 Poverty Indicators by Census Tract

INCORPORATED PLACE OR CDP	CENSUS TRACT	NUMBER OF RESIDENTS	PERCENT IN POVERTY	PERCENTILE*
Paso Robles	06079010102	6,937	50%	81
Atascadero	06079012800	234	59%	91
City of San Luis Obispo	06079011200	8,150	58%	90
City of San Luis Obispo	06079010901	10,885	90%	100
City of San Luis Obispo	06079010902	4,098	85%	100

Source: CalEnviroScreen 4.0 Indicator Maps, 2024
* The percentile for each census tract is X, meaning the percent of people living below twice the poverty level is higher than X% of the census tracts in California.

Of these socially vulnerable populations, those households that receive water from smaller water suppliers, such as CSDs or state small water systems, may be most vulnerable as these water suppliers may not have the capacity to track groundwater levels. These socially vulnerable populations may also be more susceptible to drought hazards and its cascading impacts due to their age, health, limited mobility, and limited medical resources.

Critical Facilities

Severe droughts can have far-reaching and multi-faceted direct and secondary impacts on critical facilities and lifelines in the County, specifically in the FEMA lifeline categories Safety and Security; Food, Hydration, and Shelter; and Water Systems.

Safety and Security

Drought directly impacts the availability of water for firefighting efforts. As water supplies dwindle, fire services may face challenges in accessing sufficient water for suppression needs. The financial implications of drought can also affect fire services. Many fire protection districts in the County rely heavily on property taxes, which may not keep pace with rising operational costs during droughts. Reduced revenues can hinder the ability of fire protection services to maintain sufficient staffing levels and equipment, potentially compromising response capabilities. Wildfire hazard risk is documented in Figure 2-8 of Appendix H Drought Risk Assessment and in section 5.3.15 Wildfires. If an evacuation becomes necessary, drought conditions may complicate evacuation efforts as rapidly spreading fires may leave little time for residents to evacuate safely.

Food, Hydration, Shelter

Public water systems in San Luis Obispo County are susceptible to drought as they may not have secure water supplies or alternative supply sources. Additionally, state small water systems and those systems reliant on groundwater or low yield fractured rock water, shown broadly in Figures 2-4 and 2-6 of Appendix H Drought Risk Assessment, are reliant on limited capacity sources that are particularly prone to over extractions.

Communities dependent upon or who get a large portion of water from groundwater sources are also at risk to threats to groundwater quality. These threats can include dairy farms and concentrated animal-feeding operations or storage tanks which may leak hazardous materials into groundwater reserves. According to CalEnviroScreen, several communities in San Luis Obispo County face groundwater threats, as shown in Prolonged drought can also exacerbate issues such as seawater intrusion into coastal aquifers. As groundwater levels drop due to over-extraction or reduced recharge, saltwater can encroach into freshwater supplies, compromising drinking water quality. Basins currently experiencing saltwater intrusion are noted with an asterisk in Table 5-72.

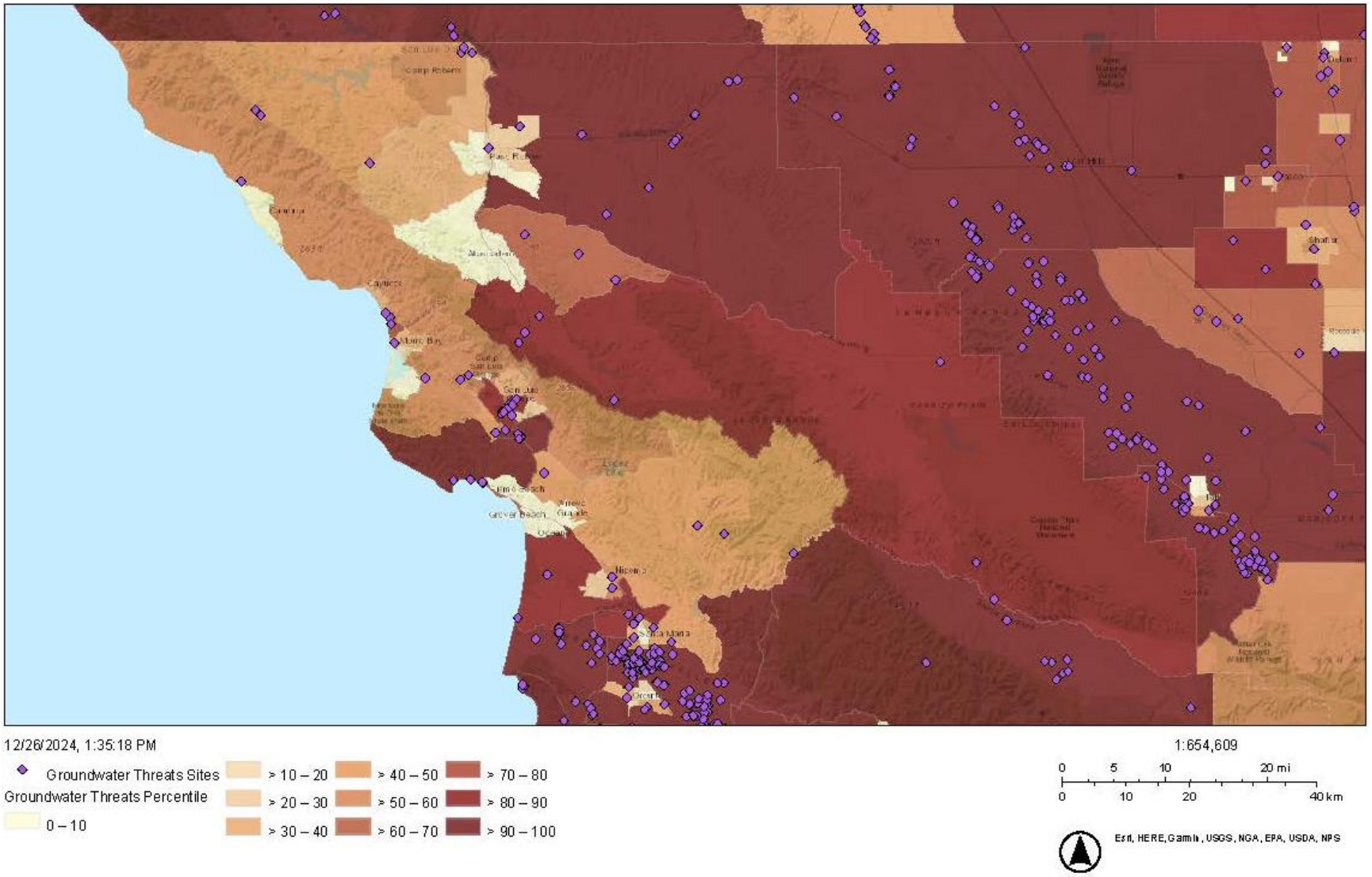
Drought can further affect Food, Hydration, and Shelter lifelines in the County through impacts to agricultural systems. San Luis Obispo has a significant agricultural sector, making impacts to this industry significant and far reaching. Drought impacts on agricultural systems in the County are explored in the Economy and Community Values below.

Figure 5-58.

Prolonged drought can also exacerbate issues such as seawater intrusion into coastal aquifers. As groundwater levels drop due to over-extraction or reduced recharge, saltwater can encroach into freshwater supplies, compromising drinking water quality. Basins currently experiencing saltwater intrusion are noted with an asterisk in Table 5-72.

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Figure 5-58 Groundwater Threat Sites and Percentiles in San Luis Obispo County



Water Systems

Drought conditions pose significant challenges for County water systems relying on groundwater resources. In particular, the Paso Robles, Los Osos, and Cuyama Valley basins are critically overdrafted, meaning that water is being withdrawn at a higher rate than it is replenished, exacerbated by prolonged drought conditions which have limited the availability of water for recharge. Although a series of recent wet winters have temporarily alleviated drought conditions by improving surface water supplies, groundwater basins continue to lag in their recovery as only a small percentage of rainfall contributes to groundwater recharge, meaning that consecutive years of above-average precipitation are needed to achieve substantial recovery in these basins.

The dwindling availability of water has cascading effects on infrastructure and community systems. With increased demand on limited water resources, existing infrastructure such as pipes and treatment facilities face increased stress. The accelerated wear and tear on this infrastructure raises maintenance costs and increases the risk of system failures, presenting both logistical and financial challenges for local agencies. Additionally, as potable water supplies decrease, the demand for wastewater treatment escalates. Communities are often compelled to expand their treatment capacity or invest in advanced technologies to recycle water for irrigation and other non-potable uses. For instance, during previous droughts, the Cambria CSD implemented advanced wastewater treatment systems to supplement their aquifer supplies.

Comparing Figure 2-10 of Appendix H Drought Risk Assessment with Figure 5-61 shows that critically over drafted basins – those classified as Phases 1 and 2 in the SGMA Basin Prioritization during the 2023 update of SB 552 data – are predominately located in the North County WPA. These basins largely coincide with areas of significant irrigated agriculture, suggesting competing demands of groundwater resources. This competition may increase the vulnerability of domestic wells and state small systems, particularly during droughts or water shortages. Additionally, these areas are experiencing subsidence with localized subsidence levels from -0.5 to 0 feet since 2016 (SGMA Data Viewer, 2024).

When compared to Figures 2-3 and 2-4 of Appendix H Drought Risk Assessment, Figure 5 61 and Figure 5 62 show that areas with high vulnerability scores in the San Simeon WPA and San Luis Obispo WPA overlap with regions of irrigated agriculture and fractured rock with high competing demand. Monitoring water availability in fractured rock regions can be challenging, leading to greater uncertainty for those relying on water from these sources. Additionally, having a higher density of domestic wells within a single square mile in fractured rock areas increases the risk of water outages, particularly during dry periods.

Figure 5-59 Amount of Irrigated Agriculture

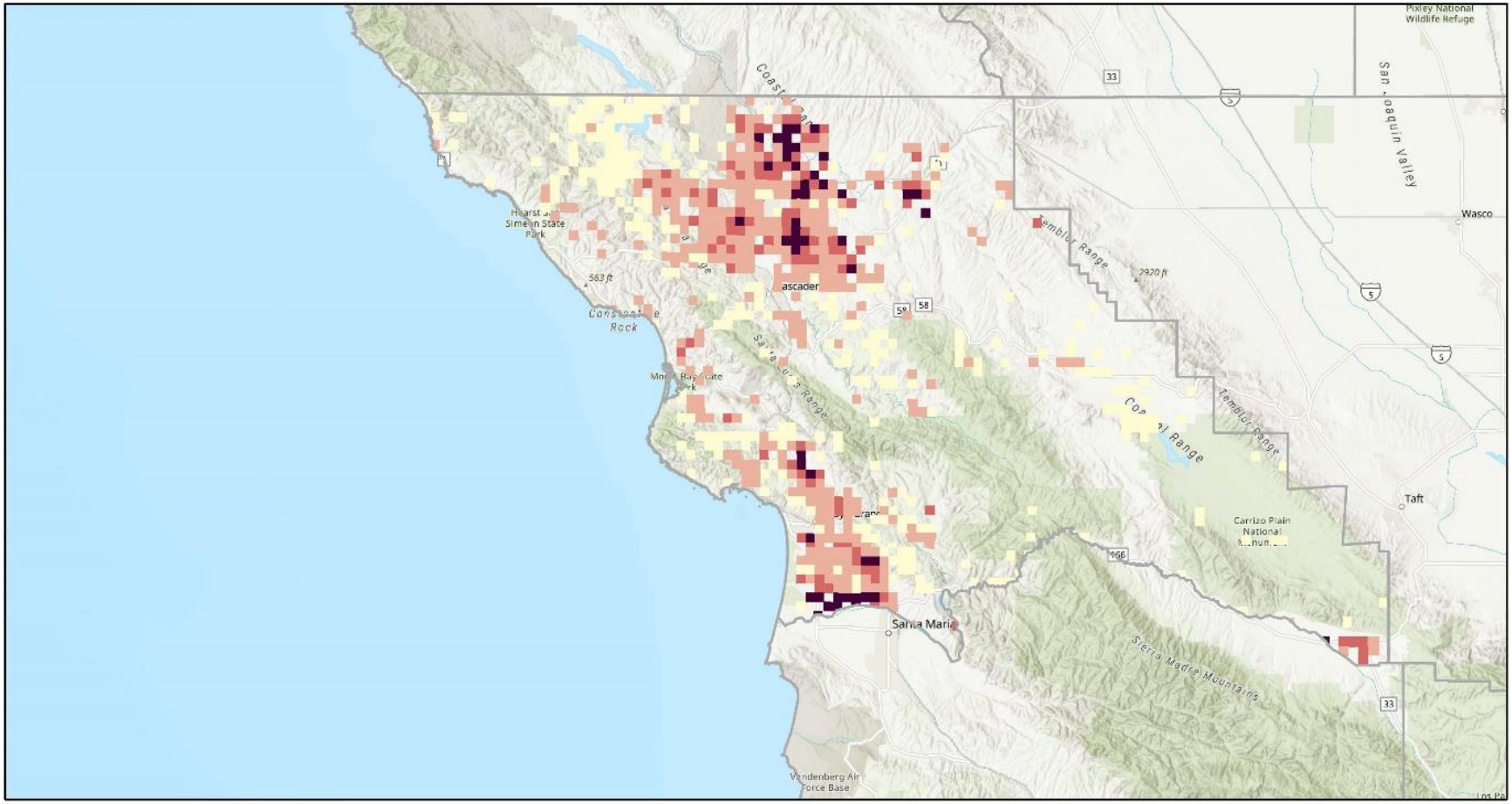
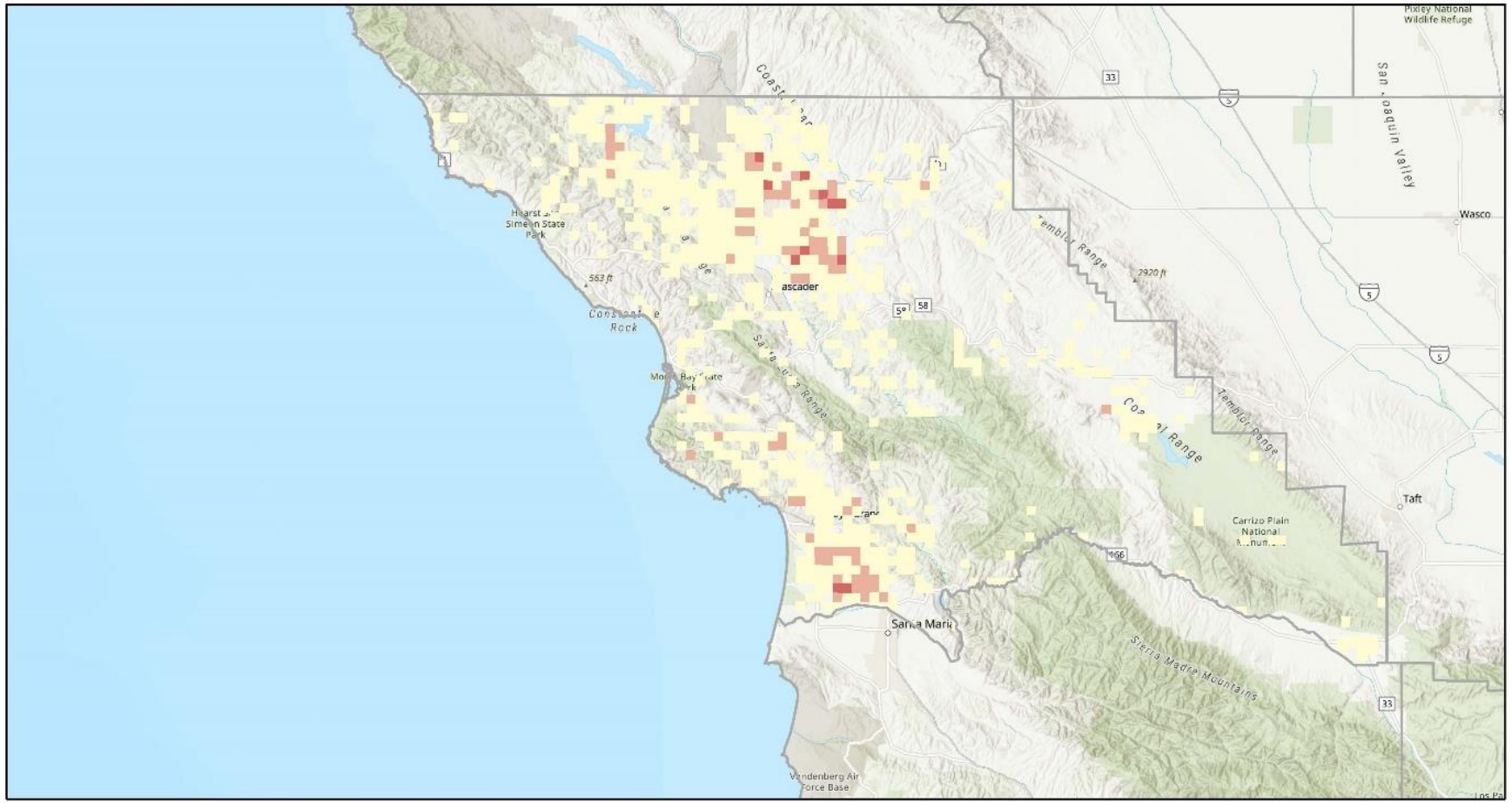


Figure 5-60 Fractured Rock Area Competing Demand



Additionally, drought conditions often lead to stricter regulations regarding wastewater discharge and reuse practices. Beyond regulatory challenges, drought-induced reductions in water flow create risks for public health and sanitation. Lower flows in sewer systems can lead to stagnation, increasing the likelihood of blockages and overflows that threaten environmental and public health.

When groundwater levels decline, wells may need to be deepened in response, which can result in temporary losses of water supply. High demand on water system infrastructure can lead to disruption of service due to line breakage and potential damage to infrastructure. Additional impacts to critical facilities include water shortfalls for facility operations and critical functions, and potential structural destabilization and damage resulting from land subsidence. Refer to the section on Land Subsidence for more information.

The impacts of these vulnerabilities are expected to intensify due to climate change. As temperatures rise and precipitation patterns become increasingly erratic, the County's small water providers are likely to face increased challenges. Growing populations will place additional strain on water resources, exacerbating existing vulnerabilities. Prolonged droughts and heatwaves, which are anticipated to become more frequent and severe under climate change, will further stress water supplies and increase the risk of shortages.

Economy and Community Values

Drought impacts to the local or regional economy can be difficult to quantify but can be extensive and long-lasting depending on the circumstances during and after a severe drought event. When water resources are limited, effects are more severe for industries that rely on large amounts of water and any prolonged drought would intensify these impacts. Sectors critical to the economy such as agriculture, tourism, related environmental resources, municipal and industrial water supply, and energy generation can be affected due to a lack of, or reduced quality of water resources.

According to the County of San Luis Obispo Department of Agriculture/Weights and Measures, total farm gate value of agricultural commodities in San Luis Obispo County surpassed $1.1 billion in 2023. The County's agriculture is characterized by a wide variety of crops, with wine grapes and strawberries being the top two products, together accounting for over half of the total agricultural value. Top agricultural commodities in the County are displayed in Figure 5-61 below.

Figure 5-61 Top Agricultural Commodities in San Luis Obispo County in 2023



Drought conditions significantly impact both surface and groundwater resources, which are essential for agricultural irrigation. As water becomes scarcer, farmers face escalating costs to access dwindling supplies, making it increasingly difficult to maintain productivity for crops and livestock. This scarcity often sparks competition among agricultural users, municipalities, and other sectors, further straining available resources. For farmers, insufficient water availability can lead to substantial reductions in crop yields, sometimes by as much as 30%. Water-stressed plants develop weaker stalks and produce smaller, less flavorful fruits and vegetables, increasing the likelihood of crop failures, especially for varieties reliant on consistent irrigation and pollination.

For instance, in 2022, many rain-dependent crops experienced near-record low yields, with thousands of acres of barley and grain hay left unharvested due to insufficient rainfall, according to the 2022 County Crop Report. Similarly, vineyards faced challenges as salinity levels increased in the soil, impacting plant health and grape quality (Fe 2021).

The challenges extend beyond reduced yields. Drought conditions exacerbate pest and disease outbreaks, as stressed plants become more susceptible to infestations that can further compromise their health. Soil erosion and degradation are also common consequences, with the lack of moisture reducing soil fertility and making it difficult for crops to absorb essential nutrients. This cycle of poor plant health and lower yields can have lasting impacts on the productivity of agricultural land.

Livestock farming is similarly affected, as insufficient rainfall leads to pasture losses. Farmers are often forced to reduce herd sizes or invest in costly feed alternatives to sustain their livestock, significantly increasing operational costs. For example, according to the 2022 County Crop Report while cattle prices increased by 16.5%, many ranchers had to sell animals at lighter weights due to lower forage availability caused by drought. Livestock owners faced challenges related to feed availability as rangeland grass and feed levels dropped significantly. This led to high supplemental feeding costs due to increased prices for hay and other feed sources (Fe 2021).

Drought directly impacts rangeland for livestock in the County as was witnessed during the 2014 drought which had a significant impact on the ranching and agriculture economy. Between 2010 and 2014, roughly 75 percent of the cattle in San Luis Obispo County were sold or taken out of state to escape the drought conditions the County had been experiencing (LA Times 2015). The heavy reliance upon groundwater to irrigate rangeland for livestock makes this sector of the local economy especially vulnerable to future drought events.

In severe drought conditions, farmers may need to delay plantings or leave fields fallow, further reducing agricultural output. The risks associated with drought can even deter farmers from planting certain crops altogether, limiting the diversity and availability of agricultural products. These challenges have severe financial repercussions. Reduced yields translate to lower revenue for farmers, and the impacts ripple through the agricultural supply chain, affecting food processors, labor demand, and local economies.

Table 5-77 provides a summary of agricultural losses due to drought across the County, using data from the USDA's Risk Management Agency Crop Indemnity Reports for 2007–2021. As shown in Table 5-77 and Figure 5-56, the years with the highest number of affected acres (2007, 2014, and 2021) coincide with periods of extreme and exceptional drought (USDM categories D3 and D4). Crop losses due to drought were reported in all years except 2011, 2017, and 2019–2020, which were primarily categorized as non-drought years or had a USDM classification of D0.

Table 5-77 Risk Management Agency Crop Indemnity Reports, 2007 to 2021

YEAR	CROP	SUM OF NET ACRES	SUM OF INDEMNITY AMOUNT
2007	Barley	10,750.3	$196,998
2007	Oats	345.2	$5,662
2007	Wheat	246.0	$4,491
2008	Barley	5,976.4	$255,299
2008	Oats	224.9	$5,078
2008	Wheat	1,527.6	$70,600
2009	Barley	7,043.8	$373,099
2009	Oats	65.0	$46
2009	Wheat	31.1	$1,489
2010	Barley	415.6	$7,697
2012	Barley	5,646.6	$289,671
2012	Oats	37.8	$842
2013	Barley	6,571.4	$595,102
2013	Oats	29.2	$98
2013	Wheat	145.5	$20,865
2014*	Adjusted Gross Revenue*	-	$75,030
2014	Barley	8,335.3	$711,417
2014	Walnuts	213.1	$85,958
2015	Barley	7,165.4	$416,544
2015	Grapes	38.4	$130,108
2015	Walnuts	176.2	$72,619
2015	Wheat	44.4	$3,081
2016	Walnuts	136.2	$56,667
2018	Barley	3,600.3	$186,521
2021	Barley	8,422.8	$513,395

YEAR	CROP	SUM OF NET ACRES	SUM OF INDEMNITY AMOUNT
2021	Grapes	1.4	$257
	Grand Total	67,189.8	$4,078,634

Source: USDA RMA Crop Indemnity Reports, 2021

* Adjusted Gross Revenue was a pilot program from the RMA that provided insurance for low revenue due to natural disasters and market fluctuations

Historic, Cultural, and Natural Resources

The historical and potential impacts of drought on the natural environment are widespread throughout public and private lands within the County. These effects include increased tree mortality, widespread harm to flora and fauna, and land destabilization, such as erosion and subsidence along streams, rivers, and within watersheds. Tree mortality was identified as an additional drought impact of significance to the County during the 2019 update. Tree mortality is a cascading hazard which exacerbates other hazards such as wildfire, agricultural and biological hazards, and wind events. Drought-stressed trees are particularly vulnerable to diseases and insect infestations, such as bark beetles, further accelerating tree mortality and its associated risks.

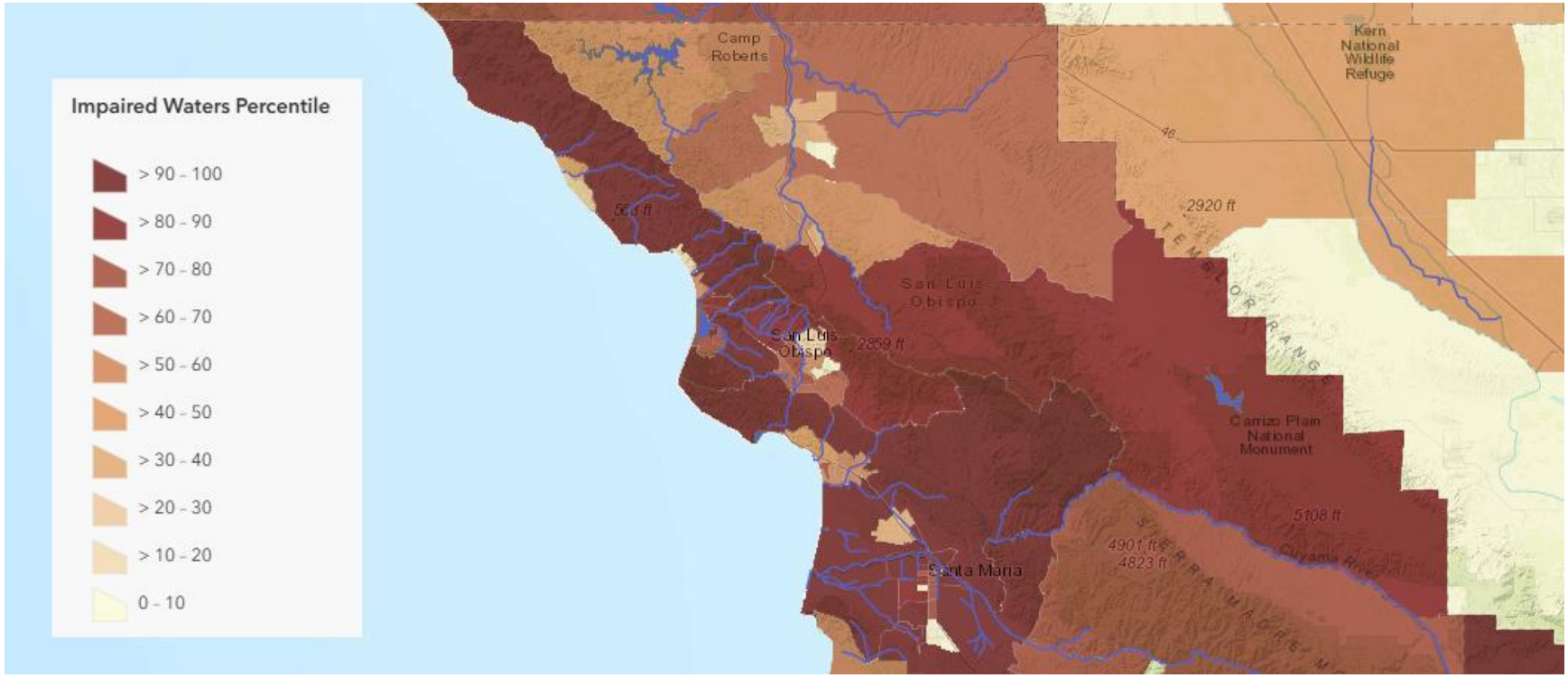
A notable example occurred during the multiyear drought from 2012–2015, when blue oak trees, renowned for their drought tolerance, experienced widespread die-offs across the County. Researchers attributed this event to severe groundwater depletion, which prevented the roots of the trees from reaching aquifers (Weiser 2017). Tree mortality risk has also increased in WPA 2 in the Montaña de Oro State Park and in WPAs 4 and 5 in the Los Padres National Forest. See Agricultural Pest Infestation, Plant Disease, Marine Invasive Species and Tree Mortality (Section 5.3.5) for more information on tree mortality and its impacts.

Impaired water bodies are particularly vulnerable during drought conditions. According to CalEnviroScreen, several coastal census tracts are identified as having severely impaired waters, as illustrated in Increased development puts further strain on waterbodies. In addition to overextraction of water, increased human activity can increase the number and amount of debris and pollutants introduced to a waterway. Contamination of these waters by pollutants can compromise the use of the water body for drinking, swimming, fishing, aquatic life protection, and other beneficial uses.

Figure 5-62 and further detailed in Table 5-78. Streams, rivers, and lakes serve multiple critical purposes, including recreation, fishing, and providing water for drinking and agriculture. When these water bodies are contaminated with pollutants, they are classified as impaired, reflecting the level of pollution present in or near the water source. Tribal communities, low-income populations, and other underserved groups often rely more heavily on the fish, aquatic plants, and wildlife from these water bodies than the general population, making them especially susceptible to the impacts of water quality impairments.

Increased development puts further strain on waterbodies. In addition to overextraction of water, increased human activity can increase the number and amount of debris and pollutants introduced to a waterway. Contamination of these waters by pollutants can compromise the use of the water body for drinking, swimming, fishing, aquatic life protection, and other beneficial uses.

Figure 5-62 Impaired Water Bodies in San Luis Obispo County



Source: CalEnviroScreen 4.0, 2025

Table 5-78 Water Body Pollution Indicators by Census Tract

INCORPORATED PLACE OR CDP	CENSUS TRACT	NUMBER OF RESIDENTS	NUMBER OF POLLUTANTS	PERCENTILE*
San Miguel	06079013000	2,741	13	92
San Luis Obispo	06079011600	3,908	12	90
Atascadero	06079012302	5,686	22	99
Atascadero	06079012304	10,975	21	99
Paso Robles	06083002502	7,573	31	100

Source: CalEnviroScreen 4.0 Indicator Maps, 2024, data from 2018
* The percentile for each census tract is X, meaning the number of impairments is higher than X% of the census tracts in California.

Development Trends

Over 58% of the County's residents rely on urban water suppliers, as shown in Table 5-79. According to the available Urban Water Management Plans (UWMPs), each urban water supplier has sufficient resources to meet customer needs during single and multiple dry-year scenarios.

Table 5-79 Reliability of Urban Water Suppliers in the County

URBAN WATER SUPPLIER	POPULATION SERVED	PERCENTAGE OF COUNTY*	URBAN WATER MANAGEMENT PLAN	ADEQUATE WATER SUPPLY FOR 5 DRY-YEARS
Atascadero Mutual Water Company	31,749	11.2%	2020 Urban Water Management Plan	Yes
City of Arroyo Grande Public Works Department	17,641	6.3%	2022 Urban Water Management Plan	Yes
City of Grover Beach Public Works Department	13,156	5.0%	2010 Urban Water Management Plan	Yes^
City of Paso Robles Water Division	31,221	11.0%	2020 Urban Water Management Plan	Yes
City of Pismo Beach Public Works Department	8,559	3.0%	2020 Urban Water Management Plan	Yes
City of San Luis Obispo Utilities Department	47,081	16.6%	2020 Urban Water Management Plan	Yes
Oceano Community Services District+	7,601	2.7%	None available	Unknown
Templeton Community Services District	7,886	2.8%	2020 Urban Water Management Plan	Yes

* Population served was determined by most recent UWMP where available, and percentage of population was determined by ACS five-year estimates corresponding to the year of the most recent UWMP
^ Three-year estimate
+Population served from State Water Resources Control Board Division of Drinking Water; County population from 2020 ACS

While past development has increased water demand, each water district has successfully managed to meet that demand by utilizing available supply. Future growth and development in the County are expected to create similar challenges, impacting populations, properties, critical facilities, and the natural environment. As the population continues to grow and climate change projections indicate more frequent and prolonged droughts, it is crucial to address both current and future water supply needs during the development review process.

Risk Summary

- Drought is considered a high significance hazard due to its widespread impacts.
- The County's primary water supply comes from groundwater, with minor contributions from surface sources like the Salinas and Estrella Rivers.
- Significant drought periods over the last three decades include 2014–2017 and 2020–2022, marked by extreme and exceptional drought affecting nearly the entire County. Temporary improvements occurred between 2017–2019 and 2023–2024, though much of the County remained abnormally dry or in moderate drought.
- Historical data and climate projections suggest San Luis Obispo County may experience drought conditions approximately once every 10 to 20 years.

- Drought impacts populations through agricultural job losses, secondary economic downturns, higher government costs for water acquisition and delivery, water rationing, and individual wells running dry.
- Prolonged drought often coincides with extreme heat, leading to dehydration risks, particularly for children and the elderly, and worsening air quality, which affects those with respiratory conditions.
- Drought can cause crop failures, food shortages, and rising food prices, disproportionately impacting low-income populations and increasing risks of malnutrition and undernutrition.
- Agriculture is critical to the County's economy, with a total farm gate value exceeding $1.1 billion in 2023, making drought a significant economic concern.
- Climate change projections show that extreme prolonged drought is likely to continue and will exacerbate existing water supply challenges.
- Areas with high physical and high social vulnerability are concentrated in inland North County, Cuyama Valley, and rural South County areas.
- Basins with the highest dry well susceptibility include Paso Robles and Los Osos Valley
- The North County Sub-Region faces the highest risk of critical overdraft, frequent well failures, and water quality degradation.
- The South County Sub-Region is also high risk with moderate overdraft and nitrate contamination driven by agriculture.
- The North Coast Sub-Region faces moderate risk with increasing saltwater intrusion.
- *Related Hazards:* Agricultural Pest Infestation and Disease, Extreme Heat, Subsidence, Wildfire

Table 5-80 Hazard Risk Summary - Drought and Water Shortage

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY (EXTENT)	OVERALL SIGNIFICANCE
San Luis Obispo County	Extensive	Likely	Critical	High
City of Arroyo Grande	Significant	Likely	Limited	Medium
City of Atascadero	Extensive	Likely	Limited	Medium
City of Grover Beach	Extensive	Likely	Limited	High
City of Morro Bay	Extensive	Likely	Critical	High
City of Paso Robles	Extensive	Likely	Limited	High
City of Pismo Beach	Extensive	Likely	Negligible	Medium
City of San Luis Obispo	Extensive	Likely	Limited	Medium
Avila Beach CSD	Extensive	Likely	Critical	High
Cambria CSD	Extensive	Likely	Critical	High
Ground Squirrel Hollow CSD	Limited	Occasional	Negligible	N/A
Heritage Ranch CSD	Extensive	Highly Likely	Critical	High
Los Osos CSD	Significant	Likely	Limited	Medium
Nipomo CSD	Significant	Likely	Limited	High

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY (EXTENT)	OVERALL SIGNIFICANCE
Oceano CSD	Extensive	Likely	Critical	High
San Miguel CSD	Extensive	Likely	Catastrophic	High
San Simeon CSD	Significant	Likely	Limited	Medium
Templeton CSD	Extensive	Likely	Limited	High
Cayucos Sanitary District	Limited	Occasional	Negligible	N/A
Port San Luis Harbor District	Extensive	Likely	Negligible	N/A
San Luis Obispo FCWCD	Extensive	Likely	Critical	High
South San Luis Obispo Sanitary District	Significant	Likely	Limited	Low

5.3.10 Earthquakes, Faults, and Liquefaction

5.3.10.1 Hazard/Problem Definition

An **earthquake** is the sudden, rapid shaking of the ground caused by the breaking and shifting of rock beneath the earth's surface or along fault lines. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as the huge plates that form the Earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free causing the ground to shake. Most earthquakes occur at the boundaries where the plates meet, commonly called faults; however, some earthquakes occur in the middle of plates.

A **fault** is a fracture in the earth's crust along which movement has occurred either suddenly during earthquakes or slowly during a process called creep. Cumulative displacement may be tens or even hundreds of miles if movement occurs over geologic time. However, individual episodes are generally small, usually less than several feet, and are commonly separated by tens, hundreds, or thousands of years. Damage associated with fault-related ground rupture is normally confined to a fairly narrow band along the trend of the fault. Structures which straddle faults are often not able to withstand fault rupture and utilities crossing faults are at risk of damage. Fault displacement involves forces so great that it is generally not feasible (structurally or economically) to design and build structures to accommodate this rapid displacement.

Fault displacement can also occur in the form of barely perceptible movement called "fault creep." Damage by fault creep is usually expressed by the rupture or bending of buildings, fences, railroads, streets, pipelines, curbs, and other linear features. Excellent examples of fault creep can be seen in the Carrizo Plain area of eastern San Luis Obispo County where gradual creep on the San Andreas fault has offset stream beds, roadways, and fence lines. In addition, there is also the potential for co-seismic creep, where movement on a fault is triggered by an earthquake on another nearby fault.

Liquefaction occurs when ground shaking causes the mechanical properties of some fine grained, saturated soils to liquefy and act as a fluid (liquefaction). It is the result of a sudden loss of soil strength due to a rapid increase in soil pore water pressures caused by ground shaking. In order for liquefaction to occur, three general geotechnical characteristics should be present: 1) ground water should be present within the potentially liquefiable zone, 2) the potentially liquefiable zone should be granular and meet a specific range in grain-size distribution, and 3) the potentially liquefiable zone should be of low relative density. If those criteria are present and strong ground motion occurs, then those soils could liquefy, depending upon the intensity and duration of the strong ground motion. Liquefaction that produces surface effects generally occurs in the upper 40 to 50 feet of the soil column, although the phenomenon can occur deeper than 100 feet. The duration of ground shaking is also an important factor in causing liquefaction to occur. The larger the earthquake magnitude, and the longer the duration of strong ground shaking, the greater the potential there is for liquefaction to occur.

5.3.10.2 Geographic Area

USGS Quaternary earthquake fault zones were mapped to display the location of fault lines in and near the planning area, along with active and potentially active earthquake faults as determined at the local level. Figure 5-63 below displays these fault lines The county is overall covered by various fault lines and zones, running in a north-south fashion from the coast to the eastern slopes. All active and potentially active faults are located in the east and south of the county, on or near the San Andreas Fault Zone, San Juan Fault Zone, Morales Fault, and La Panza Fault Zones. The Rinconada and East Huasna Fault Zones run towards the middle of the

county, north-south, with the South Cuyama Fault Zone entering Santa Barbara county to the south of the planning area. The southwest and coastal areas of the county include several faults as well including the West Huasna, San Luis Range, Edna, Cambria, and Oceanic Fault Zones.

Figure 5-63 is an earthquake shaking map of the county that is based on the 2% probability of occurrence in 50 years, taking into account all the potential seismic sources in the area and not one particular fault. It represents less likely, but more severe, ground shaking and supports the conclusion that the San Luis Obispo County planning area is at risk to future damaging earthquake hazards, especially in the eastern portion of the County near the San Andreas Fault. The western portion of San Luis Obispo County has a 2% probability of experiencing ground accelerations in the range of 0.3 g (30% g) to 0.4 g (40% g) in the next 50 years. The eastern portion of the County adjacent to the San Andreas Fault has a 2% probability of experiencing ground accelerations of 0.5 g (50% g) to 0.7 g (70% g) in the next 50 years. The statistical variance in estimated ground acceleration could easily be plus or minus 50 percent of the estimated ground motion

Figure 5-63 Earthquake Faults and Active/Potentially Active Faults

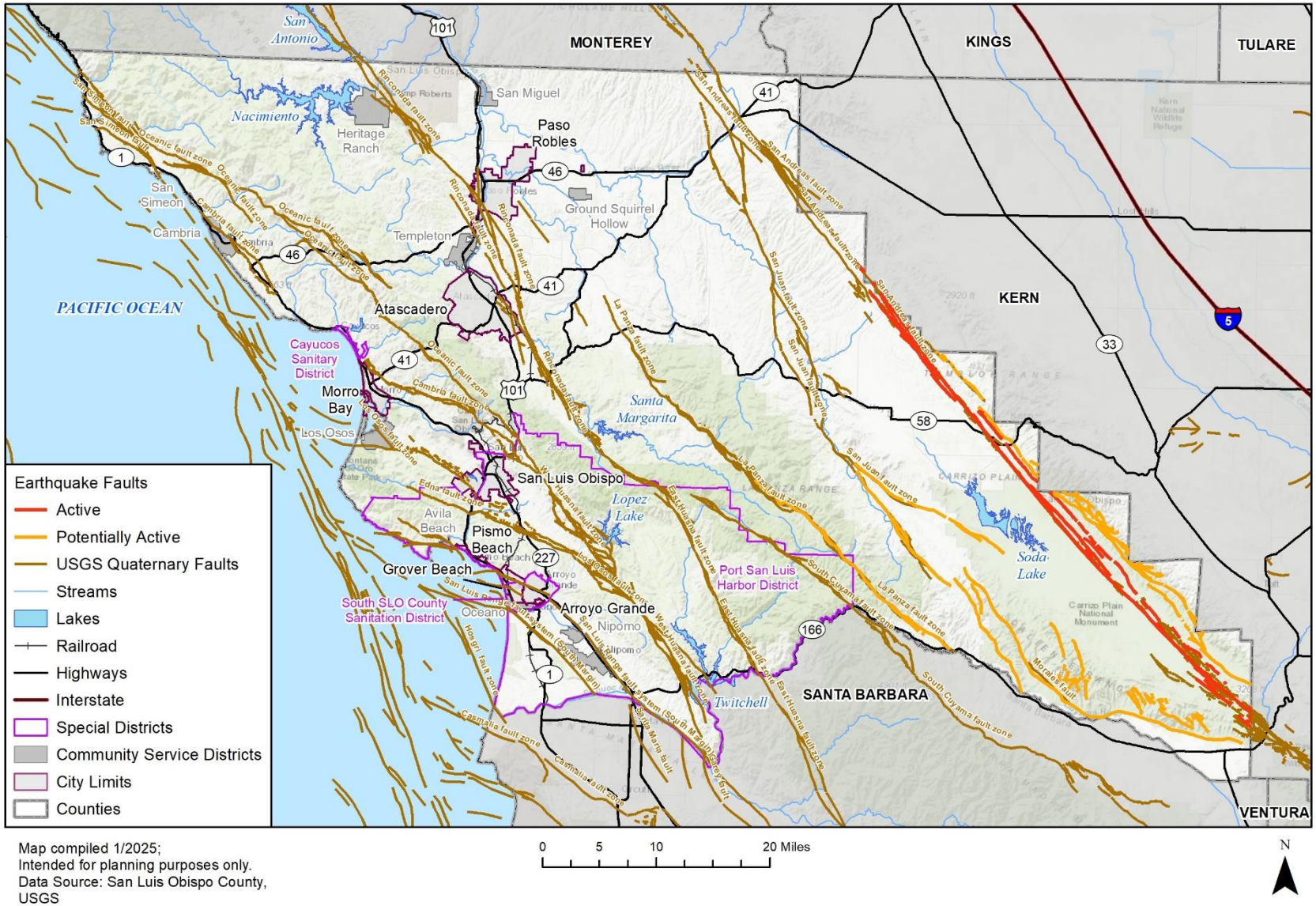
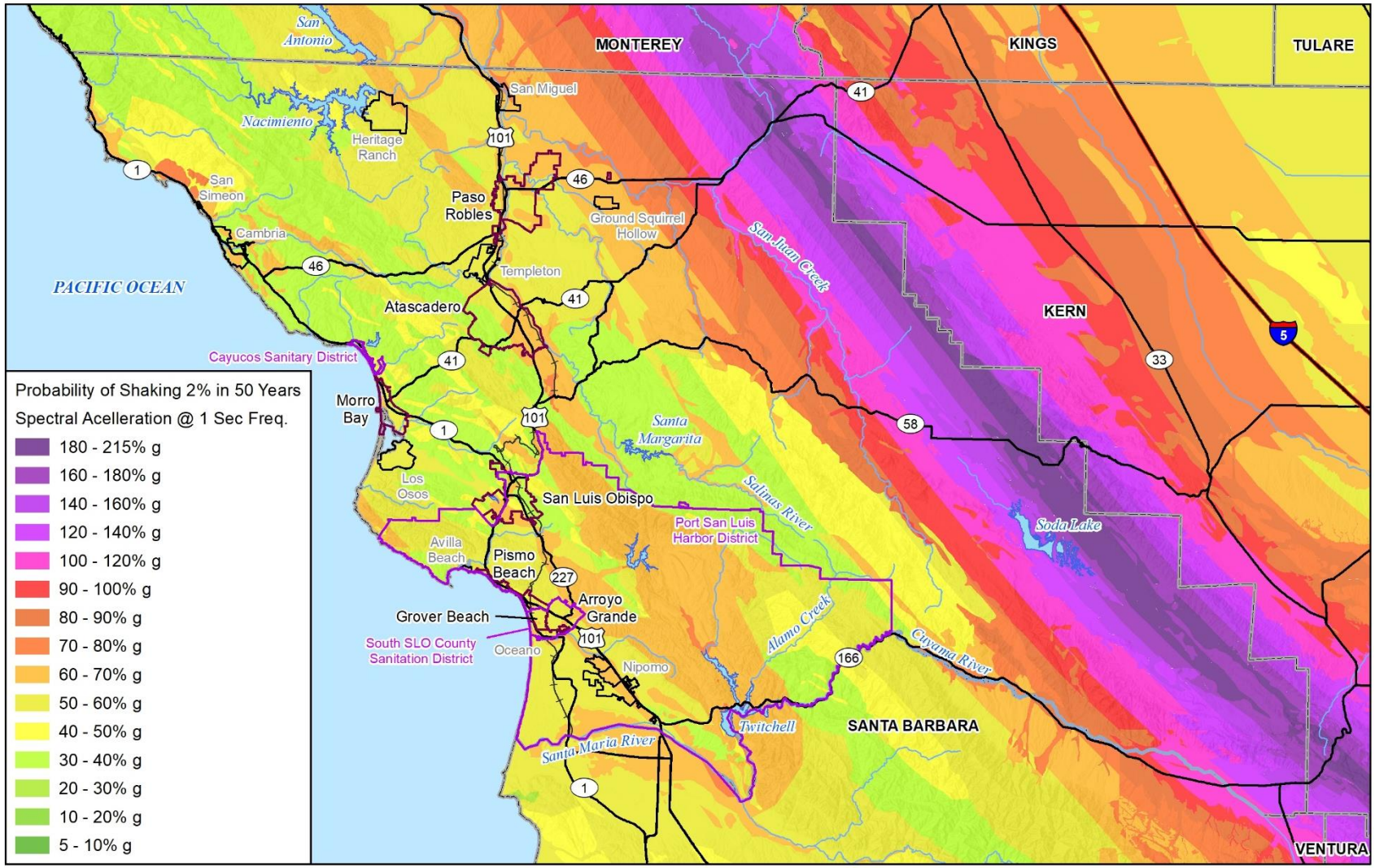


Figure 5-64 Ground Shaking Potential from Spectral Acceleration the Planning Area – Probability of Shaking 2% in 50 Years

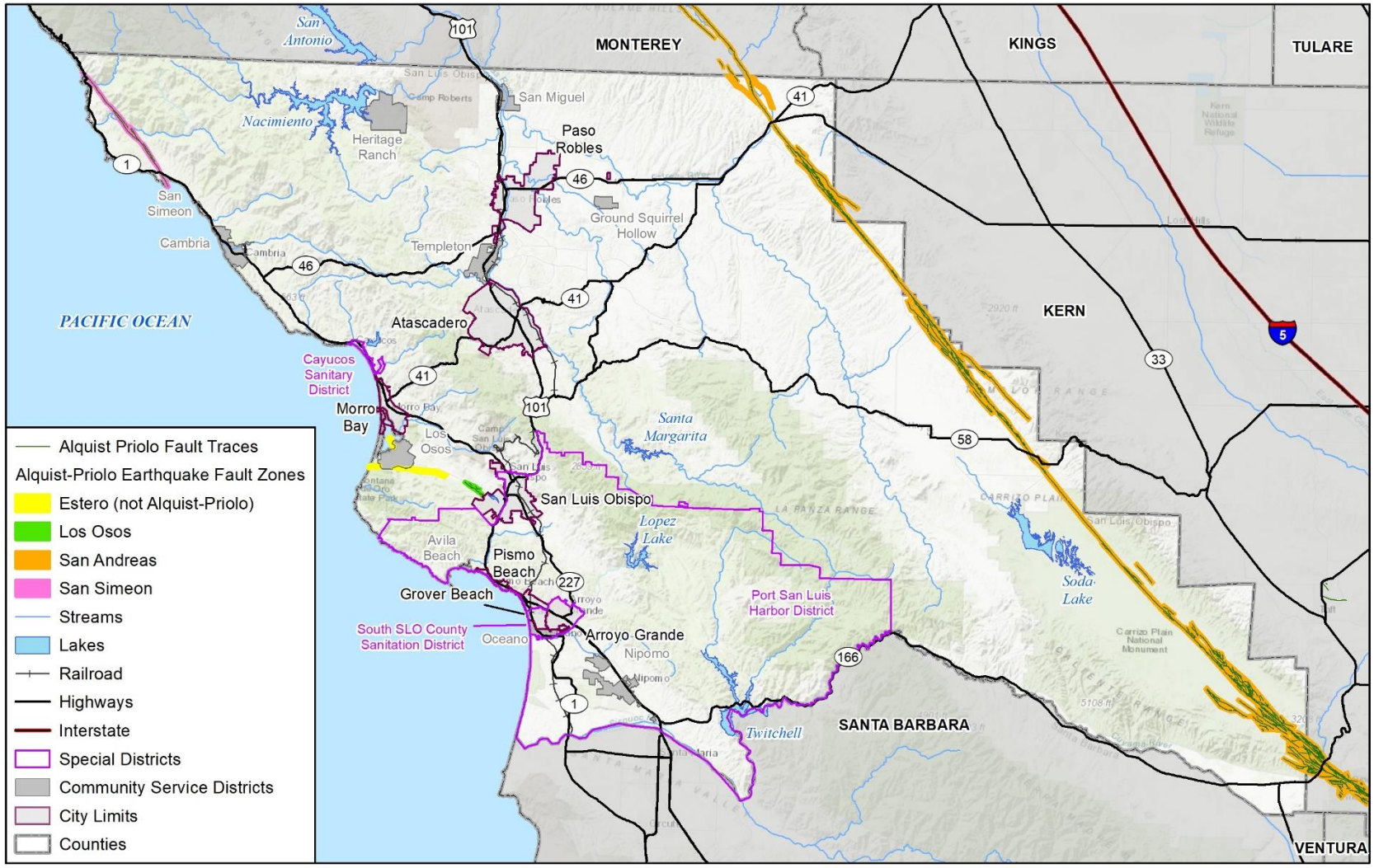


Map compiled 12/2024;
Intended for planning purposes only.
Data Source: San Luis Obispo County, California Geological Survey, USGS

Description of the Major Faults in San Luis Obispo County

The California Geological Survey (CGS) is charged with recording and mapping faults throughout California. The Alquist-Priolo Earthquake Fault Zoning (AP) Act was passed into law following the destructive February 9, 1971 6.6 San Fernando earthquake. The AP Act provides a mechanism for reducing losses from surface fault rupture on a statewide basis. The intent of the AP Act is to insure public safety by prohibiting the siting of most structures for human occupancy on or near active faults that constitute a potential hazard to structures from surface faulting or fault creep. Fault zoning is continually updated and reviewed by CGS and it is likely that other faults in addition to those currently listed by CGS will be added to the list in the future. The primary active faults identified by the AP Act in the County include the San Andreas, San Simeon-Hosgri, and Los Osos faults. A map of these earthquake fault zones within the County is available below.

Figure 5-65 San Luis Obispo County Alquist-Priolo Earthquake Fault Zones



Map compiled 1/2025;
Intended for planning purposes only.
Data Source: San Luis Obispo County, Department of Conservation

Table 5-81 lists t lists the major faults that have been mapped by the CGS in San Luis Obispo County (some of which were briefly introduced in this section and mapped under Figure 5-63). The potential for fault rupture hazards along other faults listed in the table as inactive faults is generally considered to be low. However, given the few active or potentially active faults in the planning area, earthquake hazards should be considered when placing a structure near or over any suspected fault location.

Table 5-81 Major Faults in San Luis Obispo County

FAULT NAME	MAXIMUM MOMENT MAGNITUDE	ACTIVITY	EARTHQUAKE HAZARD ZONE
Cambria	6.25	Potentially Active	Yes
Casmalia	6.5	Potentially Active	No
East Huasna	unknown	Potentially active	No
San Simeon-Hosgri	7.3	Active	Yes
La Panza Fault	7.5	Potentially Active	No
Los Osos	6.8	Active	Yes
Nacimiento	unknown	Active	No
Rinconada	7.3	Potentially Active	No
San Andreas (1857 rupture)	7.8	Active	Yes
San Andreas (1906)	7.9	Active	Yes
San Andreas-Carrizo	7.2	Active	Yes
San Andreas-Cholame	6.9	Active	Yes
San Andreas–Parkfield Segment	6.7	Active	Yes
San Juan	7.0	Potentially Active	No
San Luis Range	7.0	Potentially Active	No
Shoreline	6.5	Under Study	Under Study

Source: SLO HMP 2019

Cambria Fault: The northwesterly trending Cambria fault is approximately 64 kilometers (37.77 miles) long, including an 8-kilometer (5 mile) projection across Estero Bay. The fault is shown to coming back onshore near Morro Bay, and converging with the Oceanic and West Huasna fault near San Luis Obispo. The Cambria fault is considered potentially active. The Safety Element of the San Luis Obispo County General Plan lists the maximum moment magnitude as 6.25 for the Cambria.

East Huasna Fault: The East Husana fault zone trends north-northwest for a distance of about 70 kilometers (43.5 miles) from near Sisquoc in Santa Barbara County northward until it intersects with the South Cuyuma fault about 20 kilometers (12.4 miles) east of the city of San Luis Obispo. The fault is considered potentially active.

La Panza Fault: The northwest trending La Panza fault has been mapped for 71 kilometers (44 miles) along the western base of the La Panza Range. The La Panza fault has been identified as a thrust or reverse fault. The La Panza fault is considered potentially active. The Safety Element of the San Luis Obispo County General Plan lists the maximum moment magnitude as 5.0 – 7.5 for the La Panza.

Los Osos and Edna Fault Zones: The Los Osos fault zone has been mapped generally in an east/west orientation, along the northern flank of the Irish Hills. The western end of the onshore fault zone is located near the community of Los Osos, and the eastern end located near U.S. Highway 101. To the east of U.S. Highway 101, the fault may continue along the northeast flank of the Irish Hills as the Edna fault zone. Assuming an overall length of 56 kilometers (35 miles), the Los Osos fault has the potential to generate an earthquake with about a magnitude 6.75. Also near this area are the Hosgri and Shoreline faults.

Nacimiento Fault Zone: The Nacimiento fault zone has been mapped as a regional fault by many investigators, however it is not included as part of the data base of California faults by the California Geological Survey (CSG). While the fault is considered inactive, the Bryson earthquake of 1952 is sometimes assigned to the Nacimiento fault zone, which would make the fault seismically active. The Bryson earthquake, which occurred in a rural area of northern San Luis Obispo County, is poorly understood and may be attributed to movement on other faults such as the active San Simeon or potentially active Riconada fault zones. The faults that make up the Nacimiento fault zone enter the County in the vicinity of Nacimiento Lake. Faults, or portions of the faults, related to this system trend southwest near the city of Paso Robles, parallel Highway 101, pass through or near Templeton, through or near the city of Atascadero, through the area in and near Santa Margarita, and continues south. Given the fault's proximity to major population centers, structures, dams, transportation and pipeline routes, it could pose a serious threat to the County.

Rinconada Fault Zone: The Rinconada fault zone has been mapped as a regional fault zone about 189 kilometers (117 miles) long located along the western margin of the La Panza Range. The Rinconada fault is inferred to be part of a zone of faults including the Jolon, San Marcos, Espinosa, and Reliz faults that extends from Monterey Bay southward to its juncture with the Nacimiento fault. The California Geologic Survey considers the Rinconada fault to be potentially active. The county's Safety Element lists the maximum moment magnitude as 7.3 for the Rinconada.

San Andreas Fault: The San Andreas is a historically active fault thought to be capable of an earthquake up to and above the 8.0 magnitude range and generally runs along the eastern county border. It enters the County near the Cholame area, passes through the Carrizo Plain, and exits the county near Maricopa. As it passes through the County, three relatively distinct portions of the fault have separate potentials for causing a damaging earthquake. The portion of the fault that runs from Monterey County into San Luis Obispo County to an area near Cholame has commonly been known as the Parkfield segment of the San Andreas fault system. That portion of the fault system is the one that has an approximate 5.6 – 6.0 magnitude earthquake from time to time. A segment of the system that runs from approximately the Cholame area to about the northern edge of the Carrizo Plain area has been commonly known as the Cholame segment. The portion running from the northern Carrizo Plain area and out of the County into Kern County has been commonly known as the Carrizo segment.

It is believed that in 1857 a large (possible 7.8 or larger) earthquake occurred on the San Andreas fault that possibly originated in the Parkfield area and stretched along the fault to the area near San Bernardino. This is perhaps an illustration of the potential for the San Andreas to cause a very powerful earthquake and the need to be prepared.

A major earthquake along any section of the San Andreas Fault could result in serious damage within San Luis Obispo County. An earthquake of 8.0 or greater magnitude would result in severe ground motion and could cause damage throughout the County.

Small earthquakes do occur in the area of the San Andreas within the County from time to time, perhaps most frequently in the Parkfield and nearby areas. Generally, they are so small or in such isolated areas that they are not felt or are felt only very close by.

San Simeon – Hosgri Fault Zone: The San Simeon-Hosgri fault system generally consists of two fault zones: the Hosgri fault zone represented by a series of faults that are mapped off the San Luis Obispo County coast; and the San Simeon fault zone, which appears to be associated with the -Hosgri, and comes onshore near the pier at San Simeon point. The San Simeon fault is considered to be active. The Hosgri fault zone has been interpreted to extend from the northern termination west of the southern San Simeon fault in the Cambria/Point Estero area to its southern termination offshore of Point Perdernales, which is south of the Santa Maria

River, off of Santa Barbara County. The Safety Element of the San Luis Obispo County General Plan lists the maximum moment magnitude as 7.3 for the Hosgri-San Simeon.

Shoreline Fault: In 2008, the Shoreline Fault was discovered off the coast in the area of the Diablo Canyon Power Plant which is owned and operated by Pacific Gas and Electric Company (PG&E). The initial study of the fault, using conservative assumptions about the total length of the fault zone, indicates that a potential magnitude 6.5 strike-slip earthquake is possible. Follow up investigations were performed by PG&E in 2009 and 2010 and more detailed studies are planned in order to refine the size and potential of the fault. (Report on the Analysis of the Shoreline Fault Zone, Central Coastal California, Report to the U.S. Nuclear Regulatory Commission, January 2011, PG&E). Since then, PG&E updated the Diablo Canyon Seismic Assessment in March, 2024 in response to Senate Bill 846. This assessment has concluded that the risk for seismic-induced damage at Diablo Canyon is well within safety criteria established by the US Nuclear Regulatory Commission. Outside the scope of this plan, the County, other local agencies, and state agencies maintain emergency planning procedures related to Diablo Canyon that are regulated by FEMA and the Nuclear Regulatory Commission.

Fault Rupture Hazard Potential by Area

The following paragraphs briefly discuss the fault rupture hazard potential for the cities and several of the highly populated unincorporated areas of the County including Cambria, Cayucos, Nipomo, Oceano, the South Bay area, San Miguel, Santa Margarita, and Templeton. Note this section is intended to generally describe fault rupture hazard by area; however, it does not mean significant damages may not occur in other areas.

Arroyo Grande: Mapped faults in the City of Arroyo Grande are the potentially active Wilmar Avenue fault and the inactive Pismo fault. The Wilmar Avenue fault is exposed in the sea cliff near Pismo Beach and the buried trace of the fault is inferred to strike northwest-southeast parallel and adjacent to U.S. Highway 101 beneath portions of Arroyo Grande. The potentially active fault presents a moderate potential fault rupture hazard to the City. Further studies to evaluate the activity of the faults are warranted, prior to placing structures near the mapped fault traces.

Atascadero: Mapped faults in the vicinity of Atascadero are the potentially active Rinconada fault and the Nacimiento fault zones. The Rinconada fault and its western associated fault, the Jolon, is mapped trending northwest along the eastern City limits. The fault mostly lies east of the Salinas River and outside the City limits. Although there is evidence that indicates movement along the Rinconada fault, the fault lacks any geomorphic features to suggest the fault is active. Because the Rinconada fault is potentially active, it presents a moderate fault rupture hazard to the City of Atascadero. Further studies to evaluate the activity of the faults are warranted, prior to placing structures near the mapped fault traces.

The Nacimiento fault zone consists of a nearly 10-kilometer wide northwest trending, complex fault zone located in the Santa Lucia Range of southwest Atascadero. The Nacimiento fault zone is classified as inactive by CSG but is believed to be coincident with the location of the epicenter for historic earthquakes that suggest the fault is seismically active. Given the uncertainty of the Nacimiento fault's activity, further studies to evaluate the activity of the faults are warranted, prior to placing structures near the mapped fault traces.

Grover Beach: The only mapped fault near Grover Beach is the potentially active Wilmar Avenue fault. The Wilmar Avenue fault is exposed in the sea cliff near Pismo Beach and the buried trace of the fault is inferred to strike northwest-southeast generally along the alignment of U.S. Highway 101 past Grover Beach. The mapped location of the fault runs along a portion of the northern city limits for Grover Beach. The Wilmar Avenue fault is considered potentially active and presents a moderate fault rupture hazard to the City. Further studies to evaluate the activity of the fault are warranted, prior to placing structures near the mapped fault traces.

Morro Bay: The only known mapped faults in the City of Morro Bay are the potentially active Cambria fault and possible splays of the active Los Osos fault system. The Cambria fault is mapped within the eastern limits of the City. The Cambria fault consists of a complex system of thrust faults located primarily in the hills northeast of Morro Bay. The potentially active fault presents a moderate fault rupture hazard to City developments in that area. The Los Osos fault is active but presents essentially no fault rupture hazard to the City as it is only mapped in undeveloped areas. Further studies to evaluate the activity of the faults are warranted, prior to placing structures near the mapped fault traces.

Paso Robles: The only known mapped fault within the City of Paso Robles is the Rinconada fault. The potentially active Rinconada fault is mapped through southwestern Paso Robles and crosses Highway 101 just south of Spring Street. A trace of the fault is also identified as running up Spring Street, which corresponds to a line of hot springs that once existed in this area but have since been capped and buried. As a potentially active fault, the Rinconada presents a moderate fault rupture hazard to the City. Further studies to evaluate the activity of the faults are warranted, prior to placing structures near the mapped fault traces.

The northern end of the potentially active La Panza fault is located about 20 kilometers (12.43 miles) southeast of Paso Robles, near the town of Creston. The northwest striking La

Panza fault is about 75 kilometers (46.6 miles) long. The Huerhuero fault is a possible extension of the La Panza and is mapped trending northwest along Huerhuero Creek south of Highway 46 but is not within the current City limits.

Pismo Beach: There are no mapped active or potentially active faults in Pismo Beach. The inactive Pismo fault presents a very low potential fault rupture hazard. As noted above, the nearby cities of Arroyo Grande and Grover Beach are transected by the Wilmar Avenue fault which is considered potentially active. Based on the USGS Quaternary Faults layer mapped on Figure 5-63, however, nearby faults systems like the San Luis Range and Edna Fault Zones exist. As such, significant ground shaking would be possible near Pismo Beach.

City of San Luis Obispo: CSG has mapped the active Los Osos fault through a portion of the City, which strikes northwest-southeast along the southwestern margin of the Los Osos Valley. Field evaluations for the main strand of the Los Osos fault, found evidence of movement in the last 11,000 years. This evidence of recent activity resulted in the establishment of an Earthquake Fault Zone by CSG in 1989 under the Alquist-Priolo Fault Zoning Act. It should not be interpreted that the active portion of the main trace of the Los Osos Fault is limited only to the designated Earthquake Fault Zone. Rather, the limits of the established zone correspond to the limits of the available information provided in site specific studies that show evidence of recent fault activity in that area. The Los Osos fault presents a high to very high fault rupture hazard to City developments near and southwest of the Los Osos Valley Road area.

Other faults that are near the borders of San Luis Obispo are the West Huasna, Oceanic, and Edna faults. These faults are considered to be potentially active and present a moderate fault rupture hazard to developments in their vicinity.

Unincorporated Areas in San Luis Obispo County

Cambria: Mapped faults in the vicinity of Cambria include the Cambria and Oceanic faults, and the offshore Hosgri fault. Although the offshore Hosgri fault is considered to be active and a likely source for future seismic events, it does not itself provide a fault rupture hazard to onshore facilities. The potentially active Cambria fault consists of a complex web of thrust faults that trend northwest along Highway 1 into the town of Cambria. In the vicinity of Cambria, the fault zone extends from the eastern portion of the town eastward for about two kilometers (1.24 miles).

The potentially active Oceanic fault zone consists of a zone of northwest trending faults located about 8 kilometers (5 miles) northeast of Cambria. Because the faults are considered to be potentially active, they present a moderate fault rupture hazard to the town of Cambria. Further studies to evaluate the activity of the faults are warranted prior to placing structures near the mapped fault traces.

Cayucos: Faults in the vicinity of Cayucos include the Cayucos, Cambria, and Oceanic fault zones. Geologic mapping recorded the buried trace of the northwest striking Cayucos fault beneath the town of Cayucos. The fault is considered to be inactive and therefore results in a low potential to serve as a fault rupture hazard. Although the CSG considers the Cayucos fault to be inactive, it is often undesirable to site structures over any fault as a result of non-uniform foundation support conditions and the potential for co-seismic movement that could result from earthquakes on other nearby faults.

The northwest striking Oceanic fault zone is located about two kilometers (1.24 miles) northeast of Cayucos. The Cambria fault zone is mapped as going offshore north of Cayucos and returning to shore as a broad zone of faults passing through Cayucos. These faults are considered to be potentially active and therefore present a moderate fault rupture hazard. Further studies to evaluate the activity of the faults are warranted, prior to placing structures near the mapped fault traces.

Nipomo: The faults in the Nipomo area include the Santa Maria River, Wilmar Avenue, Oceano and West Huasna faults. The buried trace of the Santa Maria River/Wilmar Avenue fault is inferred to parallel U.S. Highway 101 in the vicinity of Nipomo. The Oceano fault generally is trending northwest across the Nipomo Mesa and into the town of Oceano.

The West Huasna fault is mapped along the eastern side of the valley. These faults generally have a subdued topographic expression and are considered to be potentially active by CSG. Review of the Oceano fault suggests that the fault is inactive. On the basis of that information, potentially active faults present moderate fault rupture hazard in the Nipomo area. The inactive Oceano fault presents a very low potential as a fault rupture hazard. Although the Oceano fault is inactive, it is often undesirable to site structures over any fault as a result of non-uniform foundation support conditions and the potential for co-seismic movement that could result from earthquakes on other nearby faults. Further studies to evaluate the activity of the Wilmar Avenue and West Huasna faults are warranted, prior to placing structures near the mapped fault traces.

Oceano: The only known mapped fault in the vicinity of Oceano is the Oceano fault. The buried trace of the potentially active Oceano fault is interpreted to strike northwest along the southwestern side of the Cienega Valley about 1,000 meters southwest of Oceano and goes offshore near the mouth of Arroyo Grande Creek. Although the fault is classified as potentially active by CSG, review of the Oceano fault suggests that the fault is inactive. The Oceano fault presents a very low fault rupture hazard to Oceano. Although the Oceano fault is likely inactive, it is often undesirable to site structures over any fault as a result of non-uniform foundation support conditions and the potential for co-seismic movement that could result from earthquakes on other nearby faults.

South Bay: The South Bay area includes the communities of Los Osos, Cuesta by-the-Sea, Baywood Park, and the south Morro Bay area. Mapped faults in the South Bay area include the active Los Osos fault. As mapped the Los Osos fault consists of a several hundred-meter-wide zone of west-northwest striking lineaments and scarps located along the southern side of the Los Osos Valley. Portions of the Los Osos fault have been zoned active by CSG. The activity of this fault segment is unknown but is inferred to be at least potentially active or possibly active. The Los Osos fault and related branches present a moderate to very high fault rupture hazard to the area. Further studies to evaluate the location and activity of the fault are warranted, prior to placing structures near the mapped fault traces.

San Miguel: The data reviewed does not indicate that there are mapped active or potentially active faults in San Miguel.

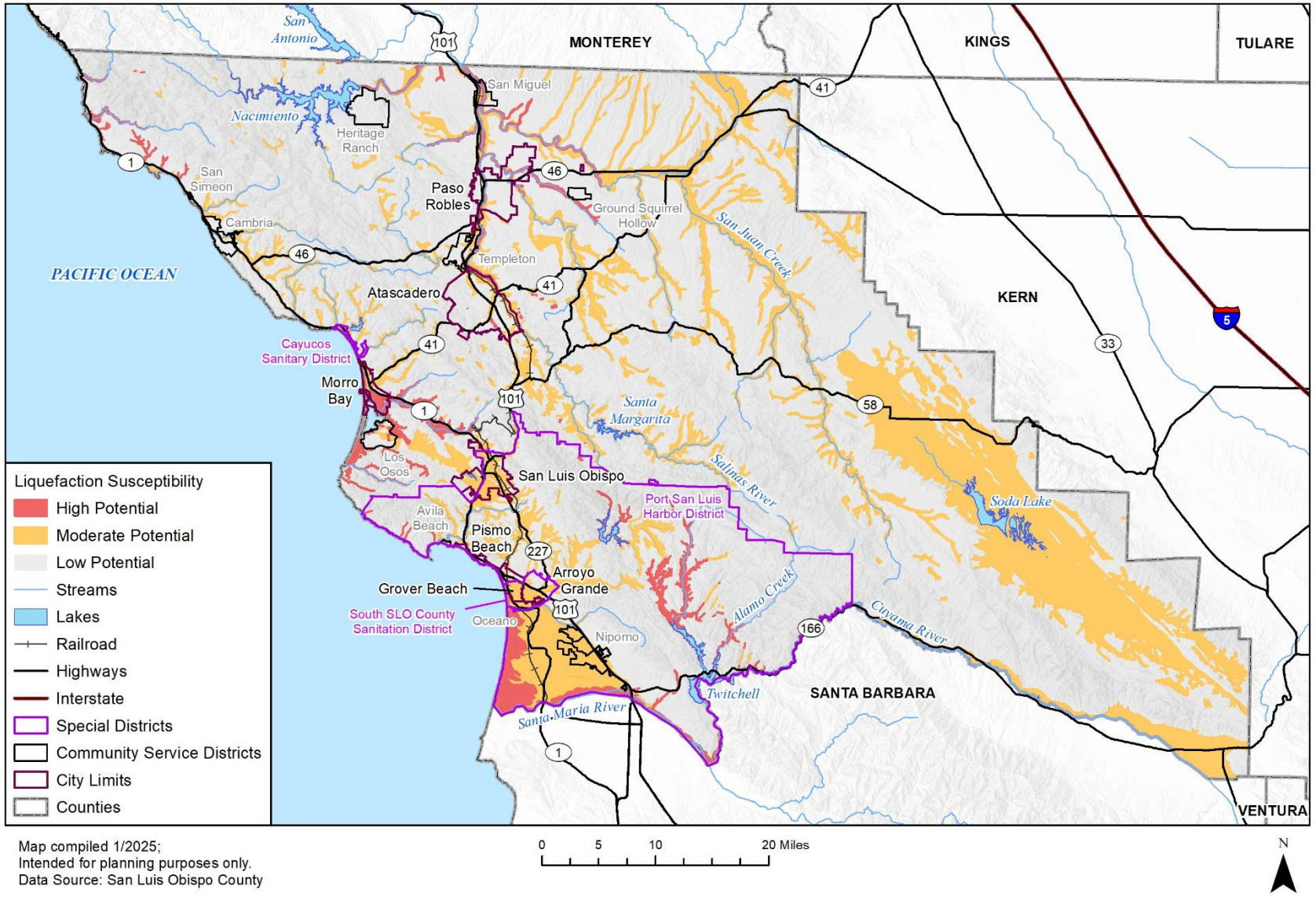
Santa Margarita: The only mapped fault in the Santa Margarita area is the potentially active Rinconada fault. The fault trends northwest through the Santa Margarita area near Pozo Road, Trout Creek, and the Salinas River. Although there is evidence that indicates movement along the Rinconada fault, the fault lacks any geomorphic features to suggest the fault is active. Because the Rinconada fault is potentially active, it poses a moderate fault rupture hazard to this area. Further studies to evaluate the activity of the faults are warranted, prior to placing structures near the mapped fault traces.

Templeton: The only mapped fault in the Templeton area is the western trace of the potentially active Rinconada fault system referred to as the Jolon fault. The fault trends northwest through the community just south of the junction of Highways 46 and 101. Although there is evidence that indicates movement along the Rinconada fault, the fault lacks any geomorphic features to suggest the fault is active. Because the Rinconada fault is potentially active, it poses a moderate fault rupture hazard to this area. Further studies to evaluate the activity of the faults are warranted, prior to placing structures near the mapped fault traces.

Areas Susceptible to Effects of Liquefaction

The figure below Figure 5-66 indicates mapping of liquefaction susceptibility for the County. Liquefaction is important to consider for planning purposes as it can lead to ground failure associated with moderate and large earthquakes and contribute to substantial building and infrastructure losses. Descriptions of specific liquefaction risks in the county and its jurisdictions are included below the figure.

Figure 5-66 Liquefaction Susceptibility in San Luis Obispo County



San Luis Obispo County: Portions of coastal San Luis Obispo County are under laid by sediments that may be vulnerable to liquefaction. Developed areas having a higher potential for liquefaction are the coastal communities of Oceano, Avila, South Bay, Cayucos, and Cambria. Site-specific studies are needed to evaluate if a geologic unit actually contains potentially liquefiable materials and if they require mitigation for development.

Arroyo Grande: The areas of Arroyo Grande that have a high potential to be underlain by potentially liquefiable sediments are those areas underlain by younger alluvium. The younger alluvium underlies most of the low-lying downtown areas south of Branch Street and along Grand Avenue. Site-specific studies are needed to evaluate if a geologic unit actually contains potentially liquefiable materials, and if they require mitigation for development.

Atascadero: The areas of Atascadero that have a high potential to be underlain by potentially liquefiable sediments are those areas underlain by younger alluvium. Portions of the City in the low-lying areas adjacent to Atascadero Creek, Graves Creek, and the Salinas River are mapped as being underlain by younger alluvium. Site-specific studies are needed to evaluate if a geologic unit actually contains potentially liquefiable materials, and if they require mitigation for development.

Grover Beach: The areas of Grover Beach that have a high potential to be underlain by potentially liquefiable sediments are those areas underlain by beach sand and young alluvium. High ground water levels can be expected near the Pacific Ocean and adjacent to Meadow Creek. Site specific studies are needed to evaluate if a geologic unit actually contains potentially liquefiable materials, and if they require mitigation for development.

Morro Bay: The areas of Morro Bay that have a high potential to be underlain by potentially liquefiable sediments are those areas underlain by beach and sand dune deposits and younger alluvium. A majority of the City is underlain by these alluvial, estuarine, beach and sand dune deposits. High ground water levels can be expected in the Embarcadero area and other beach front areas. Flood plain areas along Chorro, Little Morro and Morro Creeks are also underlain by younger alluvium. Site-specific studies are needed to evaluate if a geologic unit actually contains potentially liquefiable materials, and if they require mitigation for development.

Paso Robles: The areas of Paso Robles that have a high potential to be underlain by potentially liquefiable sediments are those areas underlain by younger alluvium. Portions of the City that are located on recent alluvium in the low-lying areas adjacent to the Salinas River (or its tributaries) appear to have the highest potential for liquefaction. Site specific studies are needed to evaluate if a geologic unit actually contains potentially liquefiable materials, and if they require mitigation for development.

City of San Luis Obispo: The areas of the City of San Luis Obispo that have a high potential to be underlain by potentially liquefiable sediments are those areas underlain by younger alluvium. Most of the City of San Luis Obispo is underlain by alluvium. Site specific studies are needed to evaluate if a geologic unit actually contains potentially liquefiable materials, and if they require mitigation for development.

5.3.10.3 Extent (Magnitude/Severity)

According to the USGS, magnitude is the size of the earthquake, and every earthquake has a single defined magnitude. However, the felt impacts of an earthquake can vary greatly depending on numerous factors. That is to say that the amount of energy released by an earthquake at its source is the same number regardless of location or the strength of shaking. The following sections describe some of these varying factors that influence earthquake impacts across space.

Intensity: Intensity represents the observed effects of ground shaking at any specified location and earthquake shaking decreases with distance from the earthquake epicenter. Intensity is an

expression of the amount of shaking at any given location on the ground surface based on felt or observed effects. Seismic shaking is typically the greatest cause of losses to structures during earthquakes. Intensity is measured with the Modified Mercalli Intensity (MMI) scale. The intensity of ground shaking at a particular site or structure is a function of many factors including: 1) earthquake magnitude, 2) distance from the epicenter, 3) duration of strong ground motion, 4) local geologic conditions (soil type and topography), and 5) the fundamental period of the structure. A brief description of those factors is presented below. The Modified Mercalli Intensity scale is summarized in Table 5-82, along with the effects associated with the MMI scale. Damage typically occurs in MMI of scale VII or above.

Earthquake Magnitude: Magnitude represents the amount of seismic energy released at the hypocenter of an earthquake. It is based on the amplitude of the earthquake waves recorded. Seismologists have developed several magnitude scales; one of the first was the Richter Scale, developed in 1932 by the late Dr. Charles F. Richter of the California Institute of Technology. The Richter scale is numeric and has a logarithmic relationship between scale factors, so that a difference of one scale number represents a tenfold increase in measured amplitude, which in turn corresponds to an approximate 31x energy release difference when compared to the next whole number value. Currently, the Moment Magnitude scale (M_w, or M) is the most used scale, which is a measurement of energy released by the movement of a fault and is the modern method used by seismologists to measure earthquakes. Overall, as the amount of energy released by an earthquake increases, the potential for ground shaking impacts also increases. The following are classifications of earthquake magnitude under the M_w scale:

- Great—Mw > 8.
- Major—Mw = 7.0 – 7.9.
- Strong—Mw = 6.0 – 6.9.
- Moderate—Mw = 5.0 – 5.9.
- Light—Mw = 4.0 – 4.9.
- Minor—Mw = 3.0 – 3.9.
- Micro—Mw < 3.

One advantage of the Mw scale is that, unlike other magnitude scales, it does not saturate at the upper end. That is, there is no value beyond which all large earthquakes have about the same magnitude. For this reason, Mw scale is now the most often used estimate of large earthquake magnitudes.

Distance from Epicenter: Earthquake energy generally dissipates (or attenuates) with distance from a fault. Over long distances, this loss of energy can be significant, resulting in a significant decrease in ground shaking with increased distance from the epicenter.

Duration of Strong Shaking: The duration of the strong ground shaking constitutes a major role in determining the amount of structural damage and the potential for ground failure that can result from an earthquake. Larger magnitude earthquakes have longer durations than smaller earthquakes.

Local Geologic Conditions: The geologic and soil conditions at a particular site have the potential to substantially increase the effects of ground shaking. The thickness, density, and consistency of the soil, as well as shallow ground water levels, have the potential to amplify the effects of ground shaking depending on the characteristics of the earthquake. In general, the presence of unconsolidated soils above the bedrock surface can amplify the ground shaking caused by an earthquake.

Fundamental Periods: Every structure has its own fundamental period or natural vibration. If the vibration of ground shaking coincides with the natural vibration period of a structure, damage to the structure can be greatly increased. The extent of damage suffered during an earthquake can also depend on non-geologic factors. The type of building and its structural

integrity will influence the severity of the damage suffered. Generally, small, well-constructed, one- and two-story wood and steel frame buildings have performed well in earthquakes because of their light weight and flexibility. Reinforced concrete structures will also usually perform well. Buildings constructed from non-flexible materials, such as unreinforced brick and concrete, hollow concrete block, clay tile, or adobe, are more vulnerable to earthquake damage.

Effects of Ground Shaking: The primary effect of ground shaking is the damage or destruction of buildings, infrastructure, and possible injury or loss of life. Building damage can range from minor cracking of plaster to total collapse. Disruption of infrastructure facilities can include damage to utilities, pipelines, roads, and bridges. Ruptured gas and water lines can result in fire and produce scour/inundation damage, respectively, to structures, as can fire from other causes, such as electrical damages. Secondary effects can include geologic impacts such as co-seismic fault movement along nearby faults, seismically induced slope instability, liquefaction, lateral spreading, and other forms of ground failure and seismic response. These secondary effects were demonstrated in Oceano by the San Simeon 2003 earthquake.

Table 5-82 Earthquake Magnitude and Intensity Measurements and Associated Characteristics

MAGNITUDE	MERCALLI INTENSITY	EFFECTS	FREQUENCY
Less than 2.0	I	Microearthquakes, not felt or rarely felt; recorded by seismographs.	Continual
2.0-2.9	I to II	Felt slightly by some people; damages to buildings.	Over 1M per year
3.0-3.9	II to IV	Often felt by people; rarely causes damage; shaking of indoor objects noticeable.	Over 100,000 per year
4.0-4.9	IV to VI	Noticeable shaking of indoor objects and rattling noises; felt by most people in the affected area; slightly felt outside; generally, no to minimal damage.	10K to 15K per year
5.0-5.9	VI to VIII	Can cause damage of varying severity to poorly constructed buildings; at most, none to slight damage to all other buildings. Felt by everyone.	1K to 1,500 per year
6.0-6.9	VII to X	Damage to a moderate number of well-built structures in populated areas; earthquake-resistant structures survive with slight to moderate damage; poorly designed structures receive moderate to severe damage; felt in wider areas; up to hundreds of miles/kilometers from the epicenter; strong to violent shaking in epicentral area.	100 to 150 per year
7.0-7.9	VIII<	Causes damage to most buildings, some to partially or completely collapse or receive severe damage; well-designed structures are likely to receive damage; felt across great distances with major damage mostly limited to 250 km from epicenter.	10 to 20 per year
8.0-8.9	VIII<	Major damage to buildings, structures likely to be destroyed; will cause moderate to heavy damage to sturdy or earthquake-resistant buildings; damaging in large areas; felt in extremely large regions.	One per year
9.0 and Greater	VIII<	At or near total destruction – severe damage or collapse to all buildings; heavy damage and shaking extends to distant locations; permanent changes in ground topography.	One per 10-50 years

Source: USGS

5.3.10.4 Past Occurrences

Where earthquakes have struck before, they will strike again. The central California coast has a history of damaging earthquakes, primarily associated with the San Andreas fault. However, there have been a number of magnitude 5.0 to 6.5 earthquakes on other faults which have affected large portions of the Central Coast. Recent events include the December 2003 – 6.5 magnitude San Simeon Earthquake and the September 2004 – 6.0 magnitude Parkfield Earthquake.

Historically active faults are generally thought to present the greatest risk for future movement and, therefore, have the greatest potential to result in fault rupture hazards. Active and potentially active faults in San Luis Obispo County are shown in Figure 5-63 above.

The areas of San Luis Obispo County most susceptible to the effects of liquefaction are those areas underlain by young, poorly consolidated, saturated granular alluvial sediments. These soil conditions are most frequently found in areas underlain by recent river and flood plain deposits, shown in Figure 5-66 above.

Following are historic earthquakes that have affected San Luis Obispo County:

1830 San Luis Obispo Earthquake. The 1830 earthquake is noted in the annual report from the Mission and had an estimated magnitude of 5. The location of the event is poorly constrained and cannot be attributed to a specific fault source, but the earthquake reportedly occurred somewhere near San Luis Obispo.

1857 Fort Tejon Earthquake. The approximate 7.9 Fort Tejon earthquake of 1857 was one of the greatest earthquakes ever recorded in the United States. It left a surface rupture scar over 350 kilometers (210 miles) in length along the San Andreas Fault and a maximum surface offset of about 9 meters (30 feet). Yet, despite the immense scale of this quake, only two people were reported killed by the effects of the shock. The location of the epicenter is not known. As the name suggests, one idea is to locate it near the area of strongest reported shaking, Fort Tejon. However, because there is evidence that foreshocks to the 1857 earthquake may have occurred in the Parkfield area, it is located near the northwestern end of the surface rupture, just southeast of Parkfield, near Cholame, on a map produced by the Southern California Earthquake Data Center (http://www.data.scec.org/significant/forttejon1857.html).

The fact that only two lives were lost was primarily due to the nature of the quake's setting. California in 1857 was sparsely populated, especially in the regions of strongest shaking, and this fact, along with good fortune, kept the loss of life to a minimum. The effects of the quake were quite dramatic, even frightening. Were the Fort Tejon shock to happen today, the damage would easily run into billions of dollars, and the loss of life would likely be substantial, as the present-day communities of Wrightwood, Palmdale, Frazier Park, and Taft (among others) all lie upon or near the 1857 rupture area.

1906 San Francisco Earthquake. This earthquake has been studied in detail and the effects in San Luis Obispo County have been documented. Modified Mercalli intensity ratings ranged from III-IV in the inland and north coast portions of the County, and IV-V in the south coast areas. The higher intensities were felt in areas underlain by alluvial soil, while the lower intensities occurred in areas underlain by bedrock formations.

1916 Avila Beach Earthquake. This magnitude 5.1 event occurred offshore of Avila Beach in San Luis Bay. The earthquake reportedly resulted in tumbling smokestacks of the Union Oil Refinery at Port San Luis, and a landslide that blocked the railroad tracks.

The maximum intensity appears to be approximately VI, but the available descriptions of the shaking are somewhat limited.

1952 Arvin-Tehachapi Earthquake. This 7.7 magnitude earthquake occurred on the White Wolf fault, located south and west of Bakersfield. Throughout most of the San Luis Obispo County, ground shaking intensities of VI were felt. Intensities of IV-V were experienced in the northwest portion of the County, and magnitude VIII intensities were felt in the Cuyama area, in the southeast portion of the County. The higher intensities were likely due to closer proximity to the earthquake epicenter.

1952 Bryson Earthquake. This magnitude 6.2 earthquake likely occurred on the Nacimiento fault and resulted in intensity ratings of VI throughout most of the western portion of the County. Intensities of IV-V were experienced in the eastern portion of the County. Higher intensities were generally felt in the coastal valley areas that are underlain by alluvial soils.

1934, 1966 and 2004 Parkfield Earthquakes. These earthquakes were all three in the range of magnitude 6.0 and occurred on the San Andreas fault in or near the northeast corner of the County. Earthquake intensities generally conformed to anticipated characteristics for events of this size, with intense shaking (VII-VIII) being limited to a relatively small area near the epicenters of the quakes. Moderate shaking was experienced in most of the central and western parts of the County. A variation from the expected intensity characteristics was experienced in the La Panza area during the 1934 earthquake. La Panza is approximately 40 miles south of the fault rupture area, but experienced earthquake intensities of VII.

2003 San Simeon Earthquake. The San Simeon Earthquake struck at 11:15 a.m. on December 22, 2003. The magnitude 6.5 earthquake is attributed to having occurred near the San Simeon/Oceanic/Hosgri Fault system. The epicenter was approximately six miles from the community of San Simeon. In addition to significant property and other damages, two fatalities resulted from damages caused by the earthquake. The nearest affected city was Paso Robles. Perhaps not surprisingly, the issue of retrofitting unreinforced masonry buildings began to receive more attention as a result of this damaging earthquake. It was also reported that of the 53 unreinforced masonry buildings in the city, none of the 9 retrofitted buildings experienced major damages. However, unreinforced ones continue to prove highly dangerous across the county and the state, often partially or completely collapsing during earthquake events such as this one.

2014 Earthquake west of the San Simeon Fault, near Cambria. This was a rather weak seismic event of a 4.1 Magnitude about 14 kilometers south-southwest of San Simeon. It had a depth of 2.9 km and occurred on February 6 of 2014, beginning at approximately 7:42 pm (UTC time). No damages were reported but the ground shaking was weakly felt on several communities including Cambria, Cayucos, Lake Nacimiento, Templeton, Morro Bay, Paso Robles, Atascadero, Los Osos, San Miguel, and Shandon.

Earthquakes which have occurred outside yet felt in the County during the last century include events such as the 7.0 Lompoc earthquake in 1927, and the 7.7 Arvin-Tehachapi earthquake of 1952. Other more recent earthquakes, such as the 1983 – 6.7 Coalinga earthquake, 1989 – 7.1 Loma Prieta earthquake, 1992 – 7.5 Landers earthquake and the 1994 – 6.6 Northridge earthquake were felt in San Luis Obispo County, but there was no damage to structures from these.

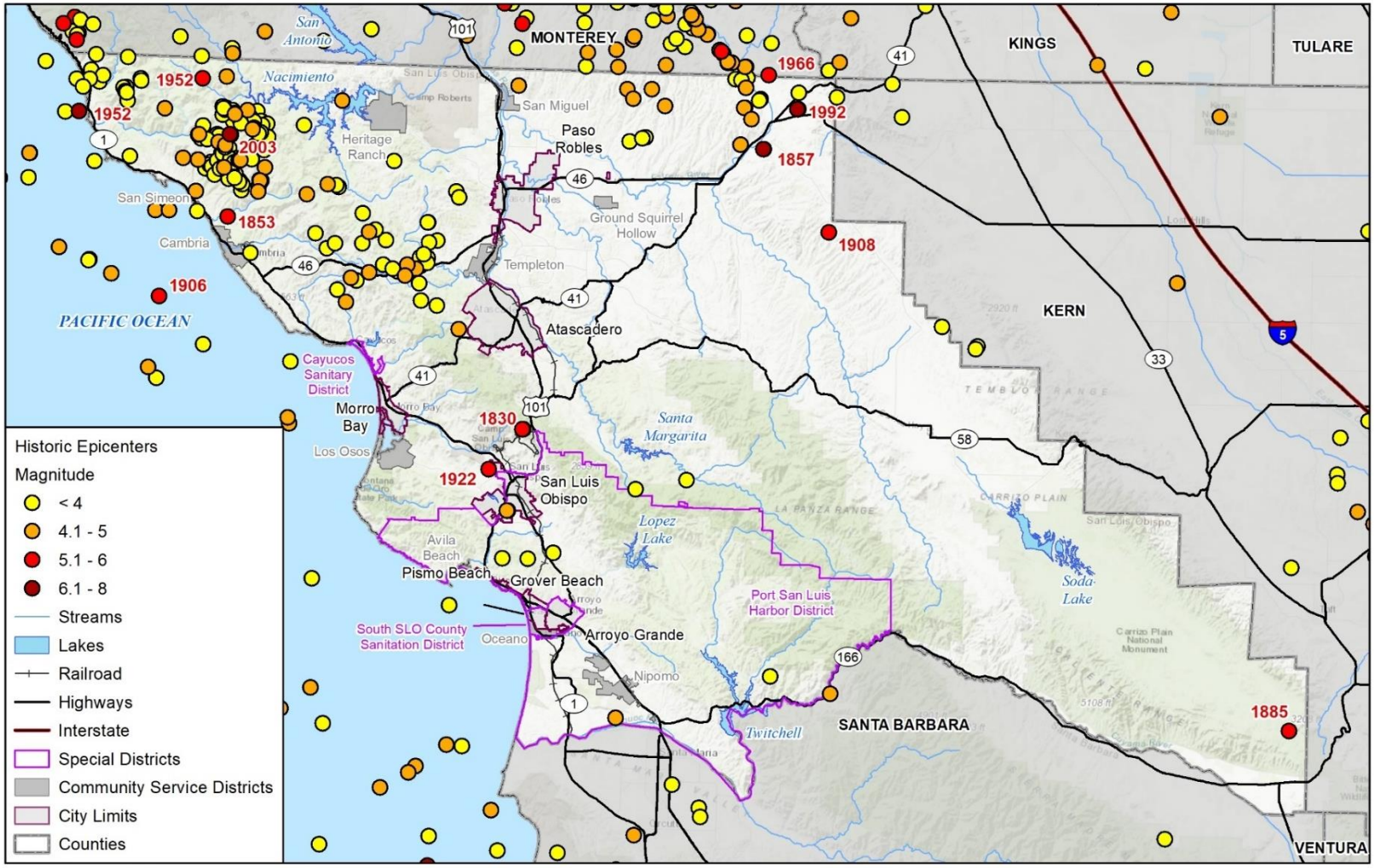
The map below displays the common areas damaged by earthquakes based on historic evidence dating back to the year 1800. The occurrences are color-coded by damaging shaking intensity across the state of California, and the county of San Luis Obispo is enclosed within a black circle. The figure shows that, per the Modified Mercalli Intensity scale noting occurrences equal to or greater than an intensity of 8, the county has experienced 1 to 3 earthquake events of this kind.

2021 Earthquake west of the San Simeon Fault, near the Monterey County Line. This was a moderate seismic event of a 4.7 Magnitude about 18 kilometers northwest of San Simeon near

the Monterey County line, along the coast. It had a depth of 7.8 km and occurred on October 25, 2021, beginning at approximately 4:42 pm (UTC time). No damages were reported but the ground shaking was weakly felt in numerous communities, largely north to south of the epicenter, with reports of shaking felt as far north as the San Francisco Bay and south to Santa Barabara.

The epicenters of historic earthquakes from 1830-2022 is mapped below.

Figure 5-67 USGS Historic Earthquake Epicenters (1830-2022)



5.3.10.5 Probability of Future Occurrences

Likely – It is estimated that major earthquakes (ranging from a magnitude of 7 to 7.9) occur in California once out of every 10 years. However, strong earthquakes (from magnitudes 6 to 6.9) strike the state about once every two to three years. A strong earthquake can cause major damage depending on the epicenter's location with regards to populated areas, and can lead to billions of dollars in disasters, deaths, injuries, and disruptions in services and communities' way of life. Moderate earthquakes (around magnitudes of 5.5) can occur three to four times a year in the state. The San Simeon event in 2003 which affected Paso Robles caused 2 deaths, 47 injuries, and $263 million in damages.

5.3.10.6 Climate Change Considerations

While climate change is not expected to directly affect earthquake frequency or intensity; it could exacerbate indirect or cascading hazards related to earthquakes.

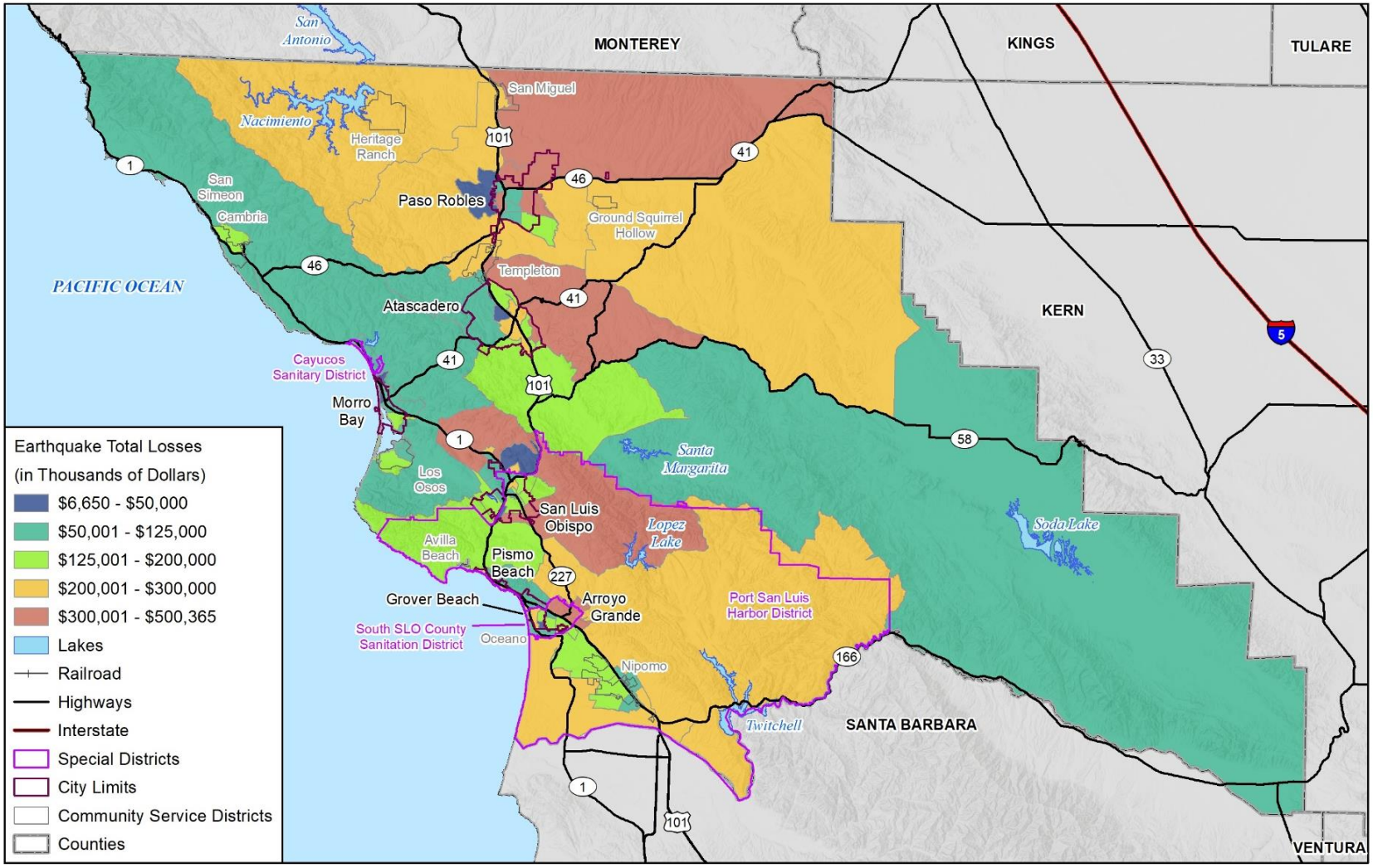
5.3.10.7 Vulnerability to Earthquake

Earthquake loss estimation for the 2025 HMP update utilized FEMA's Hazus-MH 6.1 natural hazard loss estimation software. Hazus is a GIS based, standardized, nationally applicable multi-hazard loss estimation methodology and software. Local, state and federal government officials use Hazus for preparedness, emergency response, and mitigation planning. A level 1 Hazus analysis was performed which estimates damage based on an inventory database compiled at a national level aggregated to Census Tracts. As with any model there are uncertainties, and the results should be considered approximate for planning purposes.

To evaluate potential losses associated with earthquake activity in the planning area, a Hazus 2,500-year probabilistic scenario was run for San Luis Obispo County. The 2,500-year scenario represents a worst-case level of shaking that considers multiple faults in the region. The methodology utilizes probabilistic seismic hazard contour maps developed by the U.S. Geological Survey (USGS) for the 2018 update of the National Seismic Hazard Maps that are included with HAZUS-MH. The USGS maps provide estimates of potential ground acceleration and spectral acceleration at periods of 0.3 second and 1.0 second, respectively. The 2,500-year return period analyzes ground shaking estimates from the various seismic sources in the area with a 2 percent probability of being exceeded in 50 years. The International Building Code uses this level of ground shaking for building design in seismic areas.

Hazus estimates the number of people displaced, the number of buildings and facilities/infrastructure damaged, the number of casualties, and the damage to transportation systems and utilities. Results produced by Hazus are reported by at the census tract level. The figure below displays the census tracts within the county, which were analyzed in this scenario, color-coded by the amount of total losses each tract experienced. The map is followed by the Hazus results broken up in respective sections.

Figure 5-68 Hazus Earthquake Analysis for San Luis Obispo County – Total Losses by Census Tracts (in Thousands of Dollars)



Map compiled 12/2024;
Intended for planning purposes only.
Data Source: San Luis Obispo County, Hazus 6.1

Structures (Earthquake)

Unreinforced Masonry Building (URM)s: Unreinforced masonry building type structures consist of buildings made of unreinforced concrete and brick, hollow concrete blocks, clay tiles, and adobe. Buildings constructed of these materials are heavy and brittle, and typically provide little earthquake resistance. In small earthquakes, unreinforced buildings can crack, and in strong earthquakes, they often collapse completely. These types of structures pose the greatest structural risk to life and safety of all general building types. Due to the public safety risks that are posed by unreinforced masonry buildings, the California legislature passed Senate Bill 547 (Government Code Section 8875 et seq.). This legislation went into effect January 1, 1987, and required all cities and counties located in Seismic Zone 4, which includes San Luis Obispo County, to conduct an inventory of potentially hazardous structures, including unreinforced masonry buildings.

To comply with the requirements of SB 547, the County of San Luis Obispo adopted the Uniform Code for Building Conservation as part of Title 19 (Building and Construction Ordinance) of the County Code. Surveys that were conducted to identify potentially unsafe unreinforced masonry buildings identified about 80 structures that required modifications to meet specified earthquake resistance structural standards. Identified structures that require seismic retrofit are generally located in various areas, mostly urban. The County's ordinance implementing SB 547 requires the owners of identified unreinforced buildings to demolish the structures or complete modifications, depending upon the building's use and number of occupants.

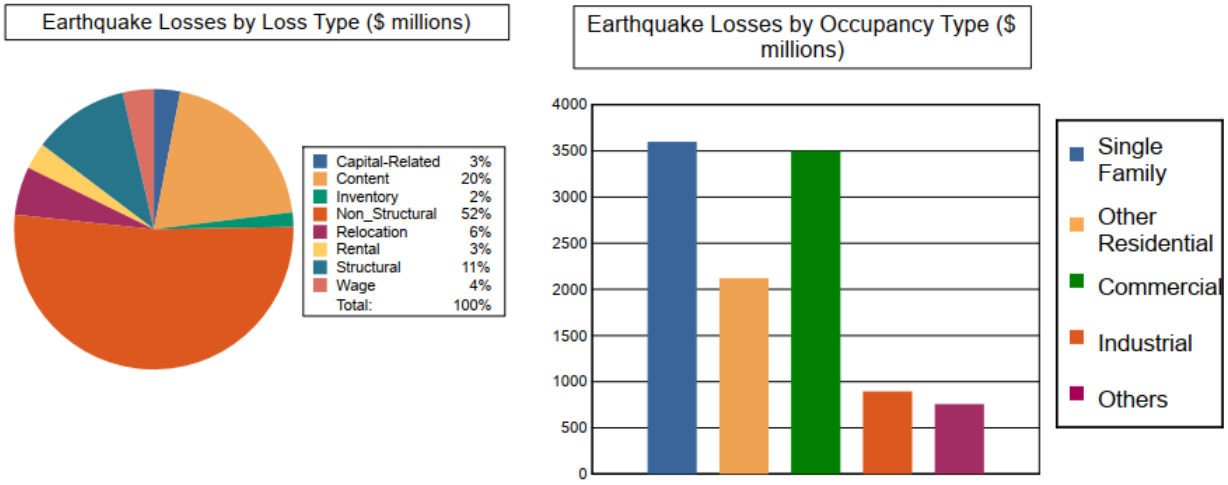
Non-structural items and building components can also influence the amount of damage that buildings suffer during an earthquake. Unreinforced parapets, chimneys, facades, signs, and building appendages can all be shaken loose, creating a serious risk to life and property.

Hazus Results: There are an estimated 118 thousand buildings in the region with a total building replacement value (excluding contents) of $62.6 billion. In terms of building construction types found in the region, wood frame construction makes up 84% of the building inventory.

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

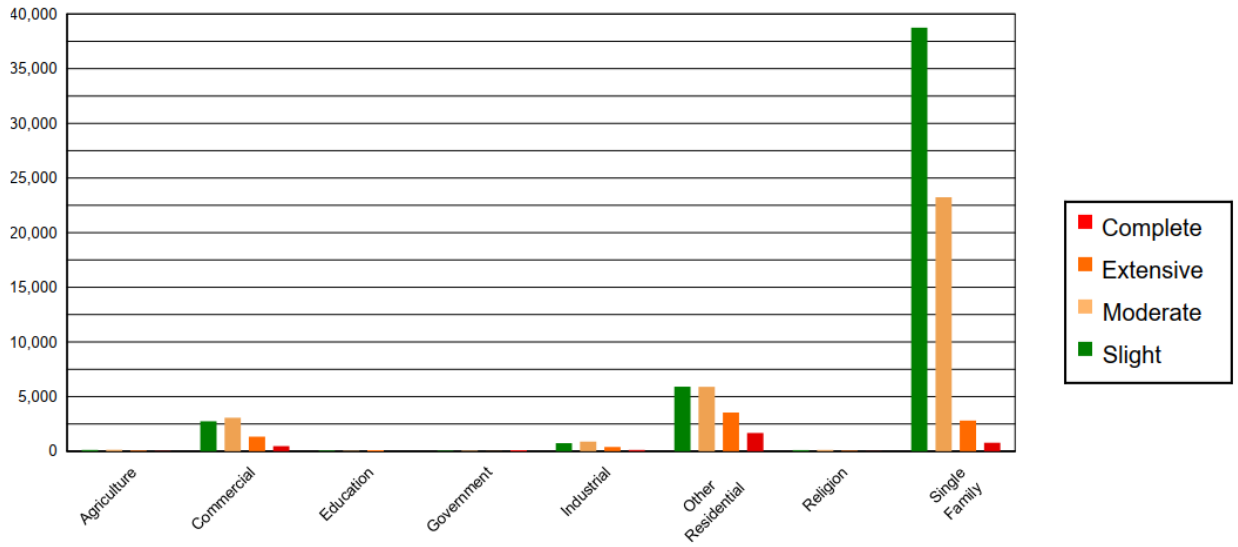
The total building-related losses were $10.9 billion. By far, the largest loss was sustained by the residential occupancies which made up over 53% of the total loss. The figures below provide a summary of the losses associated with the building damage.

Figure 5-69 Earthquake Losses by Loss Type and Occupancy Type (in Millions of Dollars)



Source: Hazus-MH 6.1

Figure 5-70 Hazus 2,500 Probabilistic Earthquake Scenario Structure Damage by Occupancy Type



Source: Hazus-MH 6.1

Hazus estimates that about 44,762 buildings will be at least moderately damaged. This is over 38.00 % of the buildings in the region. There are an estimated 3,100 buildings that will be damaged beyond repair. Table 5-83 summarizes the expected damage by property occupancy type in more detail, whereas Table 5-84 contains the results of the expected building damage by building material type.

Table 5-83 Expected Building Damage by Occupancy Class

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	65.41	0.25	126.46	0.26	140.28	0.42	63.83	0.78	25.02	0.81
Commercial	1749.83	6.82	2749.56	5.67	3067.61	9.17	1337.36	16.26	470.64	15.18
Education	62.41	0.24	65.97	0.14	44.07	0.13	8.20	0.10	1.35	0.04
Government	41.67	0.16	56.57	0.12	58.55	0.18	23.28	0.28	4.94	0.16
Industrial	422.43	1.65	744.09	1.53	876.74	2.62	390.15	4.74	122.60	3.95
Other Residential	3185.48	12.41	5908.53	12.18	5898.96	17.64	3547.06	43.13	1675.99	54.06
Religion	66.37	0.26	104.07	0.21	118.01	0.35	54.06	0.66	17.49	0.56
Single Family	20072.97	78.21	38749.40	79.89	23233.80	69.48	2800.44	34.05	782.38	25.23
Total	**25,667**		**48,505**		**33,438**		**8,224**		**3,100**	

Source: Hazus-MH 6.1

Table 5-84 Expected Building Damage by Building Material (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	23457.18	91.39	44976.74	92.73	27086.28	81.00	3315.31	40.31	917.54	29.59
Steel	402.86	1.57	576.87	1.19	1048.75	3.14	597.29	7.26	184.39	5.95
Concrete	525.22	2.05	892.60	1.84	1022.28	3.06	572.62	6.96	191.08	6.16
Precast	249.30	0.97	486.21	1.00	813.97	2.43	374.40	4.55	118.84	3.83
RM	888.63	3.46	954.77	1.97	1236.44	3.70	554.19	6.74	128.21	4.14
URM	14.77	0.06	33.56	0.07	82.42	0.25	102.02	1.24	156.02	5.03
MH	128.60	0.50	583.90	1.20	2147.89	6.42	2708.53	32.93	1404.33	45.30
Total	**25,667**		**48,505**		**33,438**		**8,224**		**3,100**	

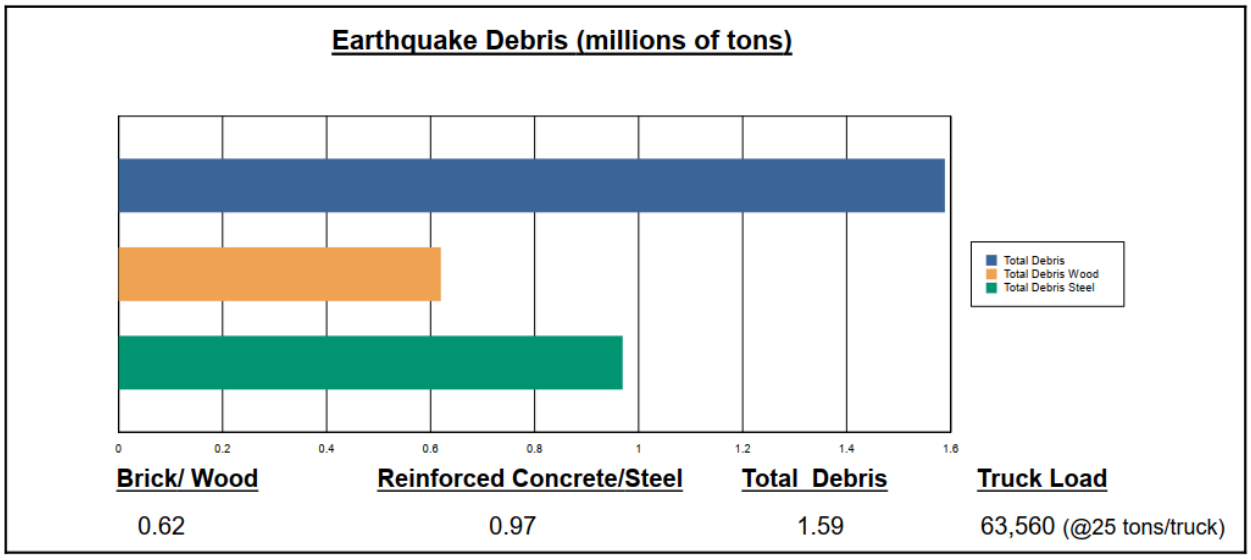
*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Source: Hazus-MH 6.1

Hazus also estimates the amount of debris that will be generated by the earthquake event analyzed. The model subdivides the debris into two general categories: a) Brick/Wood, and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 1.6 million tons of debris will be generated. Of that total amount, Brick/Wood comprises 39% of the debris, while the remainder would be Reinforced Concrete/Steel. If the debris tonnage was converted to estimates of truckloads required to remove it, debris generated would convert to about 63,560 truckloads, with each truckload carrying 25 tons. Figure 5-71 summarizes the debris generation and material type for this earthquake event.

Figure 5-71 Debris Generation in Millions of Tons and by Material Type



Source: Hazus-MH 6.1

People (Earthquake)

Shelter Requirement: Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 4,407 households to be displaced due to the earthquake. Of these, 2,216 people (out of a total population of 282,424) will seek temporary shelter in public shelters.

Casualties: Ground movement during an earthquake is seldom the direct cause of death or injury. Most earthquake-related injuries result from collapsing walls, flying glass, and falling objects as a result of the ground shaking, or people trying to move more than a few feet during the shaking. Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four severity levels that describe the extent of the injuries. The levels are described as follows:

- Severity Level 1: Injuries will require medical attention, but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening.
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is at its maximum. The 2:00 PM estimate considers that the educational, commercial and industrial sector loads are at their maximum. The 5:00 PM represents peak commute time, which is typically considered the worst-case scenario for casualties. These estimates of casualties are broken down in Table 5-85.

Social Vulnerability

Earthquake is a high significance hazard across the county due to past event history as well as the prominent presence of faults (including portions of active and potentially active faults on the eastern slopes). Because of this, the entire county's population is exposed in some way to this hazard. Based on the Social Vulnerability Index (SVI) data presented and discussed in subsection 4.4.1, some of the most socially vulnerable areas of the County are also exposed to earthquake hazards. This includes: Paso Robles, where the Rinconada and San Andreas fault zone are in the vicinity; Morro Bay, crossed by parts of the Cambria fault zone; the city of San Luis Obispo, crossed by the Edna and Cambria fault zones; Grover Beach and Oceano area, where San Luis Range fault system fault zones are present; and Nipomo, which is in proximity to the San Luis Range fault system, West Huasna fault zone, and smaller zones such as the Garey faults.

Populations most vulnerable to earthquake and liquefaction activity would be those that rely on specific services or electrical power, which may not be available during or after a quake, or those which are homeless, would have a difficult time evacuating due to age or disability, cannot communicate easily due to speaking English less than well, for example.

Table 5-85 Hazus Earthquake Casualty Estimates from San Luis Obispo County

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	11.55	3.00	0.46	0.90
	Commuting	0.15	0.21	0.35	0.07
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.66	0.16	0.02	0.04
	Industrial	13.00	3.25	0.47	0.93
	Other-Residential	439.02	94.55	8.14	14.79
	Single Family	333.42	48.28	1.80	2.86
	Total	**798**	**149**	**11**	**20**
2 PM	Commercial	766.01	198.55	30.19	59.07
	Commuting	1.38	1.89	3.13	0.61
	Educational	170.29	37.07	5.18	10.08
	Hotels	0.13	0.03	0.00	0.01
	Industrial	95.60	23.88	3.49	6.79
	Other-Residential	144.02	31.09	2.82	5.01
	Single Family	111.87	16.39	0.78	0.99
	Total	**1,289**	**309**	**46**	**83**
5 PM	Commercial	507.75	131.59	20.12	38.89
	Commuting	25.36	34.84	57.58	11.21
	Educational	34.84	7.11	0.99	1.92
	Hotels	0.20	0.05	0.01	0.01
	Industrial	59.75	14.92	2.18	4.24
	Other-Residential	162.43	35.12	3.16	5.61
	Single Family	129.80	19.04	0.91	1.15
	Total	**920**	**243**	**85**	**63**

Source: Hazus-MH 6.1

Critical Facilities and Lifelines (Earthquake)

Critical Facility Inventory: Hazus breaks critical facilities into two groups: essential facilities and high potential loss (HPL) facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

Essential Facility Damage: There are 7 hospitals in the region with a total bed capacity of 1,747 beds. There are 109 schools, 45 fire stations, 17 police stations and 2 emergency operation facilities.

On the day of the earthquake, the model estimates that only 461 hospital beds (26%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 50% of the beds will be back in service. By 30 days, 81% will be operational. The essential facility inventory and expected damages from the earthquake event are provided in Table 5-86.

Transportation Systems Inventory: Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are 7 transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are 6 utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power, and communications. The transportation systems inventory and expected damages from the earthquake, in terms of number of structures and locations affected, are provided in Table 5-87, while losses in millions of dollars are summarized in Table 5-88. The total value of the lifeline inventory is over $14.1 billion. This inventory includes over 504.5 miles of highways, 394 bridges, and 12,028.5 miles of pipes.

Utility Lifeline Systems Inventory: The replacement value of the transportation and utility lifeline systems combined is estimated to be $7.2 billion and $6.9 billion, respectively. The expected utility system facility damages in terms of total structures or systems affected, along with the inventory of this dataset, are summarized in Table 5-89. Economic losses in millions of dollars are found in Table 5-90. Site specific expected utility system pipeline damages (including their inventory) are included in Table 5-91, while the potable water and electric power system performance limitations, damages, and inventory will be in Table 5-92.

Table 5-86 Essential Facility Inventory and Expected Damage

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	7	3	0	0
Schools	109	16	0	0
EOCs	2	0	0	0
PoliceStations	17	4	0	0
FireStations	45	5	0	0

Source: Hazus-MH 6.1

Table 5-87 Transportation Systems Inventory and Expected Damage by Number of Locations

System	Component	Number of Locations_				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	229	0	0	229	229
	Bridges	394	42	7	356	368
	Tunnels	0	0	0	0	0
Railways	Segments	16	0	0	16	16
	Bridges	40	0	0	40	40
	Tunnels	0	0	0	0	0
	Facilities	3	3	0	2	3
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	2	2	0	1	2
Ferry	Facilities	0	0	0	0	0
Port	Facilities	8	8	0	6	8
Airport	Facilities	5	5	0	2	5
	Runways	5	0	0	5	5

Source: Hazus-MH 6.1

Table 5-88 Transportation System Economic Losses in Millions of Dollars

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	3713.1662	0.0000	0.00
	Bridges	1135.0602	119.4735	10.53
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**4848.2264**	**119.4735**	
Railways	Segments	2004.9469	0.0000	0.00
	Bridges	227.6000	17.1615	7.54
	Tunnels	0.0000	0.0000	0.00
	Facilities	7.9890	3.6120	45.21
	Subtotal	**2240.5359**	**20.7735**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	4.2978	2.0397	47.46
	Subtotal	**4.2978**	**2.0397**	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Port	Facilities	30.4947	13.9200	45.65
	Subtotal	**30.4947**	**13.9200**	
Airport	Facilities	46.8705	21.6693	46.23
	Runways	39.9317	0.0000	0.00
	Subtotal	**86.8022**	**21.6693**	
	Total	**7,210.36**	**177.88**	

Source: Hazus-MH 6.1

Table 5-89 Expected Utility System Facility Inventory and Damages

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	241.1259
	Facilities	1	39.2940
	Pipelines	0	0.0000
		Subtotal	**280.4199**
Waste Water	Distribution Lines	NA	144.6756
	Facilities	8	1375.6144
	Pipelines	0	0.0000
		Subtotal	**1520.2900**
Natural Gas	Distribution Lines	NA	96.4504
	Facilities	0	0.0000
	Pipelines	14	239.3456
		Subtotal	**335.7960**
Oil Systems	Facilities	2	0.2360
	Pipelines	0	0.0000
		Subtotal	**0.2360**
Electrical Power	Facilities	7	4749.9498
		Subtotal	**4749.9498**
Communication	Facilities	34	4.0120
		Subtotal	**4.0120**
		Total	**6,890.70**

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 % After Day 1	with Functionality > 50 % After Day 7
Potable Water	1	1	0	0	1
Waste Water	8	8	0	0	6
Natural Gas	0	0	0	0	0
Oil Systems	2	2	0	0	0
Electrical Power	7	7	2	0	0
Communication	34	34	0	0	34

Source: Hazus-MH 6.1

Table 5-90 Utility System Economic Losses in Millions of Dollars

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	39.2940	15.3545	39.08
	Distribution Line	241.1259	101.7832	42.21
	Subtotal	**280.4199**	**117.1377**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	1375.6144	480.3998	34.92
	Distribution Line	144.6756	51.1283	35.34
	Subtotal	**1520.2900**	**531.5281**	
Natural Gas	Pipelines	239.3456	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Line	96.4504	17.5162	18.16
	Subtotal	**335.7960**	**17.5162**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.2360	0.0810	34.32
	Subtotal	**0.2360**	**0.0810**	
Electrical Power	Facilities	4749.9498	3616.4453	76.14
	Subtotal	**4749.9498**	**3616.4453**	
Communication	Facilities	4.0120	2.3902	59.58
	Subtotal	**4.0120**	**2.3902**	
	Total	**6,890.70**	**4,285.10**	

Source: Hazus-MH 6.1

Table 5-91 Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	7,491	22618	5655
Waste Water	4,495	11362	2840
Natural Gas	42	43	11
Oil	0	0	0

Source: Hazus-MH 6.1

Table 5-92 Expected potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	107,797	104,023	103,935	103,751	102,463	95,825
Electric Power		94,383	75,435	42,943	7,859	108

Source: Hazus-MH 6.1

Diablo Canyon Power Plant: Located just north of Avila Beach this nuclear power plant was designed in the late 60s and the first unit was put in service in 1985. Equipped with extensive seismic monitoring and safety systems, the plant is designed to shut down promptly in the event of significant ground motion. The HMPC noted that the Diablo Canyon Power Plant has been determined to withstand earthquake shaking, although the powerlines from the plant are still a concern.

Diablo Canyon was originally designed to withstand a 6.75 magnitude earthquake. However, before its completion it was upgraded to withstand a 7.5 magnitude quake. This action was required based on the discovery of the Hosgri Fault located just offshore of the plant's location.

During the planning process the HMPC noted the following additional Critical Facilities and Lifelines that could be of concern in an earthquake event: the transcontinental fiber optic line as well as microwave communication site on mountain tops; State Water Project pipelines and the high-pressure gas and petroleum pipelines to Kern County that cross the San Andreas fault.

In addition, a GIS overlay analysis was performed on the seismic designation hazard areas across the county with a combination of the county-provided critical facilities and the Homeland Infrastructure Foundation-Level Data, or HIFLD layers. The purpose was to find which critical facilities are found at risk of these seismic designation zones (Alquist-Priolo fault areas). The only critical facilities found at risk within the Los Osos Alquist-Priolo hazard area were two microwave service towers in the unincorporated area of the county.

Economy and Community Values (Earthquake)

Hazus estimates the long-term economic impacts to the region. The model quantifies this information in terms of income and employment changes within the region. The total economic loss estimated for the earthquake is $15.3 billion, which includes building and lifeline related losses based on the region's available inventory. An estimated 15% of losses computed by Hazus were related to the business interruption of the region.

Since the building losses are broken into two categories (of direct building losses compared to business interruption losses), building related losses, which summarize estimates costs to fix or replace structures and damages to properties and their contents are discussed in more detail in the Table 5-93 section of this section.

However, business interruption losses are summarized herein. They included the temporary living expenses for people displaced from their homes because of the earthquake event. These business-related economic losses are included in Table 5-93 below.

Table 5-93 Building-Related Economic Loss Estimates in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	59.7307	311.5952	10.1509	16.0198	397.4966
	Capital-Related	0.0000	25.3819	304.5799	6.0611	4.6228	340.6457
	Rental	63.2995	115.9908	129.6952	5.3764	8.1131	322.4750
	Relocation	236.4801	88.6607	196.7988	26.0256	65.8008	613.7660
	Subtotal	**299.7796**	**289.7641**	**942.6691**	**47.6140**	**94.5565**	**1674.3833**
Capital Stock Losses							
	Structural	424.3761	237.0051	362.9303	96.0795	81.4240	1,201.8150
	Non_Structural	2209.0362	1285.2746	1373.6515	412.5200	358.0787	5,638.5610
	Content	664.7661	308.2335	708.5564	290.3860	206.1304	2,178.0724
	Inventory	0.0000	0.0000	112.4751	48.8103	17.2076	178.4930
	Subtotal	**3298.1784**	**1830.5132**	**2557.6133**	**847.7958**	**662.8407**	**9196.9414**
	Total	**3597.96**	**2120.28**	**3500.28**	**895.41**	**757.40**	**10871.32**

Source: Hazus-MH 6.1

Historic, Cultural, and Natural Resources (Earthquake)

Earthquake effects on the environment, natural resources, and historic and cultural assets could be very destructive depending on the type of seismic activity experienced and secondary/cascading effects from an event (e.g., wildfire). The biggest impact would likely be on older properties such as wooden or masonry buildings, though much of the unreinforced masonry structures have been retrofitted.

No historic properties or structures were found within Alquist-Priolo seismic hazard designation areas.

Development Trends (Earthquake)

Development in the county since the last update of this plan in 2019 is not anticipated to significantly affect vulnerability to earthquakes due to conformance with building codes. This is true for all participating jurisdictions in this plan. Another major reason for this is the passing of the Alquist-Priolo Earthquake Fault Zoning Act, which was signed into California law on December 22, 1972. This law has been very successful at limiting new construction intended for human occupancy in areas susceptible to surface faulting. This, coupled with California's strong seismic building standards means new development in the county is not likely to significantly or disproportionately increase the county's vulnerability to earthquakes. Population change has not been significant enough in the past five years to result in much of an increased exposure.

5.3.10.8 Vulnerability to Liquefaction

When liquefaction of the soil does occur, buildings and other objects on the ground surface may tilt or sink, and lightweight buried structures (such as pipelines) may float toward the ground surface. Liquefied soil may be unable to support its own weight or that of structures, which could result in loss of foundation bearing or differential settlement. Liquefaction may also result in the development of cracks in the ground surface followed by the emergence of a sand/water mixture, typically referred to as a sand-boil. In areas underlain by thick deposits of saturated, loose granular sediment (such as alluvial valleys or beaches), subsidence as much as several feet may result. Based on parcel and liquefaction risk overlay analysis, the following sections summarize how this hazard risk affects the county of San Luis Obispo.

Structures (Liquefaction)

Liquefaction activity, particularly that occurring along the coast of the County, could have devastating effects in terms of property damage to structures. During the 2024 update of this plan, a GIS analysis of improved property exposure to liquefaction risk areas was performed. GIS analysis indicates approximately $36.8 billion in improved values of parcels found within low, moderate, or high liquefaction risk areas; with contents the estimate of exposure is $58.7 billion. About $16 billion of that value is within unincorporated county areas. The table below summarizes the improved values for low, moderate, and high liquefaction risk areas based on hazard category.

Table 5-94 Liquefaction by Jurisdiction and Risk Category, San Luis Obispo County

PROPERTY TYPE	STRUCTURE COUNT HIGH	STRUCTURE COUNT MODERATE	STRUCTURE COUNT LOW	TOTAL STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE
Arroyo Grande	-	4,484	2,135	6,619	$2,118,305,207	$1,272,467,484	$3,390,772,691
Atascadero	16	1,688	8,528	10,232	$3,162,290,650	$1,850,812,820	$5,013,103,470
Grover Beach	-	4,669	1	4,670	$1,148,900,821	$734,490,528	$1,883,391,349
Morro Bay	2,163	1,979	1,109	5,251	$1,481,981,739	$864,400,556	$2,346,382,295
Paso Robles	36	545	10,097	10,678	$3,953,077,142	$2,540,301,037	$6,493,378,179
Pismo Beach	-	57	4,699	4,756	$1,979,863,057	$1,210,770,950	$3,190,634,007
San Luis Obispo City	-	11,190	4,258	15,448	$6,555,341,772	$4,520,789,520	$11,076,131,292
Unincorporated	877	15,801	27,965	44,643	$16,472,407,341	$8,928,634,056	$25,401,041,397
Total	3,092	40,413	58,792	102,297	$36,872,167,729	$21,922,666,950	$58,794,834,679

Source: San Luis Obispo Assessor Data November 15, 2024, WSP GIS Analysis

Critical Facilities and Lifelines (Liquefaction)

Liquefaction during major earthquakes can cause severe damage to infrastructures on level to gently sloping ground as a result of settling, titling, or floating. Table 5-95 and Table 5-96 summarize how many and which type of critical facilities (from the combination of the county-provided facilities as well as national data sources such as Homeland Infrastructure Foundation-Level Data (HIFLD) layers) are found within liquefaction risk areas. The first table contains the results by jurisdiction, then the second by community service district. These were obtained from a GIS overlay analysis of critical facilities as well as liquefaction risk layers. The majority are found in low and moderate risk zones within unincorporated portions of the county.

Table 5-95 Critical Facilities within Liquefaction Risk Areas, by Jurisdiction and FEMA Lifeline

JURISDICTION	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
High Liquefaction Susceptibility									
Atascadero	-	-	-	-	-	-	1	-	1
Morro Bay	4	-	-	-	2	4	1	2	13
Paso Robles	-	1	-	-	-	-	4	-	5
Unincorporated	5	2	-	2	-	11	41	5	66
Total	9	3	0	2	2	15	47	7	85
Moderate Liquefaction Susceptibility									
Arroyo Grande	5	-	1	-	8	11	13	-	38
Atascadero	1	-	1	-	1	6	21	-	30
Grover Beach	2	-	1	1	1	6	1	4	16
Morro Bay	-	2	1	-	1	3	11	1	19
Paso Robles	3	1	1	2	1	1	4	-	13
Pismo Beach	-	-	-	-	-	-	6	-	6
San Luis Obispo City	18	-	3	4	14	28	49	1	117
Unincorporated	65	15	4	13	13	64	165	10	349
Total	94	18	12	20	39	119	270	16	588
Low Liquefaction Susceptibility									
Arroyo Grande	2	-	1	-	-	3	1	-	7
Atascadero	5	1	2	-	11	14	13	1	47
Morro Bay	-	-	-	-	1	1	-	-	2
Paso Robles	7	-	2	7	3	25	12	1	57
Pismo Beach	3	-	1	-	3	8	9	1	25
San Luis Obispo City	1	-	1	-	4	8	5	-	19
Unincorporated	216	21	6	7	20	105	85	33	493
Total	234	22	13	14	42	164	125	36	650

Source: San Luis Obispo County, CalARP, HIFLD, NBI, NID, FCWCD, WSP Analysis

Table 5-96 Critical Facilities within Liquefaction Risk Areas, by Community Service District and FEMA Lifeline

JURISDICTION	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
High Liquefaction Susceptibility									
Los Osos	2	-	-	-	-	-	-	-	2
Templeton	-	-	-	-	-	-	3	-	3
Total	2	0	0	0	0	0	3	0	5
Moderate Liquefaction Susceptibility									
Avila Beach	1	-	-	-	-	1	-	-	2
Cambria	2	-	1	-	-	4	5	-	12
Los Osos	4	-	-	1	-	1	-	-	6
Nipomo	9	-	-	2	-	4	2	1	18
Oceano	6	-	1	2	1	7	6	1	24
San Miguel	1	1	-	-	-	6	7	-	15
Templeton	-	-	1	1	-	1	4	-	7
Total	23	1	3	6	1	24	24	2	84
Low Liquefaction Susceptibility									
Avila Beach	2	-	-	-	-	-	-	-	2
Cambria	13	-	1	-	3	26	1	-	44
Ground Squirrel Hollow	1	-	-	-	-	-	-	-	1
Heritage Ranch	1	-	-	-	1	1	-	2	5
Los Osos	1	-	1	-	1	7	-	-	10
Nipomo	1	-	1	-	-	7	3	-	12
San Miguel	3	1	-	-	-	-	1	-	5
San Simeon	1	-	-	-	-	-	-	1	2
Templeton	12	-	2	-	3	16	3	-	36
Total	35	1	5	0	8	57	8	3	117

Source: San Luis Obispo County, CalARP, HIFLD, NBI, NID, FCWCD, WSP Analysis

Historic, Cultural, and Natural Resources (Liquefaction)

GIS Analysis indicates that 85 historic and cultural properties are vulnerable to liquefaction. 25 of them are found within moderate liquefaction risk areas, whereas 5 of them in high liquefaction risk areas. Details on the specific properties at risk can be obtained in Appendix E Critical Facilities.

Development Trends (Liquefaction)

Areas slated for future development should consider potential impacts from liquefaction and soil instability, particularly development of new critical facilities in areas with vulnerable populations (e.g., schools). A GIS overlay analysis of parcels with new structures constructed from 2019 to 2024 was performed. This assessment has shown that approximately 3,800 structures valued at over $2.9 billion have been constructed in liquefaction potential areas. Specifically, 54 new structures with a total approximate value of $34.7 million have been constructed in high-risk areas. This has increased vulnerability to this hazard in the county, particularly in Morro Bay and the Unincorporated areas. This assessment does not account for any mitigation that may have been implemented during construction.

Table 5-97 Properties Exposed to Liquefaction Potential Areas, built between 2019 – 2024

LIQUEFACTION POTENTIAL	JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE
High	Atascadero	1	$746,275
	Morro Bay	36	$20,152,327
	Paso Robles	3	$2,707,757
	Unincorporated	14	$11,048,704
	Total	54	$34,655,063
Moderate	Arroyo Grande	111	$80,684,890
	Atascadero	71	$31,969,006
	Grover Beach	77	$44,952,284
	Morro Bay	46	$19,626,403
	Paso Robles	2	$896,243
	Pismo Beach	1	$9,020,268
	San Luis Obispo City	1,078	$743,320,380
	Unincorporated	673	$400,824,050
	Total	2,059	$1,331,293,524
Low	Arroyo Grande	33	$33,480,361
	Atascadero	218	$137,358,610
	Morro Bay	14	$5,770,884
	Paso Robles	240	$307,937,879
	Pismo Beach	107	$137,396,238
	San Luis Obispo City	413	$230,256,137
	Unincorporated	714	$672,789,297
	Total	1,739	$1,524,989,406
	Grand Total	3,852	$2,890,937,993

Source: San Luis Obispo County Assessor Data November 15, 2024, WSP GIS Analysis

Risk Summary (Earthquake and Liquefaction)

- San Luis Obispo County is located in a geologically complex and seismically active region. There are numerous active and potentially active faults in the County. The County has a history of damaging earthquakes, including those associated with the San Andreas fault, but there have also been a number of magnitude 5.0 to 6.2 earthquakes which have affected large portions of the County.
- The overall significance of earthquakes and liquefaction is high.

- A moderate earthquake occurring in or near San Luis Obispo County could result in deaths, casualties, property damage, agricultural and environmental damage, and disruption of normal government and community services and activities.
- The location of the epicenter as well as the time of day and season of the year would have a profound effect on the number of deaths and casualties, as well as property damage.
- The hazard of earthquakes varies from place to place, dependent upon the regional and local geology.
- There is a significant number of buildings and other infrastructure exposed to potentially liquefiable soils
- *Effects on people:* Hazus probabilistic scenario modeling of worst-case ground shaking results in estimates of 160-355 people needing hospitalization and between 20-83 deaths depending on the time of day the earthquake hits.
- *Effects on property:* Hazus probabilistic scenario modeling indicates about 44,762 buildings will be at least moderately damaged, with approximately $10.9 billion in losses. The County has removed or retrofitted the majority of unreinforced masonry buildings.
- *Effects on Economy and Community Values:* The total economic loss estimated for a large earthquake is $15.3 billion, which includes building and lifeline related losses based on the region's available inventory. An estimated 15% of losses computed by Hazus were related to the business interruption of the region.
- *Effects on Critical Facilities and Lifelines:* Essential facility damage *(*police, fire, school, medical) is predicted to be low; only 461 hospital beds (26%) would be available during the earthquake. Utility and transportation lifeline system impacts would be significant particularly to bridges; moderate damage can be expected to water, wastewater, oil systems, and power and communications facilities; loss of water and power would be significant in the days and weeks following the earthquake. For the GIS analysis with the liquefaction layer, though, it was found that a total of 236 critical facilities are at risk of moderate or high liquefiable soil areas, with most of these found in unincorporated portions of the county. The Alquist-Priolo layer analysis yielded two facilities within Los Osos Alquist Priolo areas, which are seismic hazard designation areas in the unincorporated county.
- *Cascading and Secondary Effects:* Earthquakes can cause many cascading effects such as fires, flooding, hazardous materials spills, utility disruptions, landslides, and transportation emergencies. Ground shaking may cause tsunamis or seiche, the rhythmic sloshing of water in lakes or bays.
- *Related hazards*: Landslides, Subsidence, Tsunami

Table 5-98 Hazard Risk Summary - Earthquake

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY (EXTENT)	OVERALL SIGNIFICANCE
San Luis Obispo County	Extensive	Occasional	Critical	High
City of Arroyo Grande	Significant	Occasional	Critical	High
City of Atascadero	Limited	Unlikely	Limited	Low
City of Grover Beach	Extensive	Occasional	Critical	High
City of Morro Bay	Significant	Occasional	Catastrophic	High
City of Paso Robles	Significant	Likely	Critical	High

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY (EXTENT)	OVERALL SIGNIFICANCE
City of Pismo Beach	Extensive	Occasional	Limited	Medium
City of San Luis Obispo	Extensive	Occasional	Catastrophic	High
Avila Beach CSD	Extensive	Unlikely	Critical	Medium
Cambria CSD	Significant	Likely	Limited	High
Ground Squirrel Hollow CSD	Limited	Occasional	Negligible	Medium
Heritage Ranch CSD	Extensive	Occasional	Catastrophic	High
Los Osos CSD	Extensive	Likely	Critical	High
Nipomo CSD	Extensive	Likely	Limited	Medium
Oceano CSD	Extensive	Occasional	Critical	High
San Miguel CSD	Extensive	Likely	Critical	High
San Simeon CSD	Significant	Likely	Limited	High
Templeton CSD	Significant	Unlikely	Limited	Medium
Cayucos Sanitary District	Extensive	Occasional	Limited	High
Port San Luis Harbor District	Extensive	Likely	Critical	Medium
San Luis Obispo FCWCD	Extensive	Occasional	Critical	High
South San Luis Obispo Sanitation District	Significant	Occasional	Critical	High

5.3.11 Flooding

5.3.11.1 Hazard/Problem Definition

Floods are among the most frequent and costly natural disasters, causing significant human hardship and economic loss. Typically triggered by severe weather events, floods can inflict substantial damage on structures, landscapes, and utilities, while also presenting serious life safety concerns. Health hazards commonly accompany flood events, as standing water and wet materials create the conditions for harmful microorganisms such as bacteria, mold, and viruses. These pathogens can cause diseases, trigger allergic reactions, and damage materials following flood events.

The risk of infectious diseases increases when floodwaters are contaminated with sewage or decaying animal carcasses. However, direct impacts such as drowning can be minimized through timely warnings and public education on flood safety measures. In populated areas, early warnings and efficient evacuation plans are crucial for reducing life and safety impacts.

The area adjacent to a river or stream channel is known as the floodplain. Floodplains are depicted on inundation maps, which highlight areas susceptible to flooding and indicate potential water depths. Commonly, the term "floodplain" refers to the area inundated by the 100-year flood, a flood with a one percent (1%) chance of occurring in any given year. The 100-year flood event serves as the national minimum standard for community floodplain regulations under the National Flood Insurance Program (NFIP).

Additionally, the 500-year flood refers to a flood event with a 0.2 percent chance of occurring annually. These flood events cover a broader area and reach greater depths than a 100-year flood. Overall, flooding risks can evolve over time due to land use changes and modifications to the land surface. Human activities, such as altering natural drainage patterns, can create localized flooding issues both within and outside of natural floodplains.

Environmental changes, particularly those caused by human activity, can significantly affect flood potential by altering or confining natural drainage channels. These alterations may result in unexpected flooding, even in areas not traditionally identified as flood-prone. As a result, continuous assessment and adaptation of floodplain management practices are crucial for mitigating the impacts of floods and enhancing community resilience. The types of flooding that can pose risks to the planning area are outlined below.

Riverine flooding – Riverine flooding, defined as the condition when a watercourse (e.g., river or channel) exceeds its "bank-full" capacity, generally occurs as a result of prolonged rainfall, or rainfall that is combined with already saturated soils from previous rain events. This type of flood occurs in river systems whose tributaries may drain large geographic areas and include one or more independent river basins. The onset and duration of riverine floods may vary from a few hours to many days. Factors that directly affect the amount of flood runoff include precipitation amount, intensity and distribution, the amount of soil moisture, seasonal variation in vegetation, snow depth, and water-resistance of the surface due to urbanization. In the San Luis Obispo planning area, flooding is largely caused by heavy and continued rains, and heavy flow from tributary streams. These intense storms can overwhelm the local waterways as well as the integrity of any flood control structures. The warning time associated with slow rise floods assists in life and property protection.

Localized flooding – Localized flooding problems are often caused by flash flooding, severe weather, or an unusual amount of rainfall. Flooding from these intense weather events usually occurs in areas experiencing an increase in runoff from impervious surfaces associated with development and urbanization as well as inadequate storm drainage systems.

Dam or Levee failure flooding – Flooding from failure of one or more upstream dams or water control structures such as levees is also a concern to San Luis Obispo County. A catastrophic flood control structural failure could easily overwhelm local response capabilities to save lives and require mass evacuations towards the north and east of the planning area. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Loss of life could result, and there could be associated health concerns as well as negative effects to local buildings and infrastructure. Dam failure is addressed in more detail under the Dam Failure section, while levee failures and other aspects related to localized flood problem areas are discussed throughout this section.

Coastal flooding – Coastal foods come from the Pacific Ocean where large waves are and can be affected by storm surge. Coastal foods can be very dangerous when high waters are combined with the destructive forces of waves. In low-lying coastal areas, storm surge and flooding can reach many miles from the shoreline, flowing up rivers and across flat land (FEMA, 2024). In San Luis Obispo County, coastal flooding is attributed with the following mechanisms: (1) swell runup from intense offshore winter storms in the Pacific; (2) tsunamis from Aleutian-Alaskan and Peruvian-Chilean Trenches or other off-shore faults; (3) runup from wind waves generated by landfalling storms; (4) swell runup from waves generated off Baja California by tropical cyclones; (5) Effects of landfalling tropical cyclones (FEMA, 2012). Wave runup refers to the height above the tide and surge elevation and can depend on the local water levels, wave action, and beach structure. Coastal flooding hazards is addressed in more detail under the Coastal Storms/Coastal Erosion/Sea Level Rise section.

Geographic Area

The County's varied landscape, including coastal plains, narrow valleys, and coastal mountains, directly shapes its flood hazards. Coastal areas receive more precipitation than interior regions, while valleys range from broad alluvial plains to steep canyons. Heavy winter and spring rains increase runoff, carrying debris and sediment that strain drainage systems. Flood control measures, such as reservoirs, levees, and storm drainage systems, manage runoff and mitigate flooding risks.

FEMA's 2024 Flood Insurance Study (FIS) reports that streams in the County usually produce small runoff, with significant flows occurring during and after storms. Large storms rapidly increase stream flow, often carrying debris that causes severe flood damage. Streams in remote or mountainous areas generally have minimal impact due to limited development. However, watercourses with broader floodplains can cause severe property and infrastructure damage when floods strike urbanized zones.

In the southern County, Arroyo Grande Creek and San Luis Obispo Creek have caused significant floods while flowing through urbanized areas. On the north coast, steep-gradient creeks, such as those in Cambria, surge rapidly during storms. Inland, the Salinas River, along with the Estrella River and San Juan Creek, flows near several communities but typically causes less severe impacts due to its remote location.

Several studies have analyzed water resources and watersheds in San Luis Obispo County. Previous water-related planning efforts identified 25 watershed areas within three sub-regions: North Coast, South County, and North County. The 2018 San Luis Obispo County Stormwater Resource Plan grouped these areas into nine "Watershed Groups" based on hydrologic boundaries and similar physiographic and land-use characteristics. Concurrently, the County worked on updating the Integrated Regional Water Management Plan (IRWMP), which will reduce the nine water planning areas to six groups. These watershed regions, as described in the 2018 Stormwater Resource Plan, form the foundation for regional water management strategies.

Coastal Watersheds: These watersheds drain out of the Santa Lucia Range into the Pacific Ocean. Most of the channels here are relatively short and flow to the west and southwest. In the most southerly part of this coastal region, a relatively broad coastal plain has developed from deposition of the ancestral Santa Maria River, now occupied by the communities of Shell Beach, Pismo Beach, Arroyo Grande, Grover Beach, Oceano, and Nipomo. Moving north, ancient sedimentary and metamorphic rocks of the Irish Hills limit the extent of coastal development until Los Osos Valley breaches the range front and reaches the coastline, and where the communities of Los Osos and Morro Bay are built upon the now-drowned estuary of Los Osos Creek and Chorro Creek. Even farther north, the same metamorphic rocks again encroach upon the coast without respite, leaving room only for the scattered communities of San Simeon, Cambria, and Cayucos on uplifted marine terraces only a few hundred thousand years old, plastered onto the side of the steeply descending Santa Lucia Range.

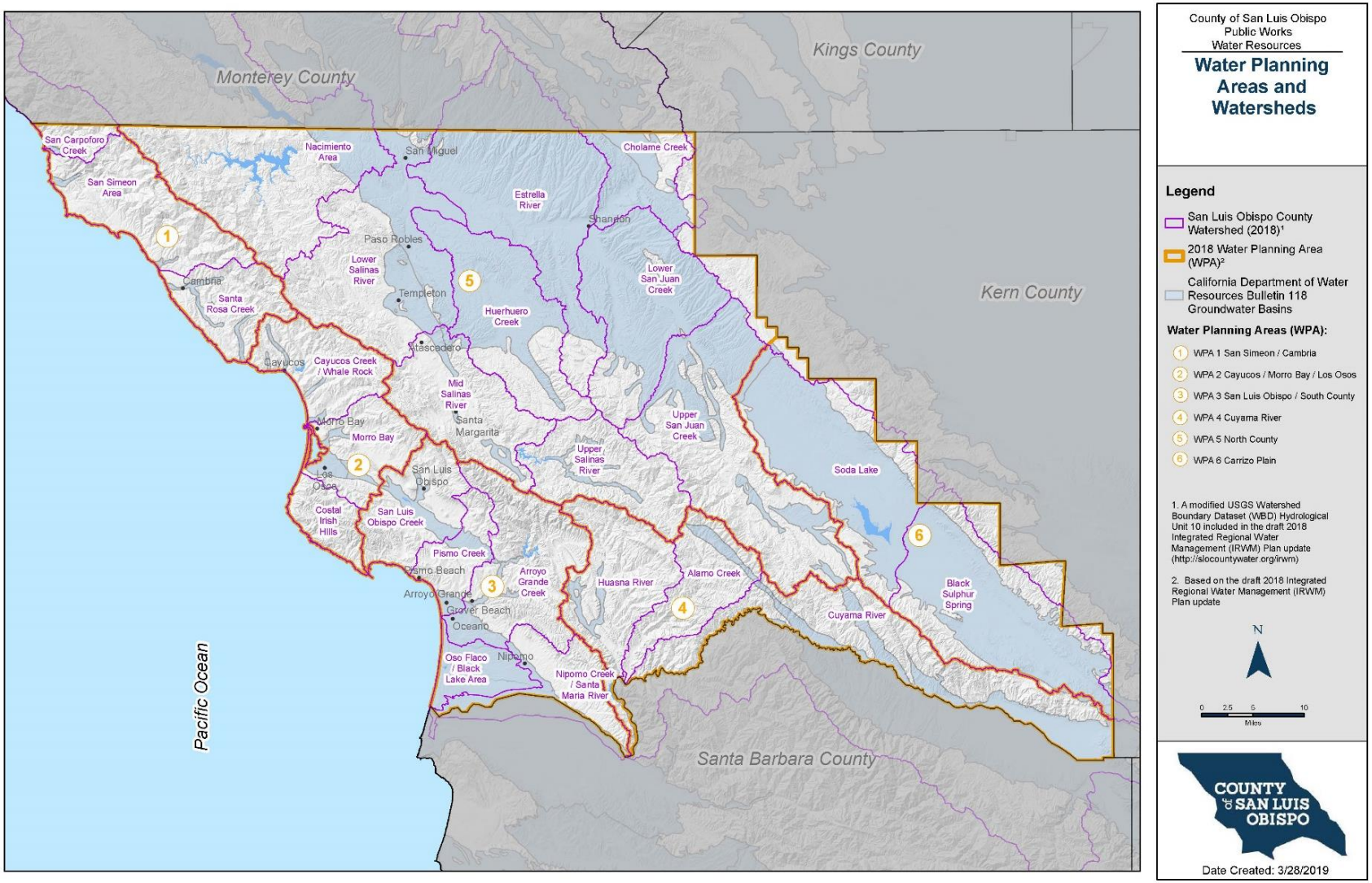
Area Between the Santa Lucia and Temblor Ranges: Watersheds in this area drain north into the Salinas and Estrella rivers. These rivers meet just upstream (south) of the Monterey County line and continue north as the Salinas River enters the Pacific Ocean in Monterey Bay. Their headwaters lie far to the south, the Salinas River emerges from Santa Margarita Lake, the Estrella River from San Juan Creek, with the two separated by the northwest-trending spur of the La Panza Range. This topography not only has guided the overall drainage patterns of the central county, but also has limited the opportunities for transportation corridors to reach into this central region. Thus, the population centers in this region (Atascadero, Templeton, Paso Robles, San Miguel) are limited to the river valley below its headwaters.

Southeast Corner of County: These watersheds drain either south, into the Cuyama River, or into the closed depression of the Carrizo Plain between the southern extent of the Temblor Range and the Caliente Range. There are no significant urban areas within this region, and only short, limited drainage courses down the mountain slopes into either the Cuyama River or the alluvial plain surrounding Soda Lake. Figure 5-72 from the San Luis Obispo County Stormwater Resource Plan depicts the various watershed groupings in the county.

Next, Figure 5-73 illustrates the FEMA 1% annual chance flood extent for both riverine and coastal areas, alongside recorded flood events from 2008 to 2024 within the study area. This figure provides a visual representation of areas at risk of significant flooding due to extreme

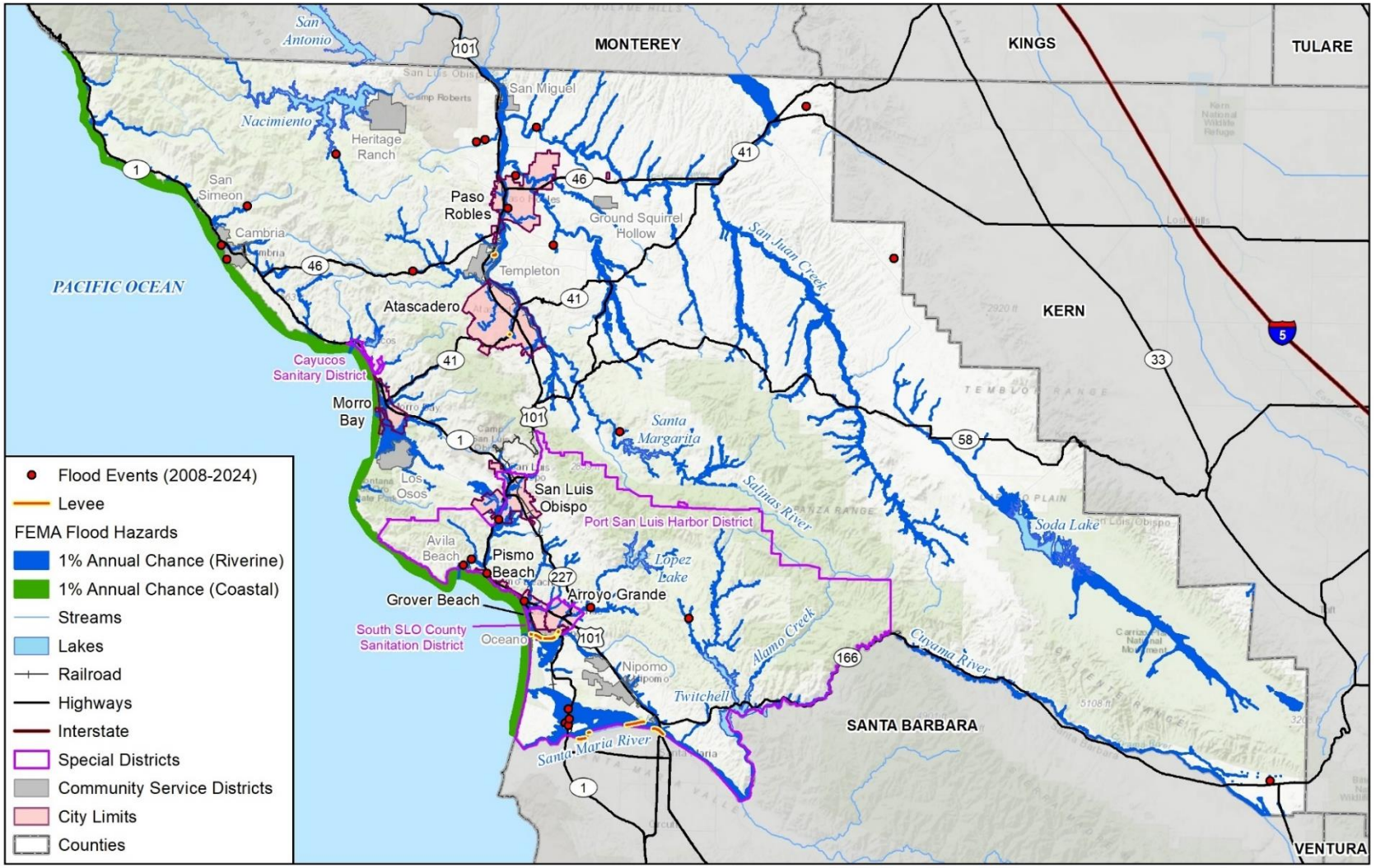
storm events, storm surge, and riverine overflow. Understanding these flood extents is critical for hazard mitigation planning, infrastructure resilience, and emergency preparedness. As climate change intensifies storm events and sea level rise exacerbates coastal flooding, these mapped flood zones highlight vulnerable areas that may require adaptation strategies, improved flood defenses, and updated land-use policies to minimize long-term risks.

Figure 5-72 San Luis Obispo County Water Planning Areas and Watersheds



Source: San Luis Obispo County Integrated Regional Water Management Plan, 2018

Figure 5-73 FEMA Special Flood Hazard Zones 1% Annual Chance Riverine and Coastal Flood Events (2008-2024)

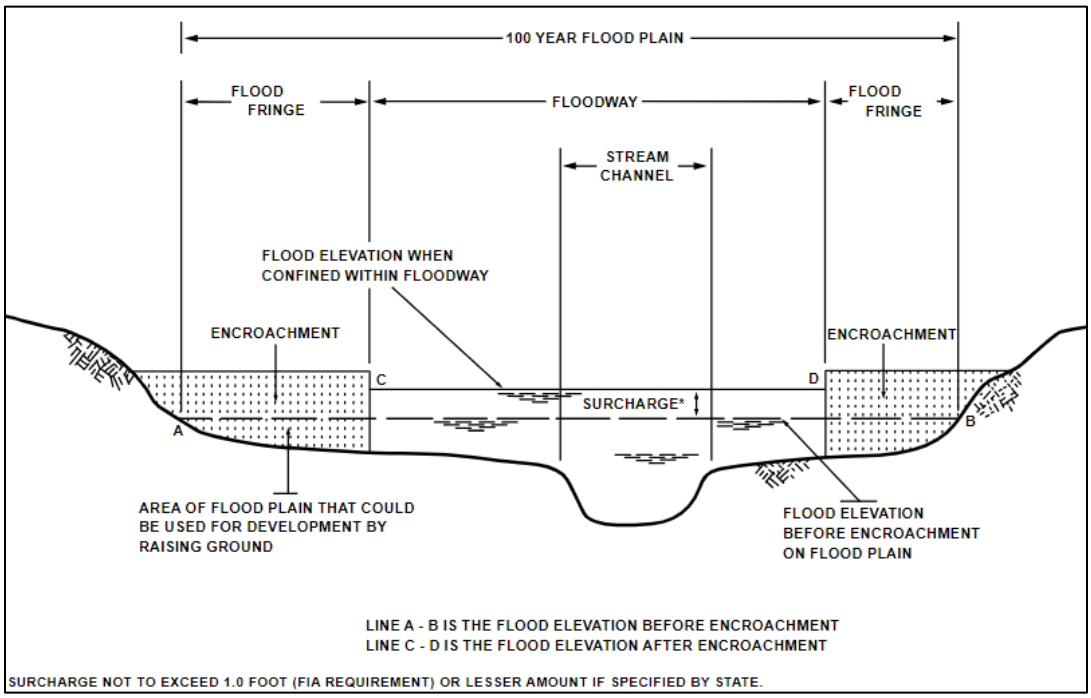


Map compiled 1/2025;
Intended for planning purposes only.
Data Source: San Luis Obispo County, FEMA NFHL Effective 6/6/2024, NCEI

FEMA Floodplain Mapping

FEMA established standards for floodplain mapping studies as part of the National Flood Insurance Program (NFIP). The NFIP makes flood insurance available to property owners in participating communities adopting FEMA-approved local floodplain studies, maps, and regulations. Floodplain studies that may be approved by FEMA include federally funded studies; studies developed by state, city, and regional public agencies; and technical studies generated by private interests as part of property annexation and land development efforts. Such studies may include entire stream reaches or limited stream sections depending on the nature and scope of a study. A general overview of floodplain mapping is provided in the following paragraphs. Details on the NFIP and mapping specific to participating jurisdictions are in the jurisdictional annexes. The NFIP makes flood insurance available to property owners in participating communities adopting FEMA-approved local floodplain studies, maps, and regulations. Figure 5-73 depicts a floodplain and its elements.

Figure 5-74 Floodplain Schematic



Source: Guidance for Flood Risk Analysis and Mapping – FEMA, 2020

Flood Insurance Rate Map (FIRM)

The FIRM is designed for flood insurance and floodplain management applications. For flood insurance, the FIRM designates flood insurance rate zones to assign premium rates for flood insurance policies. For floodplain management, the FIRM delineates 1% and 0.2% annual chance floodplains, floodways, and the locations of selected cross sections used in the hydraulic analysis and local floodplain regulation.

Major Sources of Flooding/Problem Areas

Stream flows in the County are seasonal and generally runoff from all streams are minimal. During large storms with heavy rains the stream flows increase rapidly, and floodwaters often contain high volumes of debris that are often the cause of major flood damage. The major causes of riverine flooding in the study area are the result of undersized channels with obstructions within them: small bridge opening at several highways, small culverts across local

roads, and dense vegetation growth in the channels (FEMA, 2012). In addition to riverine and localized flooding, coastal communities in the county are also at risk of coastal flooding. Refer to the Coastal Storms/Coastal Erosion/Sea Level Rise section for more information on coastal flooding. Refer to the San Luis Obispo County Flood Control and Water Conservation District Annex for a description of flood control zones in the county.

Areas of the County that have been mapped by FEMA as being located within the 1% annual chance floodplain are described below. Incorporated areas of the County that have been mapped by FEMA can be found in the jurisdictional annexes.

Arroyo Grande: Areas of potential flooding are located adjacent to Canyon/Meadow Creek on the west side of the City of Arroyo Grande, adjacent to Corbett Canyon and Arroyo Grande Creeks in the eastern portion of the City, and a limited area along Los Berros Creek, in the southeastern portion of the City. Areas that would be inundated in response to a 100-year flood along these creeks are generally located along stream channels; however, in isolated areas, adjacent properties could be adversely affected. Near the confluence of Corbett Canyon and Arroyo Grande Creek, the 100-year floodplain widens, resulting in impacts to properties. The floodplain along Arroyo Grande Creek also widens slightly on the north and south sides of U.S. 101. Although areas subject to flooding from a 100-year flood are limited, floodwater could cause roadways to become impassable, thereby hindering travel and response efforts.

Atascadero: The Salinas River is located in the northeastern and eastern areas of the City of Atascadero. The floodplain of the river is generally removed from the developed areas, however, properties on the east side could be affected by flooding during a 100-year storm. The crossing of Halcon Road over the Salinas River is frequently washed-out in storm events and would be washed-out during a 100-year storm event. Atascadero Creek extends through the central portion of the City but has a limited potential for flooding impacts as the 100-year floodplain is generally confined to the channel and adjacent properties. Where Atascadero Creek crosses U.S. 101 and State Route 41, a 100-year flood could cause inundation of the portions of the highways. This would have the potential to result in significant local and regional transportation impacts. The area designated as being located within the 500-year floodplain of the Salinas River and Atascadero Creek encompasses approximately 1.5 square miles of the central portion of Atascadero. In the southeastern portion of Atascadero, flooding hazards could result from 100-year flows in several branches of Paloma Creek. Identified inundation areas are primarily located adjacent to the creek channels, although some more extensive areas could also be affected. In the western portion of the City, flooding along Graves Creek would primarily be restricted to the stream channel.

Atascadero has historically experienced drainage and related flooding problems in an area known as the Amapoa/Tecorida Basin, which is located to the east of Atascadero Creek and Morro Road, and south of U.S. Highway 101. This area has been subject to building moratoriums and fee programs to pay for drainage improvements. In recognition of this drainage problem, the lower portion of the basin has a Flood Hazard overlay zoning designation. The Amapoa/Tecorida drainage basin has been prone to flooding for a variety of reasons.

The primary cause of flooding in this area is the result of storm events which because water flows is Atascadero Creek, greater that the 17-year design storm, to overtop the Atascadero Lake spillway channel banks and flow into the Amapoa/Tecorida basin. Other factors that have contributed to inadequate drainage in this area include flat topography and low water velocities increasing run-off volumes due to urban development, undersized drainage culverts and channels, particularly at Highway 101, and the lack of a formal method to maintain existing drainage facilities on private property. A variety of control strategies for correcting the drainage deficiencies of the Amapoa/ Tecorida area has been proposed. These measures include improvements to the Atascadero Lake spillway, construction of a new storm drains along Highway 41, requiring drainage analysis for projects located within the basin that increase

building density, and provision of a mechanism to facilitate the maintenance of drainage facilities on private property. Construction of the storm drain along Highway 41 has already begun.

Grover Beach: Isolated areas of potential flooding in response to a 100-year storm are located in the northern and western portions of the City of Grover Beach that are adjacent to Meadow Creek. Flood hazard areas in the northern portion of the City are restricted to an area south of U.S. 101 and north of Nacimiento Avenue. A mobile home subdivision is located in this area along the western part of the City, flooding could affect areas located west of the Union Pacific Railroad tracks. Local flooding conditions currently exist in two isolated areas within the City where properties are located below street level.

Morro Bay: Flooding in the City of Morro Bay can result from flows in Morro Creek, Little Morro Creek, Chorro Creek, and several smaller creeks in the northern part of the City. Flooding from these creeks could potentially render the State Highway 1 bridges over them unusable during a major storm. During the 1995 storms, Highway 1 was closed through Morro Bay due to flooding. Chorro Creek flooding affected the eastern portion of the City that year, inundating Twin Bridges (now Chorro Creek Bridge) for several days and forcing travelers from Los Osos to detour through San Luis Obispo.

The new Chorro Creek Bridge, completed in 1996, was constructed at a higher elevation to prevent future closures. However, residential areas along Alva Paul Creek and other parts of north Morro Bay also experienced flooding in 1995. The area between Highway 41 and Radcliffe Street flooded as well, causing significant damage to homes and businesses. In isolated areas where creek floodplains extend beyond the stream channels, flooding impacts remain a concern. During the 2023 storm season, Morro Bay again experienced localized flooding, including overtopping of low-lying creek areas and temporary road closures, reaffirming the city's continued vulnerability to storm-related inundation.

Paso Robles: Several watercourses are located within the City of Paso Robles that have the potential to cause flooding impacts. The Salinas River is the major watercourse located in Paso Robles and runs through the center of the City. Flows in the Salinas River that could result from a 100-year flood are primarily contained in the river channel. On the west side of the City, flooding from Mountain Springs Creek could affect isolated residential areas.

The area located adjacent to and west of U.S. 101 could also be inundated by runoff from a 100-year storm. A 100-year flood event could result in the inundation of areas in the southwestern portion of the City. In the eastern portion of the City, several unnamed creeks have 100-year floodplains that would primarily affect the creek channel and adjacent properties. In the northern portion of the City, Huerhuero Creek could cause isolated areas of flooding along the road that leads to the Paso Robles Municipal Airport.

Pismo Beach: The City of Pismo beach has two areas with potential flood hazards: the Pismo Creek/Price Canyon and Meadow Creek/Pismo Marsh drainage ways. Since major flooding in 1971, the City, with the aid of the US Army Corp of Engineers (USACE), has made alterations to Pismo Creek channel to reduce flood hazard. Existing floodplain maps prepared prior to the creek improvements show that substantially developed areas in the city's commercial core and Pismo Creek Planning Areas could be subject to flooding from a 100-year storm.

The majority of the Meadow Creek floodplain within the city limits is contained within the State Department of Fish and Wildlife controlled Pismo Lake Ecological Preserve (Pismo Marsh). The preserve is bounded on all sides by slopes which rise over the 100-year level of flood, thus containing flooding within the preserve boundary. Meadow Creek leaves the preserve at State Highway 1 which crosses the creek via a low-lying bridge. The creek flows into the North Beach Campground where it divides into two channels one flowing into the ocean and the other flowing southward into the Grover Beach area. The creek channel floods State

Highway 1, the commercial property to the north of the creek at State Highway 1, and the North Beach Campground during periods of heavy storm flows. The level of flooding is affected by tidal conditions.

City of San Luis Obispo: The City of San Luis Obispo is traversed by several creeks, including San Luis Obispo Creek and its major tributaries, Stenner Creek, Brizzolara Creek and Prefumo Creek. During the rains of 1995 Highway 1 was closed through Morro Bay due to flooding. Flooding from Chorro Creek would affect the eastern portion of the City. In 1995, flooding from Chorro Creek inundated Twin Bridges (now Chorro Creek Bridge) for several days, forcing travelers from Los Osos to detour through San Luis Obispo in order to reach Morro Bay. The new Chorro Creek Bridge, completed in 1996, was constructed at a higher elevation than Twin Bridges to avoid future closures due to flooding. The creeks located in the northern portion of the City traverse areas that have been extensively developed with residential uses. In 1995, houses located along Alva Paul Creek, and other houses in north Morro Bay, were flooded. Also, the area between Highway 41 and Radcliffe Street flooded in 1995 causing much property damage to both residences and businesses. In the isolated areas where the creek floodplains extend beyond the stream channels, flooding impacts could also be significant. The area located adjacent to and west of U.S. 101 could also be inundated by runoff from a 1% annual chance (100-year) storm. A 1% annual chance flood event could result in the inundation of areas in the southwestern portion of the City. In the eastern portion of the City, several unnamed creeks have 1% annual chance floodplains that would primarily affect the creek channel and adjacent properties. In the northern portion of the City, Huerhuero Creek could cause isolated areas of flooding along the road that leads to the Paso Robles Municipal Airport.

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The 1% annual chance (100-year) floodplains for these creeks encompass extensive areas of the City on the east and west sides of U.S. 101, including the downtown area. Historic flooding on San Luis Obispo Creek, such as the floods of 1969, 1973, 1995, and 2023 have resulted in substantial property damage and loss of life. Several areas in the downtown of San Luis Obispo are subject to localized flooding.

Unincorporated Communities

The areas of unincorporated communities that have been mapped by FEMA as being located within the 100-year floodplain are described below.

South Bay: The South Bay area of the County (including the communities of Baywood Park, Los Osos, and Cuesta-by-the Sea) has not been identified as being located within a 100-year storm floodplain by the most recent Flood Insurance Rate Maps (FIRMs). Flooding in response to a 100-year storm is generally confined to shoreline areas surrounding Morro Bay. There are locations in this area, however, that are subject to chronic localized flooding. After a significant rain, localized flooding occurs throughout the Los Osos area. Numerous intersections within the community experience flooding during storm events.

Cambria: Santa Rosa Creek has a history of flooding which has caused severe erosion of the creek banks as well as damage to phone and gas lines, water wells, and bridges. Major bank

erosion in the past has caused complete interruption of the town's water supply. The 100-year floodplain for Santa Rosa Creek is generally confined to the creek channel and surrounding areas south of Main Street. However, the West Village business area along Main Street has been subjected to severe flooding as a result of recent flood levels that overtopped the banks of Santa Rosa Creek. A creek bypass and West Village Storm Drain system constructed in 2009 has significantly reduced, but not eliminated, this potential flood scenario.

Cayucos: The 100-year flood areas near the community of Cayucos are predominately confined to areas adjacent to Cayucos Creek, Little Cayucos Creek, and Willow Creek. Several limited areas of the community along these areas have been designated as being in a 100-year floodplain.

Nipomo: Flooding in the community of Nipomo occurs primarily along Nipomo Creek and its tributaries, such as Deleissiques Creek and Mehlschau Creek. The 100-year and 500-year floodplains along these creeks encompasses areas adjacent to the watercourses, along with extensive areas located east and west of U.S. Highway 101.

Oceano: Flooding in Oceano is a result of heavy flows in Arroyo Grande Creek and Meadow Creek. The most significant inundation area is near the creeks' confluences with the ocean. Areas subject to flooding as a result of a 100-year storm generally extend south of State Highway 1 and west of Halcyon Road. The Arroyo Grande Creek channel has limited storm capacity and has potential of overtopping levees through town. An emergency response plan has been adopted to address potential breach of levees and the wide spread flooding that may result. Flooding within the town generally occurs at the Oceano County Airport and the Sanitation District Wastewater Plant, along with the residential neighborhoods in low-lying areas around these facilities in particular. This area was subject to the greatest extent of damage in the December 2010 storm.

San Margarita: Yerba Buena Creek, which drains a significant watershed, runs through the community and continues north before joining Santa Margarita Creek, which eventually empties into the Salinas River. The shadowing effect of the Santa Lucia Range to the south tends to limit overall rainfall; however, the flat terrain within the community inhibits efficient runoff, contributing to localized flooding during storm events.

Santa Margarita Creek has a history of flooding, and events in 2023 again caused inundation affecting residences and critical facilities, including the local fire station. Repeated high water levels along the creek continue to impact nearby homes and infrastructure, underscoring the community's ongoing vulnerability to storm-driven flooding.

Templeton: Watercourses located in and near the community of Templeton include the Salinas River and Toad Creek. The 100-year floodplain of the Salinas River as it passes to the east of the community is confined to the river channel and does not significantly affect the town. The floodplain for Toad Creek is not extensive. The 100-year flood along this watercourse would have the potential to affect adjacent properties most notably along Salinas and Eddy Streets and an area between Route 101 and Main Street at the north edge of town.

San Miguel: The community of San Miguel is located west of the Salinas River, and north of the confluence of the Estrella River with the Salinas River. Properties in the 100-year floodplain are primarily located on the lower terrace. Because of the lack of storm drains, low points in the community are sometimes inundated during periods of heavy rainfall. These areas are generally along N Street and Mission Street between 12th and 16th Streets. A comprehensive drainage study was prepared for San Miguel in 2003 and the associated drainage plan is being implemented incrementally as new development occurs.

Creston: The community of Creston is located between the west and middle branches of Huerhuero Creek. The 100-year floodplains of these creeks are located adjacent to the western

and eastern edges of the community and could have the potential to affect adjacent developed properties.

Shandon: The community of Shandon is located southwest of the confluence of San Juan Creek with the Estrella River. The 100-year floodplains of these watercourses are not located within the town of Shandon but are located adjacent to developed areas. These water courses also cross State Routes 41 and 46 near the town. Flooding along these watercourses could have the potential to adversely affect access to and from the community.

Rural Areas: Many other areas in the unincorporated portion of San Luis Obispo County are isolated or residents and travelers in these rural areas of the County may need to take excessively long detours during and after floods due to flood impacts on roads. Road impacts are considered a significant flood impact and potential safety risk. In 1997 after the Logan fire, severe rains took out California Highway 166 and two CHP officers and two civilians died, in addition to property loss.

Levee Systems of Concern

A levee is a raised area that runs along the banks of a river or canal. Levees reinforce the banks and help prevent flooding. By confining the flow, levees can also increase the speed of the water. Levees can be natural or man-made. A natural levee is formed when sediment settles on the riverbank, raising the level of the land around the river. To construct a man-made levee, workers pile dirt or concrete along the riverbanks, creating an embankment. This embankment is flat at the top, and slopes at an angle down to the water. For added strength, sandbags are sometimes placed over dirt embankments. Levees provide strong flood protection, but they are not failsafe.

Levees are designed to protect against a specific flood level and could be overtopped during severe weather events. Levees reduce, not eliminate, the risk to individuals and structure behind them. A levee system failure or overtopping can create severe flooding and high-water velocities. It is important to remember that no levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

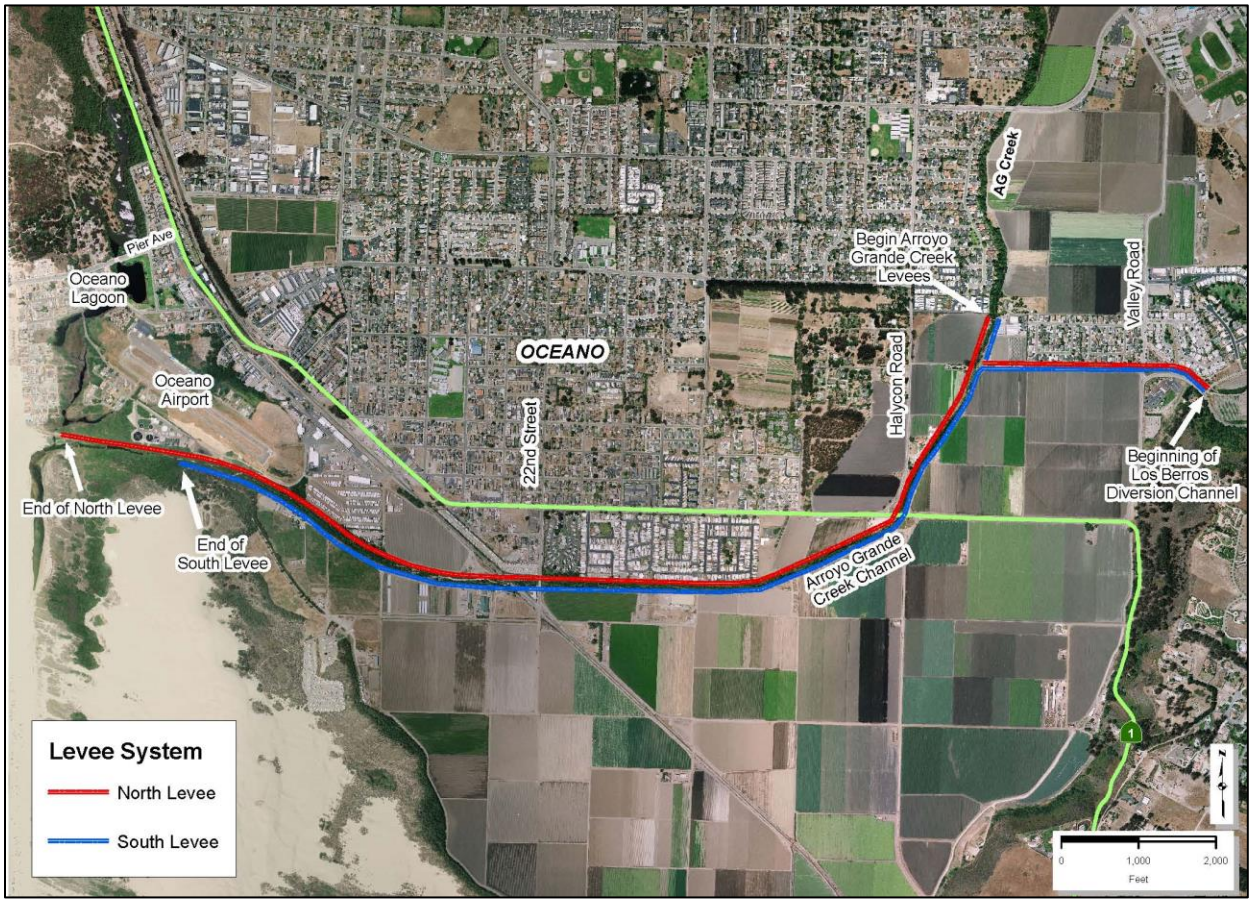
Arroyo Grande Creek Levee System

The lower Arroyo Grande Creek, or Cienaga Valley lies at the downstream, lower gradient terminus of a large watershed, causing it to be especially vulnerable to flooding. Severe flooding from the Arroyo Grande Creek in the 1950s resulted in inundation of farmland and had significant impacts on infrastructure. As an outcome of the severe flooding, the community organized the Arroyo Grande Creek Flood Control Project (Project). The main element of the project is a levee system and trapezoidal channel that confined the Arroyo Grande Creek in levees from its confluence with Los Berros Creek downstream to the Pacific Ocean. Runoff from Pismo Lake that travels through Meadow Creek, enters the Arroyo Grande Creek through a pair of flap gates near the Oceano Dunes State Vehicular Recreation Area. The Project was completed in 1961 and was constructed to convey the design capacity of 7,500 cubic feet per second (cfs) with two-feet of freeboard. The original constructed channel was designed to provide flood protection from a 50-year recurrence interval. Since the completion of the project the channel has lost significant capacity due to challenges to maintain the channel.

According to the Arroyo Grande Creek Erosion, Sedimentation, and Flooding Alternative Study (2006) the existing capacity of the channel is estimated to be 2,500 cfs providing flood protection from a storm with only a 4.6-year recurrence interval, or a chance of overtopping every 4.6 years. The Arroyo Grande Creek Levees have experienced failure by high water overtopping in the past. In 2023 intense rainfall exceeded holding capacities for infrastructure such as the Arroyo Grande Creek Levee, resulting in levee failure and causing chunks of sand,

mud, and debris to flow into the surrounding community of Arroyo Grande. Figure 5-75, below, depicts the Arroyo Grande Creek Levee system.

Figure 5-75 Arroyo Grande Creek Levee System



Source: San Luis Obispo County Flood Control and Water Conservation District, 2024

Under the current conditions of this levee system, the County estimates the channel will likely overtop the south levee between State Highway 1 and the 22nd Street bridges (Dam and Levee Failure Evacuation Plan, 2016). The threat of flooding related to the Arroyo Grande Creek levee failing will be confined to areas immediately adjacent to levees as well as the potential for damage in low-lying areas less than 50-feet above mean sea level and are immediately adjacent to the Arroyo Grande Creek levees. According to the County's Evacuation Plan for dam and levee failure, critical facilities of concern of failure of the Arroyo Grande Creek Levee include the South County Sanitation District's waste water treatment plan and the Oceano Airport; both of which are located adjacent to the north levee of the channel between the mouth of the Arroyo Grande Creek and the Union Pacific railroad bridge (Dam and Levee Failure Evacuation Plan, 2016). The County expects flooding due to levee overtopping or breaching to damage roadways, communication systems and infrastructure, with the area's most at-risk of the Arroyo Grande Creek Levee system failing being those adjacent to the channel and within in the 1% annual chance floodplain.

Santa Maria River Levee

The Santa Maria River Levee was designed and built by the USACE from 1959 to 1963 and is now owned and operated by the Santa Barbara Department of Public Works' Flood Control District (Dam and Levee Failure Plan, 2016). The San Luis Obispo County's Flood Control District also provides some funding towards the maintenance of the levee as part of the minor flood control for Zone 4. Zone 4 collects service fees from properties in the County of San Luis Obispo that receive flood protection form the levees and reimburses the Santa Barbara District for its maintenance services (San Luis Obispo County Flood Control and Water Conservation District 2009). The levee runs along the Cuyama River, the same river which would be affected by a failure of the high hazard dam, Twitchell Dam, (Refer to the Dam Failure section for information specific to the Twitchell Dam). The Santa Maria River Levee is built of river sand and the portion facing the river is covered with a layer of rock. The levee is not certified by the USACE to withstand a 100-year flood.

The USACE reviewed inspected the Santa Maria River Levee in 2006 as part of a systematic assessment of flood control structure and facilities in the United States following the events of Hurricane Katrina. In March 2006, after inspecting the Santa Maria River Levee the USACE placed the levee on the national list of levees at risk of failure and denied certification that the levee could withstand a 100-year flood event. The Santa Maria River Levee will be affected by a failure of the Twitchell Dam. The community that will most likely be impacted is the City of Santa Maria which borders the County of San Luis Obispo and is located in Santa Barbara County. The Santa Barbara Flood Control District is responsible for the levee.

5.3.11.2 Extent (Magnitude/Severity)

The County is large and is characterized by its extremely diverse terrain. This varying and diverse terrain when viewed in combination with flood maps can be an indicator of flood extent Together, coastal terrain and narrow valleys, flood depth, and velocity affect the extent of flood hazards and resulting damage in the County. Deeper and faster flood flows can damage communities in the County. However, shallow flooding with higher flows can cause similar damage.

The Santa Lucia Mountain Range, which curves from the northwest to the southeast to form a barrier between the coast and interior areas; leading to more precipitation on the coast compared to the interior areas (Refer to the Adverse Weather section for more information on differences in precipitation throughout the county). The coastal plain in the North Coast Area from Morro Bay to Cambria in the north, consists of a narrow beach that backs up to the Santa Lucia Range and is cut by a number of stream valleys that empty into the Pacific Ocean. The southern coastal plain area between Arroyo Grande and Morro Bay is characterized by valley and mountain ridges. The lower reaches of the valleys are formed by broad alluvial plains that open to the ocean. While the upper reaches of the valleys are narrow and end in steep mountain canyons. During the winter and spring months the County experiences heavy rain events that cause high runoff into the river systems. Issues arise when the runoff carries debris and sediment that overwhelm the County's drainage infrastructure. To prevent flooding, a wide variety of storm drainage and flood control measures are used throughout the County to prevent issues with high runoff. These include flood control reservoirs, levee systems, and watershed treatments. In developed areas, storm drainage systems composed of street gutters, inlets, underground storm drains, ponds, pumping stations, and open channels are used to collect and control stormwater runoff. The storm drainage and flood control systems are discussed further in the sections that follows.

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levee could withstand a 100-year flood event. The Santa Maria River Levee will be affected by a failure of the Twitchell Dam. The community that will most likely be impacted is the City of Santa Maria which borders the County of San Luis Obispo and is located in Santa Barbara County. The Santa Barbara Flood Control District is responsible for the levee.

5.3.11.3 Previous Occurrences

Severe flooding has repeatedly impacted the County, causing extensive property damage and posing ongoing risks to local communities. Flood hazards occur most frequently along major rivers and streams, including the Salinas River, San Luis Obispo Creek, Santa Rosa Creek, Arroyo Grande Creek, Morro Creek, and Huerhuero Creek. Areas that have flooded in the past remain highly vulnerable to future events, emphasizing the importance of historical flood data in guiding land use planning and mitigation efforts. The San Luis Obispo Creek Watershed has experienced numerous significant flooding events. Historical records show major floods occurred in 1858–62, 1884, 1897, 1911, 1948, 1952, 1962, 1969, 1973, 1995, and 1998. During the 1995 floods in January and March, floodwaters overtopped the creek's banks near the intersection of Marsh and Higuera Streets in San Luis Obispo. Water remained outside the channel for nearly three miles downstream, causing an estimated $2.3 million in damages (USACE, 2000). The City and Zone 9 spent an additional $1 million to repair bank erosion. Near Avila, high flows and debris blockages damaged several bridges along the creek.

Flooding in 1969 and 1973 caused even more destruction than the 1995 events. According to USACE estimates (adjusted to 2000 dollars), the 1969 storm caused $6.92 million in damages within the San Luis Obispo Creek Watershed, while the 1973 storm resulted in $13.6 million in damages (Public Works, 2024).

Specific impacts included:

- $899,000 in damages along Stenner Creek
- $161,000 along Brizzolara Creek
- $3.6 million along Prefumo Creek
- $241,000 along See Canyon Creek

More recent floods continue to highlight the region's vulnerability. In January 2021, an AR delivered torrential rainfall to Central California, triggering severe flooding. San Luis Obispo received 14 inches of rain, forcing evacuations in foothill neighborhoods below the El Dorado Fire burn scar. The storm washed out a 150-foot section of Highway 1 in Big Sur, demonstrating the widespread impacts of extreme weather.

In January 2023, a series of severe winter storms, flooding, landslides, and mudslides led to a major disaster declaration (DR-4683) for California on January 14, 2023. The storms began on December 27, 2022, causing widespread damage. The County's Flood Control and Water Conservation District estimated over $20 million in infrastructure damages from this event, which resulted in multiple road and school closures. Additionally, one missing persons case remains open. The damage costs encompassed repairs, slope and pipeline failures, emergency response efforts, debris and sediment removal, vegetation management, and repairs to the Arroyo Grande Creek Levee.

Later that year, another severe storm event (DR-4699) occurred from early summer until July, causing over $400,000 in infrastructure damages and multiple road closures. The damages included repairs to the Lopez Terminal Reservoir Perimeter Channel and the Lopez Spillway Flip Bucket Riprap Protection. The 2023 storms recorded historic rainfall totals, with 47.66 inches measured at Cal Poly, the second highest in 152 years. On January 9, Rocky Butte recorded 7.6 inches of rainfall, followed by 8.6 inches on March 10, contributing to a season total of 96 inches from December 2022. In 2024, additional severe winter storms led to another

disaster declaration (DR-4769), causing over $1 million in damages and further reinforcing the county's continued vulnerability to flood hazards.

These repeated flood events highlight the County's ongoing challenges in mitigating flood risk. The historical record and recent severe weather underscore the need for proactive planning, infrastructure improvements, and emergency preparedness. By studying past events, officials can better understand flooding patterns and develop strategies to protect communities, property, and critical infrastructure. The following table contains a list of previous flooding events throughout the County from the NCEI over the past fifty years. Table 5-99 shows major flooding events in the County from 1969 to 2024.

Table 5-99 Major Floods in San Luis Obispo County

DATE OF EVENT	INCIDENT DESCRIPTION
January-February 1969	A series of storms delivered 12-21 inches of rainfall over an 8-day period. In February, another storm brought over 5 inches of rain. The most severe damage to urban property occurred in the City of San Luis Obispo, where San Luis Obispo Creek channel filled with debris and flow over-topped the channel banks and onto the city streets. Severe damages were sustained by streets, highways, and utilities through-out the County. In Cambria, the water-supply system was damaged. The sewage-treatment plants at Morro Bay, Avila Beach, and Pismo Beach were inundated by both floods.
January, 1973	Unusually heavy rainfall occurred over a 10-hour period. San Luis Obispo Creek, and its tributary, Stenner Creek, overtopped their banks and inundated a wide area of downtown City of San Luis Obispo.
February 22, 1993	This flash flood occurred in a 2-hour period causing $500,000 damage to four businesses and several residences. 2.5 inches of rain in total were reported.
January and March, 1995	Serious flooding occurred in all coastal and many inland streams. Extensive damaged occurred in the City of San Luis Obispo and the San Luis Obispo Golf Course. Cambria had up to 6 feet of water in areas.
February 2, 1998	Heavy rain drenched the entire area causing an average of rainfall totals that ranged from 2 to 8 inches over coastal areas, up to 12 inches in the mountains. Widespread flooding was reported in all areas. Forty homes were flooded in Solvang and 15 homes were flooded in Ojai. Flooding and mudslides closed parts of most major roadways across the area including State Highways 1, 33, 101, 118, 126, 150, 154, 166 and the 246. Refer to the Adverse Weather Past Events tables for more information on the rain, and wind hazards that were associated with this event.
November 28, 1998	Moderate rain produced local street flooding in several Central Coast communities including Santa Maria, Lompoc and Pismo Beach.
May 5, 1998	Heavy rain produced flash flooding and mudslides across Southern San Luis Obispo County and closed portions of State Highway 166. Rainfall totals ranged from 1 to 3 inches over coastal areas, up to 6 inches in the mountains. Numerous flooding problems were reported across the area.
January 31, 1999	Urban flooding, along Los Osos road, was reported in the City of San Luis Obispo.
January 8, 2001	Heavy rain produced street flooding in the city of Pismo Beach.

DATE OF EVENT	INCIDENT DESCRIPTION
January 11, 2001	An extremely large swell combined with high astronomical tides produced heavy surf and flooding of coastal areas along Central and Southern California.
March 4-5, 2001	Heavy rain produced numerous flooding. In Oceano, the Arroyo Grande Creek overflowed, destroying numerous crops and damaging one home. Also, the Pacific Dunes RV Park was flooded, stranding several residents. In Arroyo Grande, flooding along Corbett Creek damaged four homes and five classrooms in Arroyo Grande High School. In Pismo Beach, flooding along Pismo Creek damaged some homes in Pismo Court Village. In Nipomo, several small streams flooded, damaging 20 to 30 homes. In Creston, the heavy rain produced widespread urban flooding.
December 30, 2004	The heavy rain resulted in numerous reports of urban and rural flooding. In Lopez Canyon near Paso Robles, a 62-year-old man was swept down a flooded creek. Refer to the Adverse Weather section for details on heavy rain amounts related to this event.
Late December of 2005 and early January 2006	In late December of 2005 and early January 2006, a series of storms battered the County. Most of the damage occurred New Year's Eve and New Year's Day. High winds and saturated soils resulted in significant tree falls particularly in the Cambria area where heavy damage was reported to a number of homes and businesses. There was one fatally which was a result of a tree falling on a pick-up truck while it was traveling on U.S. Highway 101 in the Paso Robles area. Damage estimates for both private property loss and the loss and cost to local governments totaled approximately $3,000,000.
November 21, 2010	An early season storm dropped down across Central and Southern California, bringing heavy rain and flash flooding. The storm produced two impulses of rainfall between November 19th and 21st. The heaviest rainfall occurred across San Luis Obispo, Santa Barbara and Ventura Counties with rainfall totals ranging from 0.50 to 1.50 inches across coastal areas to between 1.50 and 4.00 inches in the foothills and mountains. California Highway Patrol reported flash flooding in southern San Luis Obispo County. Due to heavy rain, the roadway was completely washed away at the intersection of State Highway 1 and Division Street.
December 19, 2010	A series of and slow-moving storms brought heavy rain, strong winds and light snow to the area. The most severe damages began on December 19, with primarily affected areas in the South County, particularly in the Oceano area. Damages reported to Cal EMA were just over $2,000,000 in private property losses and an estimated cost and loss total to local governments of just over $1,100,000 for a total storm damage cost estimate of approximately $3,135,000.
June 10, 2015	The combination of remnant moisture from Hurricane Blanca and an upper level low pressure system off the Central California coast brought strong thunderstorms to interior sections of San Luis Obispo and Santa Barbara counties. Flash flooding and mud/debris flows were reported just east of the community of Cuyama. California Highway Patrol reported flash flooding at the intersection of Highway 33 and Highway 166.
May 6, 2016	A moist and unstable atmosphere generated thunderstorms and flash flooding across inland sections of Santa Barbara and San Luis Obispo counties. Due to flash flooding and mud and debris flows, sections of State Highways 46 and 166 were closed. California Highway Patrol reported flash flooding and mud and debris flows across sections of Highway 46, northeast of Shandon.
March 2019	Recent severe winter storms occurred during February and March 2019 in San Luis Obispo County. Atmospheric rivers brought heavy amounts of precipitation to the Central Coast region causing the Salinas River, one of the largest rivers in the

DATE OF EVENT	INCIDENT DESCRIPTION
	County, to flood multiple times. In February, a woman was rescued from the flooded Salinas River in Paso Robles by the Paso Robles Fire Department. She was transported to the hospital and was expected to recover from the incident (KEYT, 2019). In March, after heavy rains the Salinas River's water raised quickly causing the river to flood once more. In Atascadero south of the Highway 41 bridge, five people, five dogs and one cat were rescued from the Salinas River after they were stranded on an island in the middle of the river. The group was rescued by Atascadero Fire and Emergency Services using swift water rescue equipment to wade through the high water and bring the people and animals back to the shore safely. No injuries were reported (Atascadero News, 2019).
January 2021	In late January 2021, an atmospheric river brought drenching rains to southern California and blizzard conditions in the Sierra Nevada Mountains. Central California was hit hardest, with severe 24-hour rainfalls that washed out a 150-foot section of Highway 1 in Big Sur. The storm poured 14 inches of rain on San Luis Obispo and forced evacuations in the foothill neighborhoods below the El Dorado Fire burn scar.
January 2023	In January 2023, San Luis Obispo experienced a 25-year storm event, which included two intense storms that pelted the area with the second largest rainfall amount in 152 years. The rain filled our reservoirs and creeks, providing the community with much-needed drinking water
February – July 2023	County-wide severe storms with damages including repairs to the Lopez Terminal Reservoir Perimeter Channel and the Lopez Spillway Flip Bucket Riprap
January 2024	Severe county-wide winter storms

Source: NCEI Storm Events Database, County of San Luis Obispo, FEMA Flood Smart, 2024

Figure 5-76, below, depicts flooding and a closure along Avenales Ranch Road in 2023.

Figure 5-76 2023 Flooding at Avenales Ranch Road



Next, Figure 5-77 depicts flooding on Highway 101 near Santa Rosa Street in 2021, which was closed in both directions, with up to two feet of water. The storm also brought power outages, crashes, and mudslides across the Central Coast.

Figure 5-77 2021 Highway Flooding



Source: NCEI Storm Events Database, 2024

Figure 5-78, below, shows 2021 floodwater as it continues to cover First Street in Avila Beach, forcing some people out of their homes.

Figure 5-78 2021 floodwater Covers First Street in Avila Beach



Source: KSBY News, 2021

Previous Arroyo Grande Creek Levee Flooding Events

2023 Arroyo Grande Creek Levee Breach and Flooding Event

On January 9, 2023, intense rainfall and storm runoff led to the overtopping and subsequent breach of the Arroyo Grande Creek Levee, resulting in significant flooding in Oceano. This event inundated homes and farmland with mud, debris, and floodwaters, underscoring the levee's vulnerability to extreme weather events. At the time of the breach, Lopez Lake Reservoir, a critical component of regional flood management, was at 24.87% capacity on January 4, 2023. Due to the heavy rainfall throughout the month, the reservoir's capacity rose to 51.3% by January 18, 2023. (San Luis Obispo County Public Works – January 2023 Lopez Reservoir Monthly Operational Report).

In response to the levee breach, the County's Flood Control and Water Conservation District initiated two key projects:

1. Phase I: Arroyo Grande Creek Channel Emergency Capacity Restoration Project.
    a. Focused on restoring flow characteristics within the Arroyo Grande Creek Channel by removing vegetation and sediment to restore flood capacity to pre-2022-2023 winter storm conditions.
    b. Construction began in September 2023 at the western end of the Arroyo Grande Creek Channel.
    c. The project scope includes excavation of approximately 11,100 cubic yards of storm-deposited debris and sediment.
    d. Crews will begin from the South Levee downstream of the UPRR bridge, then shift to the North Levee after excavation of sediment management zones 1, 2, 5, and 6.

e. These efforts will increase flood conveyance capacity and reduce the risk of sediment buildup, which contributed to the January 2023 flooding event.

2. Phase II: Arroyo Grande Creek Emergency Levee Rehabilitation Project.
    a. Aimed at stabilizing the levee system and addressing damages caused by overtopping and seepage during the 2022-2023 winter storms.
    b. Phase 2A:
        i. The District began advertising for bids on September 14, 2023.
        ii. Work includes re-grading the South Levee outer slopes and repairing approximately 3,000 square yards of turf reinforcing mat from Creek Road to just downstream of the UPRR bridge.
        iii. Construction was anticipated to begin in early November 2023.
    c. Phase 2B:
        i. This phase involves the installation of hydraulic barrier walls within the levees to mitigate future seepage and erosion.
        ii. Staff is finalizing plans and specifications with consultants.
        iii. Construction began pending weather conditions during winter 2023-2024.

Figure 5-79, Figure 5-80, Figure 5-81, and Figure 5-82, below, show the impacts of the 2023 flooding events on the Arroyo Grande Creek Levee.

Figure 5-79 Downed Tree Impacts from the 2023 Arroyo Grande Creek Flooding



Source: County Public Works, 2023

Figure 5-80 Sediment Impacts from the 2023 Arroyo Grande Creek Flooding



Source: County Public Works, 2023

Figure 5-81 Through-Seepage Impacts from the 2023 Arroyo Grande Creek Flooding



Source: County Public Works, 2023

Figure 5-82 South Levee Breach Impacts from the 2023 Arroyo Grande Creek Flooding



Source: County Public Works, 2023

2001 Arroyo Grande Creek Levee Breach and Flooding

The following levee failure event was noted in the 2016 San Luis Obispo County Dam and Levee Failure Evacuation Plan:

> *"In March 2001 following a heavy rain event, the Arroyo Grande levee system was breached on the south side between the mouth of the Arroyo Grande Creek and the Union Pacific railroad bridge. Hundreds of acres of farmland in the Cienega Valley as well as several residences were flooded. Impacts from the levee failure and resulting flooding lasted beyond the winter months due to the clay soils in the southern portion of the valley that remained saturated for months later. The northern levee did not fail and was able to protect several residential developments, and the regional wastewater treatment plant that serves Arroyo Grande, Oceano, and Grover Beach. Failure of the north levee of the Arroyo Grande levee systems would be a significant risk to property and human lives.."*

Figure 5-83, taken from the Arroyo Grande Creek Channel Waterway Management Program Final Report, 2010, are pictures of the levee failure event.

Figure 5-83 Arroyo Grande Levee Failure Event, March 2001 (Looking South)



Source San Luis Obispo County OES , taken during storm damage assessment, March 2001

Figure 5-84, Figure 5-85, and Figure 5-86, below, depict more past flooding events in the County.

Figure 5-84 2023 Flooding Damage– Huasna Townsite Road



Source San Luis Obispo County Public Works, 2023

Figure 5-85 Image of Past Flooding in San Luis Obispo County



Source San Luis Obispo County OES, 2006

Figure 5-86 Image of Past Flooding in San Luis Obispo County



Source San Luis Obispo County OES, 2006

5.3.11.4 Probability of Future Occurrences

1% Annual Chance (100-Year) Flood

Likely – The 1% annual chance or 100-year flood is the flood that has a one percent chance in any given year of being equaled or exceeded.

<1% Annual Chance (100-Year) Flood/Outside the 1% Annual Chance (100-Year) Floodplain

Highly Likely—Based on historical data, flooding events less severe than a 100-year flood and those outside of the 100-year floodplain occur frequently during periods of heavy rains.

5.3.11.5 Climate Change Considerations

There are two types of flooding that will be exacerbated by climate change, coastal flooding related to sea level rise and inland flooding due to the projected increase in the precipitation which may also lead to levee or dam failure due to overtopping. The discussion in this section focuses on inland flooding. Refer to the Coastal Storms/Coastal Erosion/Sea Level Rise section for climate change considerations related to coastal flooding.

The Oroville Dam incident in 2017 triggered the State of California.to pursue considerable academic research into extreme weather and runoff events. Specifically, the ARkStorm 2.0 study of severe storm and flood scenario was released in 2022 (Huang and Swain, 2022) and documented that climate change has already doubled the probability of an event sufficient to cause catastrophic flooding. In addition, the dynamics of a changing precipitation regime

could increase sudden runoff by another 200-400% in the future. The underlying causes of these extreme events are complex. While climate change is not expected to drastically alter the overall amount of precipitation received by the County, warming temperatures are expected to shift precipitation patterns, resulting in both more droughts and flooding events. Secondary effects of this cycle are likely to result in increased flooding. Soil that has been dried out and hardened by drought is less adept at absorbing water, resulting in a greater volume of runoff. Vegetation, which may have slowed water flow, will likely be weakened, or killed by drought. Damaged vegetation also becomes fuel for wildland fire, which in turn dries out soil, hardening it, and in some severe fires the combustion of vegetation creates a gas that penetrates the soil profiles and as it cools condenses and forms a waxy coating that causes the soil to repel water (hydrophobic soil), which increases the rate of water runoff and makes the area more prone to flooding. The combination of West coastal hydrology, soils and topography may cause areas to experience frequent and localized flooding. Drainage problems and flooding have occurred in low-lying areas where culverts are undersized or blocked with debris can intensify flooding (EDWA 2019). .

California's Fourth Climate Assessment found that costs associated with direct climate change impacts by 2050 will be dominated by human mortality, coastal damage, and the potential for droughts and mega-floods (California Natural Resources Agency 2018). Scientific studies outlined in the same assessment also indicated shifts in California's precipitation regime, which show more dry days, more dry years, a longer dry season, and increases in occasional heavy precipitation events and floods. Studies also project great storm intensity with climate change, resulting in more direct runoff and flooding (California Natural Resources Agency 2018). As a result, high frequency flood events in conjunction with heavy precipitation events and extreme storm events will increase with climate change. Certain climate studies noted in the Fourth Climate Assessment also forecast that during periods with heavy rain and frequent storm events there is an increase in flood events, as well as landslide and debris flow (California Natural Resources Agency 2018). Also, with wildfires already being a problem in California, increasing periods of drought and lack of precipitation are expected to exacerbate conditions for fires to occur, and in turn worsen the potential for runoff and flooding associated with burned areas.

Vulnerability

While there are some benefits associated with flooding, such as the replenishment of beach sand, and nutrients to agricultural lands, it is considered a hazard to development in floodplains. Floods can cause many cascading effects. Fire can break out as a result of dysfunctional electrical equipment. Hazardous materials can also get into floodways, causing health concerns and polluted water supplies. In many instances during a flood, the drinking water supply will be contaminated. During the 2025 update the following vulnerability analysis was updated, using GIS and updated flood hazard mapping.

Structures

Historically, the County has been at risk to flooding primarily during the winter and spring months when river systems in the county swell with heavy rainfall. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. But occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. Flooding has occurred in the past within mapped floodplains and in other localized areas. Table 5-100 presents the County's flood zones categorized by type.

Table 5-100 San Luis Obispo County Parcels in Flood Zones

FLOOD ZONE	DEFINITION
Special Flood Hazard Areas (SFHA) Subject to Inundation by 100-Year Flood	
Zone A	No base flood elevations determined
Zone AE	Base flood elevations determined
Zone AH	Flood depths of 1-3 feet (usually areas of ponding); base flood elevations determined
Zone AO	Flood depths of 1-3 feet (usually sheet flow on sloping terrain); average depths determined; for areas of alluvial fan flooding, velocities also determined
Zone AR	SFHA formerly protected from the 1 percent annual chance flood by a flood control system that was subsequently decertified; zone AR indicates that the former flood control system is being restored to provide protection from the 1 percent annual chance or greater flood
Zone A99	Area to be protected from 1 percent annual chance flood by a federal flood protection system under construction; no base flood elevations determined
Zone VE	Area where waves and fast-moving water can cause extensive damage during the base flood event. Wave heights are larger than 3 feet. A detailed study has been done and BFEs have been calculated.
Other Flood Areas	
Zone X (with color coding)	Areas of 0.2 percent annual chance flood (i.e., 500-year flood); areas of 1 percent annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1 percent annual chance flood
Other Areas	
Zone X (with no shading)	Areas determined to be outside the 0.2 percent annual chance floodplain
Zone D	Areas in which flood hazards are undetermined, but possible

Source: FEMA, 2024

A flood loss estimate analysis was conducted using depth-damage functions developed by the USACE and implemented through FEMA's modeling tools. The analysis applies FEMA's estimated content replacement values based on property type, assuming that agricultural, commercial, exempt, and open space structures contain contents equal to 100% of their structure value, while residential and multi-residential structures contain 50%, and industrial structures contain 150%. For this planning-level assessment, a 2-foot average flood depth was assumed, with a 25% damage ratio applied to structures based on standardized depth-damage curves.

The flood loss analysis results indicate significant exposure to flood hazards across SLO County. County-wide, 2,991 improved properties exist within the 1% annual chance floodplain (Table 5-101). These properties have a total improved value of $1.3 billion and the estimated loss from a 1% annual chance flood is $569.8 million. The City of San Luis Obispo and unincorporated portions of the county together account for 82% of the structures within the 1% annual chance floodplain and 87% of the estimated losses that would occur from a 1% annual chance flood event. Other jurisdictions with 100 or more structures exposed a Morro Bay, Arroyo Grande, and Paso Robles, which collectively account for approximately 400 structures at risk.

Table 5-101 Improved Properties and Population Within the 1% Annual Chance Floodplain, by Municipality

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE	CONTENT VALUE	TOTAL VALUE	LOSS ESTIMATE	POPULATION
Arroyo Grande	139	$37,870,881	$25,164,228	$63,035,109	$15,758,777	269
Atascadero	100	$26,019,736	$16,583,339	$42,603,075	$10,650,769	203
Grover Beach	8	$471,202	$235,601	$706,803	$176,701	20
Morro Bay	159	$45,120,952	$26,812,625	$71,933,577	$17,983,394	240
Paso Robles	82	$32,096,949	$26,066,585	$58,163,534	$14,540,884	144
Pismo Beach	46	$39,718,731	$23,026,922	$62,745,653	$15,686,413	70
San Luis Obispo City	973	$643,406,578	$534,200,399	$1,177,606,977	$294,401,744	1,231
Unincorporated	1,484	$499,104,037	$303,255,889	$802,359,926	$200,589,982	2,559
Total	2,991	$1,323,809,066	$955,345,588	$2,279,154,654	$569,788,663	4,736

Source: San Luis Obispo Assessor Data November 15, 2024, FEMA NFHL Effective Date 6/6/2024, DWR, USACE Comprehensive Study, WSP GIS Analysis

A 0.2% annual chance flood is fundamentally more powerful, more destructive, and extends to a greater area than a 1% annual chance flood. The larger floodplain of a 0.2% annual chance floodplain often extends into areas that are more densely populated than the 1% annual chance floodplain. As a result, the exposure and loss from a 0.2% annual chance flood will be greater than the exposure and loss from a 1% annual chance flood.

The data in Table 5-102 represent the *additional structures and people* exposed to a 0.2% annual chance flood relative to a 1% annual chance flood. Stated another way, the exposure reported in Table 5-101 for a 1% annual chance flood serves as the baseline for Table 5-102, and the values describe the *additional exposure* caused by a 0.2% annual chance flood. Adding the values in Table 5-101 and Table 5-102 yields the full exposure to a 0.2% annual chance flood.

In SLO county, the difference in structures and people exposed by a 1% annual chance flood and a 0.2% chance flood is profound. When the extent of flooding expands from a 1% annual chance flood to a 0.2% chance flood, an additional, 12,069 structures are exposed (Table 5-102). The total number of structures in the 0.2% annual chance floodplain (15,060) is roughly five times the number in the smaller 1% annual chance floodplain (2,991). The value of structures in the 0.2% floodplain increases by $3.75 billion and expected loss increases by $1.56 billion above what exists within the 1% floodplain.

The most dramatic increase of structures and people within the 0.2% annual chance floodplain relative to the 1% annual chance floodplain occurs in Paso Robles and Atascadero. Losses in these and all participating jurisdictions are described further in jurisdiction-specific annexes to this HMP update.

Table 5-102 Improved Properties and Population Between the Maximum extent of the 1% Annual Chance Floodplain and the 0.2% Annual Chance Floodplain, by Municipality

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE	CONTENT VALUE	TOTAL VALUE	LOSS ESTIMATE	POPULATION
Arroyo Grande	449	$112,503,903	$62,132,345	$174,636,248	$43,659,062	1,033
Atascadero	2,797	$715,580,704	$474,630,540	$1,190,211,244	$297,552,811	5,462
Grover Beach	8	$287,940	$220,448	$508,388	$127,097	17

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE	CONTENT VALUE	TOTAL VALUE	LOSS ESTIMATE	POPULATION
Morro Bay	251	$59,448,218	$34,580,458	$94,028,676	$23,507,169	528
Paso Robles	5,781	$1,851,956,347	$1,205,064,189	$3,057,020,536	$764,255,134	13,134
Pismo Beach	169	$112,433,316	$91,859,021	$204,292,337	$51,073,084	275
San Luis Obispo City	1,509	$556,138,622	$382,120,553	$938,259,175	$234,564,794	3,085
Unincorporated	1,105	$341,200,843	$231,157,570	$572,358,413	$143,089,603	2,050
Total	12,069	$3,749,549,893	$2,481,765,123	$6,231,315,016	$1,557,828,754	25,585

Source: San Luis Obispo Assessor Data November 15, 2024, FEMA NFHL Effective Date 6/6/2024, WSP GIS Analysis

Within CSDs, Table 5-103 and Table 5-104 provide a detailed breakdown of improved properties that exist within the 1% annual chance floodplain and the additional improved properties that exist within the 0.2% annual chance floodplain, respectively. 632 people and 460 structures exist within the 1% annual chance floodplain, with a total estimated loss of $56.7 million. The highest economic losses are observed in Cambria, Oceano, and Nipomo, where a combination of high property values and flood risk contribute to millions of dollars in potential damages. Under the 0.2 annual chance flood scenario, the population within the floodplain increases by 852 people and 537 structures valued at over $193 million. The losses in each CSD are discussed further in CSD-specific annexes to this HMP update.

Table 5-103 Improved Properties and Population Within the 1% Annual Chance Floodplain by Community Service District Summary

COMMUNITY SERVICE DISTRICT	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	ESTIMATED LOSS	POPULATION
Cambria	74	$26,735,870	$26,686,658	$53,422,528	$13,355,632	-
Heritage Ranch	1	$295,800	$147,900	$443,700	$110,925	2
Los Osos	20	$9,620,420	$6,818,329	$16,438,749	$4,109,687	27
Nipomo	96	$18,517,834	$14,871,332	$33,389,166	$8,347,291	104
Oceano	158	$33,098,330	$22,160,215	$55,258,545	$13,814,636	267
San Miguel	62	$14,777,867	$7,391,935	$22,169,802	$5,542,451	151
San Simeon	4	$7,115,563	$7,115,563	$14,231,126	$3,557,782	-
Templeton	45	$18,166,868	$13,282,118	$31,448,986	$7,862,246	82
Total	460	$128,328,552	$98,474,049	$226,802,601	$56,700,650	632

Source: San Luis Obispo Assessor Data November 15, 2024, FEMA NFHL Effective Date 6/6/2024, DWR, USACE Comprehensive Study, WSP GIS Analysis

Table 5-104 Improved Properties and Population Between the Maximum extent of the 1% Annual Chance Floodplain and the 0.2% Annual Chance Floodplain by Community Service District Summary

COMMUNITY SERVICE DISTRICT	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	ESTIMATED LOSS	POPULATION
Avila Beach	97	$79,095,122	$59,733,644	$138,828,766	$34,707,191	138
Cambria	83	$33,635,424	$30,405,120	$64,040,544	$16,010,136	74

COMMUNITY SERVICE DISTRICT	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	ESTIMATED LOSS	POPULATION
Nipomo	125	$22,906,234	$16,116,916	$39,023,150	$9,755,787	193
Oceano	226	$57,259,631	$37,683,428	$94,943,059	$23,735,765	435
San Miguel	3	$548,633	$213,260	$761,893	$190,473	5
Templeton	3	$520,680	$260,340	$781,020	$195,255	7
Total	537	$193,965,724	$144,412,707	$338,378,431	$84,594,608	852

Source: San Luis Obispo Assessor Data November 15, 2024, FEMA NFHL Effective Date 6/6/2024, WSP GIS Analysis

Table 5-105 and Table 5-106 break down flood risk by property type, highlighting that residential and commercial properties face the highest overall losses. Within the 1% annual chance (100-year) floodplain, residential structures account for 1,672 at-risk properties valued at $495 million, with estimated losses of $188.1 million. Commercial properties follow, with 546 properties valued at $488 million and estimated losses of $244.3 million.

In the substantially larger 0.2% annual chance (500-year) floodplain, the number or people and residential structures exposed increases more than five-fold, by 22,353 people and 8,856 properties. The loss estimate for residential property increases four-fold, by more than $746 million (Table 5-105 and Table 5-106). Commercial properties also see a sharp increase in exposure as the floodplain expands from 1% to 0.2% annual chance, with 1,106 additional properties valued at $808 million and estimated losses of an additional. $404 million.

Table 5-105 Improved Properties within the 1% Annual Chance Floodplain by Property Type

PROPERTY TYPE	STRUCTURE COUNT	IMPROVED VALUE	CONTENT VALUE	TOTAL VALUE	LOSS ESTIMATE	POP.
Agricultural	75	$10,278,830	$10,278,830	$20,557,660	$5,139,415	-
Commercial	546	$488,658,270	$488,658,270	$977,316,540	$244,329,135	-
Exempt	51	$10,594,727	$10,594,727	$21,189,454	$5,297,364	-
Industrial	49	$31,647,653	$47,471,480	$79,119,133	$19,779,783	-
Mining	1	$342,291	$513,437	$855,728	$213,932	-
Mixed Use	196	$63,172,757	$63,172,757	$126,345,514	$31,586,379	-
Mobile/Manufactured Homes	115	$46,064,669	$23,032,335	$69,097,004	$17,274,251	272
Multi-Family Residential	165	$87,338,216	$44,386,750	$131,724,966	$32,931,241	404
Residential	1,672	$495,972,238	$256,586,306	$752,558,544	$188,139,636	4,060
Vacant Improved	121	$89,739,415	$0	$89,739,415	$22,434,854	-
TOTAL	2,991	$1,323,809,066	$944,694,890	$2,268,503,956	$567,125,989	4,736

Source: San Luis Obispo Assessor Data November 15, 2024, FEMA NFHL Effective Date 6/6/2024, DWR, USACE Comprehensive Study, WSP GIS Analysis

Table 5-106 Improved Properties that Exist Between the Maximum extent of the 1% Annual Chance Floodplain and the 0.2% Annual Chance Floodplain

PROPERTY TYPE	STRUCTURE COUNT	IMPROVED VALUE	CONTENT VALUE	TOTAL VALUE	LOSS ESTIMATE	POP.
Agricultural	6	$5,727,160	$5,727,160	$11,454,320	$2,863,580	-
Commercial	1,106	$808,904,520	$808,904,520	$1,617,809,040	$404,452,260	-
Exempt	87	$68,582,229	$68,582,229	$137,164,458	$34,291,115	-

PROPERTY TYPE	STRUCTURE COUNT	IMPROVED VALUE	CONTENT VALUE	TOTAL VALUE	LOSS ESTIMATE	POP.
Industrial	102	$97,076,023	$145,614,035	$242,690,058	$60,672,514	-
Mixed Use	567	$166,535,003	$166,535,003	$333,070,006	$83,267,502	-
Mobile/Manufactured Homes	300	$47,993,506	$23,996,753	$71,990,259	$17,997,565	780
Multi-Family Residential	971	$533,899,882	$266,949,941	$800,849,823	$200,212,456	2,425
Residential	8,856	$1,990,910,964	$995,455,482	$2,986,366,446	$746,591,612	22,353
Vacant Improved	74	$29,920,606	$0	$29,920,606	$7,480,152	-
TOTAL	**12,069**	**$3,749,549,893**	**$2,481,765,123**	**$6,231,315,016**	**$1,557,828,754**	**25,558**

Source: San Luis Obispo Assessor Data November 15, 2024, FEMA NFHL Effective Date 6/6/2024, WSP GIS Analysis

Approximately $8.5 billion of structures and contents exist within the 0.2% annual chance floodplain (the sum of structure value and estimated contents in Table 5-105 and Table 5-106), highlighting the significant economic vulnerability of San Luis Obispo County to major flood events. While the model does not account for all potential economic losses, such as business disruptions, environmental damages, or displacement costs, the findings provide a critical baseline for flood risk assessment. Furthermore, the analysis does not differentiate properties developed under modern floodplain regulations, meaning some structures may be elevated above base flood levels and thus less vulnerable than indicated. Conversely, assessed property values are often significantly lower than actual market values, meaning the true financial exposure may be even higher than reported. The results highlight the urgent need for flood mitigation strategies, particularly in Paso Robles, Atascadero, San Luis Obispo, and unincorporated coastal areas, which face some of the highest economic risks. Proactive measures such as floodproofing, infrastructure reinforcements, and policy-driven resilience efforts will be essential in minimizing long-term financial impacts and protecting vulnerable communities regulations.

Coastal Flooding Estimated Loss Analysis

An exposure analysis was conducted to assess exposure to FEMA's coastal 1% annual chance flood hazard, focusing on both population impacts and property risk. The results indicate that 89 people and 38 structures in the unincorporated areas of San Luis Obispo County are at risk, with one structure located in Morro Bay. The total exposed property value is $19 million, with an estimated loss of $7,258,875.

Table 5-107 provides a jurisdictional breakdown, showing that the majority of exposed structures are in unincorporated areas, accounting for 37 structures valued at $18.7 million with estimated losses of $7.04 million. Morro Bay has only one exposed structure with an estimated loss of $215,883. This indicates that unincorporated coastal areas bear the greatest financial risk from coastal flooding in the County.

Property type analysis, as detailed in Table 5-108, highlights that residential structures are the most impacted, with 35 residential properties valued at $17 million and estimated losses of $8.6 million. Commercial properties are the next most affected, with two structures valued at $541,008 and projected losses of $270,504. A single multi-family residential building is also at risk, with an estimated loss of $717,642. These findings emphasize that housing and small businesses are particularly vulnerable to coastal flood hazards, reinforcing the need for targeted flood mitigation measures in residential and commercial zones.

Table 5-107 San Luis Obispo County Improved Properties Exposed to FEMA Coastal 1% Flood Hazard by Jurisdiction Summary

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	ESTIMATED LOSS	POPULATION
Morro Bay	1	$431,766	$431,766	$863,532	$215,883	0
Unincorporated	37	$18,744,899	$9,427,071	$28,171,970	$7,042,992	89
Total	38	$19,176,665	$9,858,837	$29,035,502	$7,258,875	89

Source: San Luis Obispo Assessor Data November 15, 2024, FEMA NFHL Effective Date 6/6/2024, WSP GIS Analysis

Table 5-108 San Luis Obispo County Improved Properties Exposed to FEMA Coastal 1% Flood Hazard by Property Type Summary

PROPERTY TYPE	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	ESTIMATED LOSS	POPULATION
Commercial	2	$541,008	$541,008	$1,082,016	$270,504	-
Multi-Family Residential	1	$1,435,283	$1,435,283	$2,870,566	$717,642	2
Residential	35	$17,200,374	$17,200,374	$34,400,748	$8,600,187	86
Total	38	$19,176,665	$19,176,665	$38,353,330	$9,588,333	89

Source: San Luis Obispo Assessor Data November 15, 2024, FEMA NFHL Effective Date 6/6/2024, WSP GIS Analysis

Within CSDs, Table 5-109 provides further insight into coastal flood exposure. A total of three structures are at risk across Cambria, Los Osos, and Oceano, with a combined property value of nearly $2.6 million and estimated losses of $997,957. Cambria has the highest exposure, with one structure valued at $1 million and projected losses of $405,105, while Oceano also faces significant financial risk, with one structure valued at $1.4 million and estimated losses of $538,231.

Table 5-109 San Luis Obispo County Improved Properties at Exposed to FEMA Coastal 1% Flood Hazard by Community Service District Summary

COMMUNITY SERVICE DISTRICT	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	ESTIMATED LOSS	POPULATION
Cambria	1	$1,080,279	$540,140	$1,620,419	$405,105	2
Los Osos	1	$109,242	$109,242	$218,484	$54,621	-
Oceano	1	$1,435,283	$717,642	$2,152,925	$538,231	2
Total	3	$2,624,804	$1,367,023	$3,991,827	$997,957	4

Source: San Luis Obispo Assessor Data November 15, 2024, FEMA NFHL Effective Date 6/6/2024, WSP GIS Analysis

The analysis highlights that unincorporated areas and small coastal communities face the highest risk of economic losses from coastal flooding, particularly in residential and small commercial properties. These findings emphasize the need for coastal resilience strategies, including flood-resistant infrastructure, land-use planning adjustments, and emergency preparedness efforts to mitigate the long-term financial and social impacts of rising sea levels and coastal flood hazards.

Insurance Coverage, Claims Paid, and Repetitive Losses

The FIS develops flood-risk data for various areas of a community that is used to establish flood insurance rates and to assist the community in its efforts to promote sound floodplain management. The current San Luis Obispo County FIRM is dated June 6, 2024. This study covers the unincorporated and all incorporated areas of the County.

Table 5-110 below, shows the flood insurance policy information for the study area.

Table 5-110 San Luis Obispo County Flood Insurance Policy Information

JURISDICTION	POLICIES	TOTAL COVERAGE	TOTAL PREMIUM	TOTAL CLAIMS SINCE 1978	TOTAL PAID SINCE 1978
City of Arroyo Grande	60	$18,120	$68,290	30	$573,833
City of Atascadero	68	$20,844	$73,216	40	$915,067
City of San Luis Obispo	430	$140,599,000	$650,045	155	$811,001
City of Grover Beach	13	$4,199,000	$9,725	7	$45,397
City of Morro Bay	97	$31,298,000	$75,407	37	$828,657
City of Paso Robles	36	$10,695,000	$41,130	11	$153,642
City of Pismo Beach	76	$26,872,000	$92,207	16	$85,644
County of San Luis Obispo	469	$136,511,000	$462,645	310	$4,408,953
Total	**1,249**	**$389,138,000**	**$1,472,665**	**606**	**$7,822,194**

Source: FEMA CIS (Community Information System), April 2025.

FEMA NFIP Policy and Claims Data

As of 2025, there are 1,249 active NFIP policies across the County, with total coverage exceeding $389 million. Since 1978, FEMA has recorded 606 claims in the region, resulting in over $7.8 million in total paid losses. The Count accounts for over half of all claims (310) and more than $4.4 million in payouts, by far the largest share across all jurisdictions.

Several cities also experienced notable increases in paid losses. Atascadero and Morro Bay each reported over $300,000 in additional losses in the past five years alone, likely driven by winter storm events in 2021, 2022, 2023, and 2024. While the City of San Luis Obispo has the highest number of policies (430) and the largest coverage value ($140.6 million), it has seen more modest historical claim payouts ($811,001), indicating lower frequency or severity of losses relative to insured value.

Generally, paid losses have increased across nearly all jurisdictions since the last plan update, underscoring the ongoing financial exposure from flooding hazards. This trend reinforces the importance of continued participation in NFIP and sustained investment in flood risk reduction strategies.

Repetitive Loss Properties

FEMA insures properties against flooding losses through the NFIP. As part of efforts to reduce or eliminate repetitive flooding to structures across the U.S., FEMA has developed a Repetitive Loss (RL) strategy aimed at identifying, cataloging, and proposing mitigation measures to minimize flood losses to properties that account for a disproportionate share of insurance claims.

A RL is defined by FEMA as a property with two or more NFIP claims of at least $1,000 each within any 10-year period since 1978. These properties, whether currently insured or not, contribute significantly to the overall costs of the NFIP payouts. Within the County, there are 42 repetitive loss buildings, with a subset of 4 classified as Severe Repetitive Loss (SRL) properties.

A SRL property is one that has either four or more separate NFIP claims exceeding $5,000 each or two or more claims where total payments exceed the building's market value. There are four SRL properties within the County, with two of these located in the City of Arroyo Grande, and with one located in the unincorporated community of Nipomo and another located in the unincorporated community of Santa Margarita.

Table 5-111 shows the County's RL and SLR properties by jurisdiction and Table 5-112 shows the RL and SLR properties by property type (as categorized and defined by FEMA).

Table 5-111 FEMA RL/SRL Properties by Jurisdiction

JURISDICTION	RL PROPERTIES	SLR PROPERTIES
City of Arroyo Grande	3	2
City of Atascadero	3	-
City of Grover Beach		
City of Morro Bay	3	-
City of Pismo Beach	1	-
County of San Luis Obispo	32	2
Total	**42**	**4**

Source: FEMA OpenFEMA Dataset), 2024.

Table 5-112 FEMA RL/SRL Properties by Property Type

PROPERTY TYPE	RL PROPERTIES	SLR PROPERTIES
Single Family Residence	18	-
2 to 4 Unit Residential Building	4	1
Non-Residential Building	9	-
Single-Family Residential Building, (excluding mobile homes or units within multi-unit buildings)	10	3
Residential Non-Condo Building (with 2, 3, or 4 units seeking insurance on all units)	2	-
Total	**42**	**4**

Source: FEMA (OpenFEMA Dataset), 2024.

The distribution of flood-prone structures within the study area reveals that single-family residences account for the largest share of RL properties (1), followed by non-residential buildings (9) and single-family residential buildings excluding mobile homes or multi-unit structures (10). Smaller multi-unit residential buildings, such as 2 to 4 unit structures (4 RL properties) and residential non-condominium buildings (2 RL properties), also exhibit flood vulnerability, though at a lower frequency.

For SRL properties, the total count is notably lower, with only 4 recorded properties. The majority fall under single-family residential buildings (3), with one SRL property classified as a 2 to 4 unit residential building.

The number of repetitive loss properties highlights the need for targeted flood mitigation efforts, such as elevating, retrofitting, or acquiring at-risk structures to reduce long-term flood

risk. Addressing repetitive loss claims can also help sustain the financial health of the NFIP. For a more detailed breakdown of repetitive loss properties by jurisdiction, refer to the jurisdictional annexes.

People

Flood risk varies across the County, with thousands of residents living in both the 100-year and 500-year floodplains. As shown in Table 5-113, an estimated 4,736 residents live within the 100-year flood zone, meaning they face a 1% annual chance of flooding each year. The unincorporated county has the largest number of residents exposed, with 2,559 people living in the flood hazard area. The City of San Luis Obispo follows, with 1,231 residents at risk. Other jurisdictions with notable exposure include Arroyo Grande (269 residents), Atascadero (203), Morro Bay (240), and Paso Robles (144), while Grover Beach (20) and Pismo Beach (70) have comparatively lower populations in the 1% annual chance flood zone. It is important to note that these estimates do not account for seasonal student populations, particularly in San Luis Obispo, where a large number of university students reside. If these individuals were included, the actual number of residents at risk in this jurisdiction could be significantly higher than reported.

As the floodplain expands from 1% annual chance to 0.2% annual chance, the number of SLO County residents potentially exposed to flood hazards increases more than six-fold (by 25,585 residents, Table 5-114). The number of people in Paso Robles potentially exposed to flood hazards expands by 90-fold (by 13,134 people) as the floodplain expands from a 1% annual chance to a 0.2% annual chance. Nearly half of the county's total population living within the 0.2% annual chance floodplain live in Paso Robles. A similar, though less severe, pattern exists in Atascadero. An estimated 203 Atascadero residents live within the 1% annual chance floodplain, but the number swells 28-fold, by 5,462 residents, living within the larger 0.2% annual chance floodplain.

The substantial increase in people living within the 0.2% annual chance floodplain relative to the 1% chance floodplain exists beyond Paso Robles and Atascadero, but is relatively modest. In all other participating jurisdictions and unincorporated portions of SLO County, the number of people living within the 0.2% annual chance floodplain more than doubles relative to the number living within the 1% annual chance floodplain (Table 5-113 and Table 5-114).

This pattern suggests that while immediate flood risks may be concentrated in specific areas, broader long-term hazard mitigation planning should account for the thousands of additional residents exposed in extreme flood scenarios. These findings emphasize the need for targeted flood mitigation strategies, particularly in jurisdictions with high concentrations of at-risk populations.

Table 5-113 Population Living in 1% Annual Chance Flood Hazard Zone

JURISDICTION	POPULATION
Arroyo Grande	269
Atascadero	203
Grover Beach	20
Morro Bay	240
Paso Robles	144
Pismo Beach	70
San Luis Obispo City	1,231
Unincorporated	2,559
Total	4,736

Source: San Luis Obispo Assessor Data November 15, 2024, FEMA NFHL Effective Date 6/6/2024, DWR, USACE Comprehensive Study, WSP GIS Analysis

Table 5-114 Population Living Between the Maximum extent of the 1% Annual Chance Floodplain and the 0.2% Annual Chance Floodplain, by Municipality

JURISDICTION	POPULATION
Arroyo Grande	1,033
Atascadero	5,462
Grover Beach	17
Morro Bay	528
Paso Robles	13,134
Pismo Beach	275
San Luis Obispo City	3,085
Unincorporated	2,050
Total	25,585

Source: San Luis Obispo Assessor Data November 15, 2024, FEMA NFHL Effective Date 6/6/2024, WSP GIS Analysis

Social Vulnerability

Flood hazards especially affect the socioeconomically vulnerable, those with disabilities, minorities, and housing or transportation vulnerable populations. This is because these populations may be unable to evacuate in a timely manner; may lose access to critical resources including life support technology or medicine due to flood damages; may be found in situations where their health conditions are exacerbated due to stagnant water-borne pathogens (or other communicable diseases); and may be more likely to drown, get injured, or suffer from hypothermia due to physical or mental impairments. Some of the most socially vulnerable areas of the County per the SVI are also vulnerable to flooding. This includes Oceano, Grover Beach, Paso Robles, and San Luis Obispo. A 500-year event in Paso Robles could have extensive societal impacts. Oceano and Grover Beach as well as Morro Bay, Los Osos and San Simeon may be of particular interest again due to their location along the coast, as they may see increased hazard risk due to combined exposure to tsunamis, coastal erosion, or sea level rise.

Critical Facilities and Lifelines

The following analysis summarizes the number and types of critical facilities exposed to FEMA and DWR 1% (100-year) and 0.2% (500-year) flood hazards, organized into three sections: Jurisdictions, Community CSDs, and Coastal Areas. The analysis combines exposure from the 1% and 0.2% flood hazards for jurisdictions and CSDs, highlighting differences in exposure between these scenarios. Coastal area exposure is analyzed separately based on the 1% flood hazard only. Table 5-115 and Table 5-116 Critical Facility Assets Exposed to FEMA and DWR Awareness 1% Flood Hazards by Jurisdictions and FEMA Lifelines and Critical Facility Assets Exposed to FEMA Riverine 0.2% Flood Hazards by Jurisdictions and FEMA Lifelines, respectively.

Across all jurisdictions, a total of 347 critical facilities are exposed to the 1% flood hazard, while exposure decreases to 129 facilities under the 0.2% flood hazard, reflecting a more limited extent of riverine flooding at the higher return interval. However, there are significant differences in exposure patterns across lifelines.

The unincorporated areas face the highest exposure, with 244 facilities at risk under the 1% flood hazard and 35 facilities under the 0.2% flood hazard, indicating that the majority of flood risk is concentrated within the 100-year floodplain. Exposure is driven by vulnerabilities in transportation (200 facilities under 1% and 5 under 0.2%) and safety and security lifelines (18 under 1% and 22 under 0.2%), highlighting that safety-related infrastructure remains highly exposed even in the 500-year flood scenario.

The City of San Luis Obispo experiences notable exposure with 46 facilities under the 1% flood hazard, which decreases to 16 facilities under the 0.2% flood hazard, reflecting that many assets fall within the 100-year floodplain. Transportation facilities (31 under 1%, 10 under 0.2%) face the greatest exposure, with reduced but still significant risk to communications (11 under 1%, 1 under 0.2%) and safety and security facilities (1 under both scenarios).

In Paso Robles, exposure remains high under both scenarios, with 12 facilities at risk under the 1% flood hazard and 41 facilities under the 0.2% flood hazard, indicating increased vulnerability beyond the 100-year floodplain, especially for safety and security facilities (17 under 0.2%) and communications (7 under 0.2%), which are critical for emergency response and regional connectivity.

Atascadero faces similar trends, with 19 facilities at risk under the 1% hazard and 29 under the 0.2% hazard, with transportation facilities (19 under 1% and 10 under 0.2%) being the most exposed. Additionally, there is increased exposure under the 0.2% flood scenario to communications (5 facilities) and safety and security services (8 facilities), highlighting risks to emergency operations during extreme flood events.

Among coastal jurisdictions, Morro Bay has 12 facilities exposed under the 1% hazard and 2 under the 0.2% hazard, with reduced risk to transportation and water systems under the 500-year scenario. Pismo Beach faces limited exposure, with 5 facilities under the 1% hazard and no additional facilities exposed under the 0.2% flood hazard, indicating that flood impacts are largely limited to the 100-year floodplain.

Grover Beach has minimal exposure, with only 1 facility exposed under the 0.2% flood hazard and no facilities exposed under the 1% hazard, indicating localized flood risks.

Table 5-115 Critical Facility Assets Exposed to FEMA and DWR Awareness 1% Flood Hazards by Jurisdictions and FEMA Lifelines

JURISDICTION	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Arroyo Grande	-	-	-	-	-	-	9	-	9
Atascadero	-	-	-	-	-	-	19	-	19
Morro Bay	-	2	-	-	-	-	9	1	12
Paso Robles	-	1	-	-	-	-	11	-	12
Pismo Beach	-	-	-	-	-	-	4	1	5
San Luis Obispo City	11	-	-	-	2	1	31	1	46
Unincorporated	10	1	-	3	1	18	200	11	244
Total	21	4	0	3	3	19	283	14	347

Source: San Luis Obispo County, FEMA NFHL Effective Date 6/6/2024, DWR, USACE Comprehensive Study, CalARP, HIFLD, NBI, NID, FCWCD, WSP Analysis

Table 5-116 Critical Facility Assets Exposed to FEMA Riverine 0.2% Flood Hazards by Jurisdictions and FEMA Lifelines

JURISDICTION	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Arroyo Grande	-	-	1	-	-	2	2	-	5
Atascadero	5	-	3	-	3	8	10	-	29
Grover Beach	-	-	-	-	-	-	1	-	1
Morro Bay	-	-	1	-	-	1	-	-	2
Paso Robles	7	-	3	4	3	17	6	1	41
San Luis Obispo City	1	-	1	-	1	3	10	-	16
Unincorporated	5	-	1	1	1	22	5	-	35
Total	18	0	10	5	8	53	34	1	129

Source: San Luis Obispo County, FEMA NFHL Effective Date 6/6/2024, DWR, USACE Comprehensive Study, CalARP, HIFLD, NBI, NID, FCWCD, WSP Analysis

CSD Lifeline Exposure to 1% and 0.2% Flood Hazards

A total of 30 critical facilities are exposed to the 1% flood hazard within CSDs, while 22 facilities are exposed under the 0.2% flood hazard, reflecting moderate differences between flood scenarios.

Cambria CSD faces the highest exposure, with 9 facilities under the 1% flood hazard and 16 under the 0.2% hazard, indicating increased vulnerability under extreme flood conditions. The greatest increase in exposure occurs within safety and security facilities (2 under 1% and 13 under 0.2%), highlighting risks to emergency response services during significant flood events.

Oceano CSD has 9 facilities at risk under the 1% flood hazard, decreasing to 1 facility under the 0.2% flood hazard, with transportation (5 facilities under 1%) and communications (3 facilities under 1%) facing the highest exposure.

Nipomo CSD sees relatively consistent exposure between scenarios, with 6 facilities under the 1% flood hazard and 3 under the 0.2% hazard, with transportation and safety services remaining the most vulnerable.

San Simeon CSD experiences 2 facilities at risk under the 1% hazard, while the 0.2% hazard impacts only 1 facility, primarily affecting water systems, reflecting localized but critical flood vulnerability.

Templeton CSD faces 4 facilities at risk under the 1% flood hazard, with no additional exposure under the 0.2% flood hazard, indicating that all flood risk is concentrated within the 100-year floodplain.

Table 5-117 and Table 5-118 present critical facility assets exposed to FEMA and DWR 1% annual chance (100-year) flood hazards, categorized by Community Services Districts (CSDs) and FEMA lifelines. Additionally, they identify critical facility assets at risk from FEMA 0.2% annual

chance (500-year) riverine flood hazards, highlighting infrastructure that could be impacted during extreme flood events.

Understanding the exposure of critical facilities, such as emergency services, utilities, and transportation infrastructure, is essential for flood risk management, emergency response planning, and resilience-building efforts. As climate change increases the frequency and severity of extreme precipitation and flood events, these assessments provide valuable insights for mitigation strategies, infrastructure reinforcements, and long-term adaptation planning to protect vital community resources.

Table 5-117 Critical Facility Assets Exposed to FEMA and DWR Awareness 1% Flood Hazards by Community Service District and FEMA Lifelines

COMMUNITY SERVICE DISTRICT	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Cambria	1	-	-	-	-	2	6	-	9
Nipomo	1	-	-	-	-	2	3	-	6
Oceano	3	-	-	-	-	-	5	1	9
San Simeon	1	-	-	-	-	-	-	1	2
Templeton	-	-	-	-	-	-	4	-	4
Total	6	0	0	0	0	4	18	2	30

Source: San Luis Obispo County, FEMA NFHL Effective Date 6/6/2024, DWR, USACE Comprehensive Study, CalARP, HIFLD, NBI, NID, FCWCD, WSP Analysis

Table 5-118 Critical Facility Assets Exposed to FEMA Riverine 0.2% Flood Hazards by Community Service District and FEMA Lifelines

COMMUNITY SERVICE DISTRICT	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Avila Beach	1	-	-	-	-	1	-	-	2
Cambria	2	-	-	-	1	13	-	-	16
Nipomo	-	-	1	-	-	2	-	-	3
Oceano	-	-	-	1	-	-	-	-	1
Total	3	0	1	1	1	16	0	0	22

Source: San Luis Obispo County, FEMA NFHL Effective Date 6/6/2024, CalARP, HIFLD, NBI, NID, FCWCD, WSP Analysis

Coastal Area Lifeline Exposure to 1% Flood Hazards

Coastal areas face unique flood risks driven by storm surge, wave run-up, and coastal erosion, particularly during high tide events or coastal storms. The analysis of 1% (100-year) coastal flood

hazards highlights specific vulnerabilities to critical infrastructure in unincorporated areas and coastal CSDs.

In unincorporated coastal areas, 2 critical facilities are at risk under the 1% coastal flood hazard, including one safety and security facility and one water system facility, highlighting potential disruptions to emergency services and water supply during coastal flood events.

Within coastal CSDs, San Simeon CSD has 1 facility at risk under the 1% coastal flood hazard, specifically impacting a water system facility, which could compromise local water supply during coastal flood events.

Table 5-119 and Table 5-120 show critical facility assets exposed to FEMA coastal 1% and 0.2% flood hazards by jurisdictions and FEMA lifelines

Table 5-119 Critical Facility Assets Exposed to FEMA Coastal 1% Flood Hazards by Jurisdictions and FEMA Lifelines

JURISDICTION	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Unincorporated	-	-	-	-	-	1	-	1	2
Total	0	0	0	0	0	1	0	1	2

Source: San Luis Obispo County, FEMA NFHL Effective Date 6/6/2024, CalARP, HIFLD, NBI, NID, FCWCD, WSP Analysis

Table 5-120 Critical Facility Assets Exposed to FEMA Coastal 1% Flood Hazards by Community Service District and FEMA Lifelines

COMMUNITY SERVICE DISTRICT	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
San Simeon	-	-	-	-	-	-	-	1	1
Total	0	0	0	0	0	0	0	1	1

Source: San Luis Obispo County, FEMA NFHL Effective Date 6/6/2024, CalARP, HIFLD, NBI, NID, FCWCD, WSP Analysis

Economy and Community Values

Flooding poses a significant economic risk to the County, with direct and indirect losses affecting multiple sectors. Based on the flood loss analysis, 546 commercial structures valued at approximately $977 million are located within the 1% annual chance flood zone. If a major flood event were to occur, direct losses to these properties could total $244 million, as estimated in the loss analysis. However, these figures do not account for secondary economic impacts, including business closures, lost wages, supply chain disruptions, and prolonged downtime costs. The agricultural sector, a cornerstone of the county's economy, is particularly vulnerable to flooding. Beyond the immediate damage to crops and livestock, flooding can degrade soil quality, making it difficult for agricultural operations to recover even after

floodwaters recede. Floodwaters can erode topsoil, deposit contaminants, and disrupt the natural nutrient cycle, reducing soil fertility and long-term productivity.

Additionally, flooding can cause extensive damage to irrigation systems, water storage reservoirs, and natural water bodies, leading to water shortages, contamination, and prolonged agricultural disruption. The combined effect of property losses, business interruptions, and agricultural disruptions underscores the widespread economic consequences of flooding.

Historic, Cultural, and Natural Resources

The County has significant historic, cultural, and natural resources located throughout the County. Natural areas within the floodplain often benefit from periodic flooding as a naturally recurring phenomenon. These natural areas often reduce flood impacts by allowing absorption and infiltration of floodwaters. Natural resources are generally resistant to flooding except where natural landscapes and soil compositions have been altered for human development or after periods of previous disasters such as drought and fire. Wetlands, for example, exist because of natural flooding incidents. Areas recently suffering from wildfire damage may erode because of flooding, which can permanently alter an ecological system. Table 5-121 shows historical sites exposed to flood hazards by jurisdictions and flood zone type.

Table 5-121 Historical Sites Exposed to Flood Hazards by Jurisdictions and Flood Zone Type

JURISDICTION	FEMA COASTAL 1% FLOOD	FEMA RIVERINE 1% FLOOD	FEMA 0.2% FLOOD
Atascadero	1	-	1
Paso Robles	1	-	1
San Luis Obispo City	1	-	1
Unincorporated	16	11	16
Total	19	11	19

Source: San Luis Obispo County, FEMA NFHL Effective Date 6/6/2024, WSP Analysis

The analysis of historical sites in the County reveals varying levels of exposure to FEMA-designated flood hazards. Under the 1% annual chance (100-year) coastal flood hazard, only one historical site in unincorporated areas is at risk. However, the 1% annual chance riverine flood hazard poses a significantly greater threat, with 11 historical sites in unincorporated areas exposed. The most extensive flood risk is associated with the 0.2% annual chance (500-year) flood hazard, which affects 19 historical sites across multiple jurisdictions, including Atascadero, Paso Robles, San Luis Obispo City, and unincorporated areas. These findings highlight the importance of targeted flood mitigation and preservation efforts to protect historically significant sites from potential flood damage.

Development Trends

Flooding and floodplain management are significant issues for the County. The potential or likelihood of a flood event in the county increases with the annual onset of heavy rains in winter and spring months. Much of the historical growth in the problem areas connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards. Future annexations of unincorporated areas could significantly add to the number of flood-prone structures in the County.

For NFIP participating communities, floodplain management practices implemented through local floodplain management ordinances should mitigate the flood risk to new development in floodplains. The overall development trend in the planning area is moderate. Much of this growth is occurring in the urban and coastal areas, which can increase stormwater runoff. The

potential for flooding may increase as stormwater is channelized due to land development. Such changes can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. Floodplain modeling and master planning should be based on buildout land use to ensure that all new development remains safe from future flooding. While local floodplain management, stormwater management, and water quality regulations and policies address these changes on a site-by-site basis, their cumulative effects can have a negative impact on the floodplain.

The County and NFIP participating jurisdictions (Arroyo Grande, Atascadero, City of San Luis Obispo, Grover Beach, Morro Bay , Paso Robles, Pismo Beach) follow local regulations for floodplain management to protect new development from flood hazards.

Table 5-122 shows properties exposed to FEMA riverine 1% flood hazard built between 2019-2024 while Table 5-123 shows properties exposed to DWR awareness riverine 1% flood hazards and Table 5-124 shows properties exposed to FEMA riverine 0.2% flood hazard built between 2019-2024.

Table 5-122 Properties Exposed to FEMA Riverine 1% Flood Hazard Built between 2019-2024

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE
Arroyo Grande	3	$7,364,206
Morro Bay	1	$348,464
Paso Robles	2	$2,453,068
Pismo Beach	1	$577,422
San Luis Obispo City	36	$76,780,604
Unincorporated	85	$34,875,855
Total	128	$122,399,619

Source: San Luis Obispo Assessor Data November 15, 2024, FEMA NFHL Effective Date 6/6/2024, WSP GIS Analysis

Table 5-123 Properties Exposed to DWR Awareness Riverine 1% Flood Hazard Built between 2019-2024

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE
Unincorporated	2	$1,316,837
Total	2	$1,316,837

Source: San Luis Obispo Assessor Data November 15, 2024, DWR, USACE Comprehensive Study, WSP GIS Analysis

Table 5-124 Properties Exposed to FEMA Riverine 0.2% Flood Hazard Built between 2019-2024

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE
Arroyo Grande	10	$5,625,822
Atascadero	94	$48,534,931
Morro Bay	5	$2,648,198
Paso Robles	77	$148,842,529
Pismo Beach	3	$53,848,369
San Luis Obispo City	61	$37,090,715
Unincorporated	24	$18,774,465
Total	274	$315,365,029

Source: San Luis Obispo Assessor Data November 15, 2024, FEMA NFHL Effective Date 6/6/2024, WSP GIS Analysis

Recent development between 2019 and November 2024 was analyzed using GIS overlays on the FEMA Riverine 1% (100-year), DWR Awareness 1%, and FEMA Riverine 0.2% (500-year) flood hazard layers. This analysis highlights increased development in flood-prone areas, particularly in The City of San Luis Obispo, Paso Robles, and unincorporated areas, though it does not account for flood-resistant design measures or local mitigation requirements.

Within the FEMA 1% flood hazard area, 128 properties were developed, valued at approximately $122.4 million. The highest growth occurred in unincorporated areas, with 85 structures totaling $34.9 million. The City of San Luis Obispo had significant urban expansion, with 36 properties valued at $76.8 million, marking it as the highest-value development area. Morro Bay and Pismo Beach experienced limited coastal flood hazard area development, with 1 property each.

Development in the unregulated DWR Awareness 1% flood zone was minimal, with only 2 properties built in unincorporated areas, valued at approximately $1.3 million. In contrast, development within the FEMA 0.2% (500-year) flood hazard area was significantly higher, with 274 properties totaling approximately $315.4 million, more than twice the development in the 100-year floodplain. Paso Robles saw the highest growth, with 77 properties valued at over $148.8 million, followed by Atascadero, with 94 properties totaling approximately $48.5 million, highlighting suburban expansion into areas with lower perceived flood risk. The City of San Luis Obispo continued to expand, with 61 properties valued at approximately $37.1 million.

Coastal development, though limited, represented high-value investments. Pismo Beach recorded only 3 properties, but they totaled approximately $53.8 million, underscoring the economic risk from coastal flooding. Morro Bay saw 5 properties developed, valued at approximately $2.6 million. The disparity between 100-year and 500-year floodplain development is significant, with development in the 500-year floodplain more than doubling that in the 100-year floodplain (274 vs. 128 properties). Particularly notable are Paso Robles (77 properties under 0.2% vs. 2 under 1%) and Atascadero (94 properties under 0.2% vs. none under 1%), reflecting suburban growth into areas prone to extreme flood events.

These trends emphasize the need for strong floodplain management, particularly in high-growth areas such as Paso Robles, Atascadero, and The City of San Luis Obispo, and highlight the vulnerability of high-value coastal development in areas like Pismo Beach. Additionally, the limited development in DWR Awareness zones suggests possible success in local flood management efforts but also underscores the importance of comprehensive flood risk communication.

Risk Summary

- Overall significance of the flood hazard is High.
- *Effects on People:* Approximately 4,736 residents live in the 100-year flood zone, with the largest population at risk in unincorporated areas and City of San Luis Obispo. Paso Robles, Atascadero, and Morro Bay also have notable at-risk populations. In a 500-year flood scenario, the at-risk population increases to 25,585 residents, with Paso Robles experiencing the largest increase. Flooding poses life-safety risks due to drowning, displacement, and potential exposure to contaminated floodwaters and can affect socially vulnerable populations. The disparities between the 100-year and 500-year floodplain populations reinforce the importance of comprehensive land use planning, flood control investments, and emergency preparedness initiatives to protect vulnerable communities from both frequent and extreme flood events.
- *Effects on Property:* Flooding poses a significant threat to structures, with 2,991 improved properties valued at $2.27 billion located in the 100-year floodplain. Estimated flood losses for a 1% annual chance event total $569.8 million. The 500-year floodplain exposes 12,069 structures valued at over $6.23 billion, with estimated losses exceeding $1.55 billion.

- *Effects on the Economy and Community Values:* Flooding threatens businesses, infrastructure, and agricultural operations. There are 546 commercial structures worth approximately $977 million in the 100-year flood zone, with estimated losses of $244 million. Flood-related damage to agriculture includes crop loss, soil degradation, water contamination, and disruption of irrigation systems, all of which can have long-term economic consequences.
- *Effects on Critical Facilities and Lifelines*: Across all jurisdictions, a total of 347 critical facilities are exposed to the 1% flood hazard, while exposure decreases to 129 facilities under the 0.2% flood hazard, reflecting a more limited extent of riverine flooding at the higher return interval. However, there are significant differences in exposure patterns across lifelines. Exposure is driven by vulnerabilities in transportation (200 facilities under 1% and 5 under 0.2%) and safety and security lifelines (18 under 1% and 22 under 0.2%), highlighting that safety-related infrastructure remains highly exposed even in the 500-year flood scenario.
- *Effects on Historic, Cultural, and Natural Resources*: The analysis of historical sites in the County reveals varying levels of exposure to FEMA-designated flood hazards, with the 1% annual chance (100-year) coastal flood hazard putting one historical site at risk in unincorporated areas, the 1% riverine flood hazard threatening 11 sites, and the 0.2% annual chance (500-year) flood hazard affecting 19 sites across multiple jurisdictions, emphasizing the need for targeted flood mitigation and preservation efforts to protect these historically significant sites.
- *Related*-Hazards: Adverse weather, Coastal Storm, Coastal Erosion, Sea Level Rise, Dam Incidents, Earthquake, Faults and Liquefaction, Tsunami, Seiches, Land Subsidence, Landslide, Drought, and Wildfire.

Table 5-125 Hazard Risk Summary - Flood

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY	OVERALL SIGNIFICANCE
San Luis Obispo County	Significant	Likely	Critical	Medium
City of Arroyo Grande	Significant	Highly Likely	Limited	Medium
City of Atascadero	Significant	Occasional	Critical	Medium
City of Grover Beach	Limited	Occasional	Limited	Low
City of Morro Bay	Extensive	Highly Likely	Critical	High
City of Paso Robles	Significant	Likely	Limited	High
City of Pismo Beach	Significant	Likely	Limited	Medium
City of San Luis Obispo	Limited	Occasional	Limited	Medium
Avila Beach CSD	Significant	Highly Likely	Limited	Medium
Cambria CSD	Significant	Likely	Critical	Medium
Ground Squirrel Hollow CSD	Limited	Occasional	Limited	Low
Heritage Ranch CSD	Extensive	Likely	Critical	High
Los Osos CSD	Significant	Likely	Limited	Low

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY	OVERALL SIGNIFICANCE
Nipomo CSD	Limited	Occasional	Limited	Low
Oceano CSD	Significant	Highly Likely	Limited	Medium
San Miguel CSD	Limited	Occasional	Limited	Medium
San Simeon CSD	Limited	Likely	Negligible	Low
Templeton CSD	Limited	Likely	Limited	Low
Cayucos Sanitary District	Significant	Likely	Critical	High
Port San Luis Harbor District	Limited	Highly Likely	Limited	Medium
San Luis Obispo FCWCD	Significant	Likely	Critical	Medium
South San Luis Obispo Sanitary District	Significant	Highly Likely	Limited	Medium

5.3.12 Landslides and Debris Flow

5.3.12.1 Hazard/Problem Definition

A landslide is a geologic hazard where the force of gravity combines with natural or manmade factors to cause earth material to move or slide down an incline. Landslides can occur suddenly or gradually over time, with speeds ranging from inches per year to tens of miles per hour. When landslides occur suddenly and unexpectedly the damage can be deadly to people and catastrophic to properties and ecosystems. Slower moving landslides can be highly destructive over time, causing damage to buildings, roads, and pipelines.

Debris flows is a type of mass movement mostly triggered by intense rainfall on steep hill slopes. Debris flows include a mixture of rock fragments, soil, vegetation, water and, in some cases, entrained air that flows downhill as a fluid. Debris flows can range in consistency from that of freshly mixed concrete to running water. Debris flows can be further classified as mudflows and earth flows depending on the ratio of water to soil and rock debris.

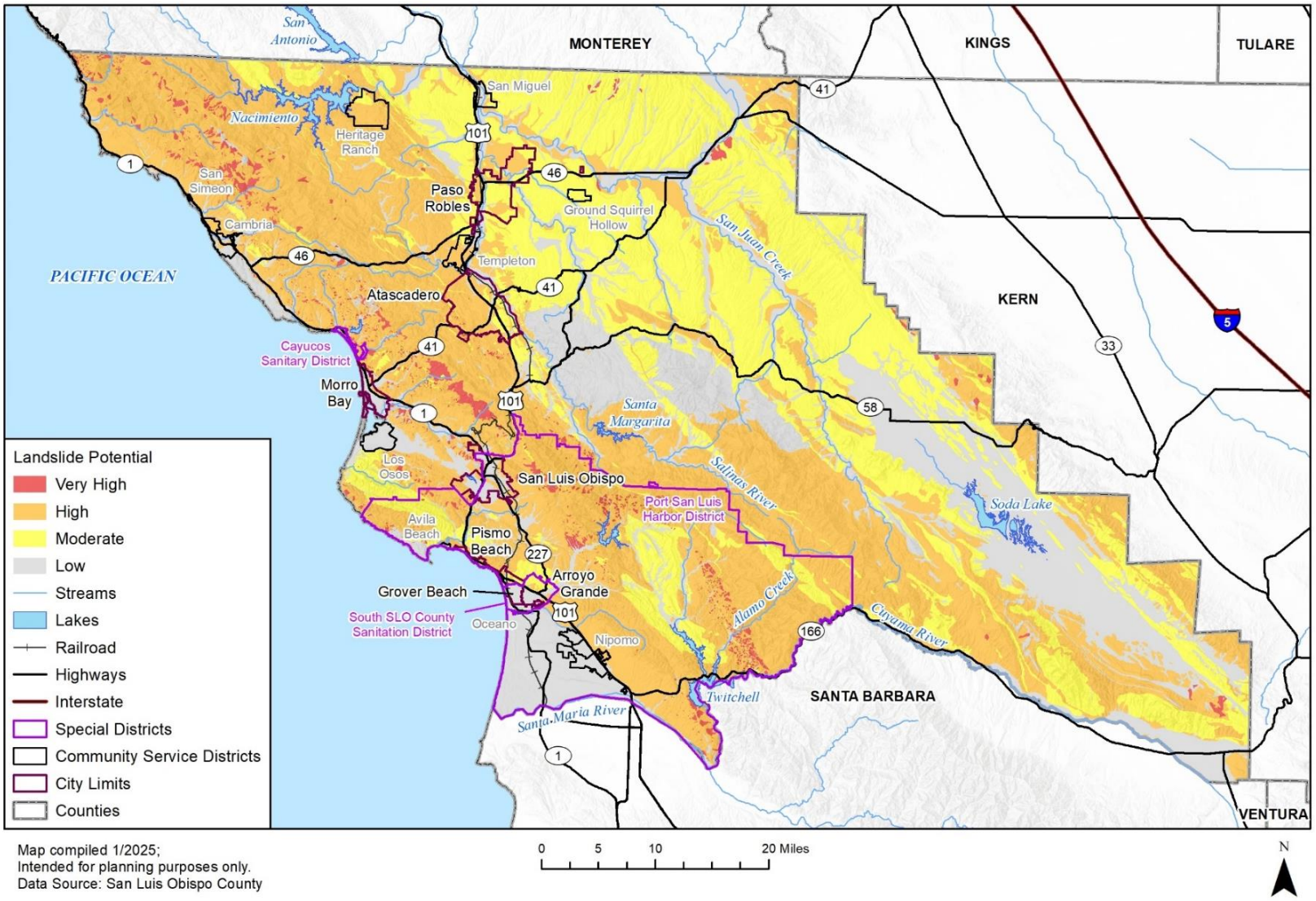
Landslide and debris flow problems can be caused by land mismanagement, particularly in mountain, canyon, and coastal regions. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides and debris flows, due to a lack of vegetation following a fire that can destabilize soils. As human populations expand over more of the land surface, these processes become an increasing concern.

There are predictable relationships between local geology and landslides, rockslides, and debris flows. The down-slope movement of earth material, either as a landslide, debris flow, mudslide, or rockslide, is part of the continuous, natural process of erosion. This process, however, can be influenced by a variety of causes that change the stability of the slope. Slope instability may result from natural processes, such as the erosion of the toe of a slope by a stream, or by ground shaking caused by an earthquake. Slopes can also be modified artificially by grading, or by the addition of water or structures to a slope. Development that occurs on a slope can increase the frequency and extent of potential slope stability hazards. Knowledge of these relationships can improve planning and reduce vulnerability. Slope stability is dependent on many factors and their interrelationships, including rock type, moisture content, slope steepness, and natural or man-made undercutting.

5.3.12.2 Geographic Area

In San Luis Obispo County, there are several geologic formations commonly associated with slope stability problems. The data presented on the following page shows a summary of landslide hazard potential as it varies across the County. The source of the mapping is San Luis Obispo County and based on a geologic study by Darrel S Cowan and the United States Geologic Survey, the Morro Bay-San Simeon area consists of a mélange, or a mappable body of rock characterized by fragmentation of rocks and mixing of different rock types that can cause stability problems. The geologic formations commonly associated with slope stability problems in San Luis Obispo County include the Franciscan, Rincon, Toro, and Monterey formations. Of these the Franciscan formation is characterized as a mélange and the most well-known formation known for slope instability. Numerous landslides within the Franciscan complex are observable along the Highway 1 corridor from San Luis Obispo to San Simeon. Numerous landslides have also been mapped in the Franciscan and Toro formations along Highway 101 on the Cuesta Grade. Landslides in the Franciscan formation have impacted residences, roadway facilities, pipelines, and other infrastructure in the county. The Rincon and Toro formations have a similar geologic history of land sliding but are not as widespread as the Franciscan. An active landslide has also been identified in the vicinity of Harbor Terrace near Port San Luis Harbor west of Avila Beach.

Figure 5-87 Landslide Potential



Geologic formations located in San Luis Obispo County that present a moderate slope stability hazard potential include the Quaternary bedrock units such as the Paso Robles Formation and formations of equivalent age and composition. The susceptibility of areas underlain by these formations to slope stability impacts will vary based on a variety of site-specific factors, such as slope, the orientation of bedding planes, rainfall, characteristics of the overlying soil, and the type and extent of proposed slope modifications. In some areas, slopes may be stable in a natural condition, but alterations to the hillsides to accommodate urban development may cause unstable conditions that could adversely affect future development. Prior to the initiation of new development that could be adversely affected by slope movement, site specific evaluations are necessary to determine the hazard potential and to identify engineering design methods to minimize the risk of landslide-related damage.

San Luis Obispo County is within the latitudes effected by intense atmospheric rivers, with mountain ranges causing water vapor to rise and cool, creating heavy precipitation for areas between the coast and the mountains. The areas of the county directly west of the Santa Lucia, La Panza, and Caliente Mountains are more likely to experience heavy rainfall events and debris flows due to atmospheric rivers in the future.

San Luis Obispo County: Throughout the winter months of 2023 and 2024 the county experienced a large increase in rain events and severe winter storms that led to multiple incidences of landslides and debris flow. Numerous large landslides are mapped in the steep mountainous terrain of the Santa Lucia, La Panza and Caliente Mountain ranges and many canyons. Landslides of this type have been mapped in all of the formations and are generally related to steep slopes, adverse geologic structure, weak or weathered formations, faulting, and wet slopes. To date, only limited geologic mapping has been performed to evaluate the presence of landslides in the hillside areas of the County. Most of the geologic studies to date have focused on large scale geologic structure, faulting, or other geologic issues and did not specifically evaluate land sliding. A significant amount of additional studies needs to be performed to identify and evaluate landslides to help reduce the potential for long term damage related to slope instability.

Arroyo Grande: Most of the existing development in Arroyo Grande is located on gently inclined alluvial valley sediments and the hilly terrain north of Branch Street. The potential for slope stability hazards in valley areas is moderate. The potential slope instability is greatest in the hilly areas of the City. The potential for slope instability in the sloping terrain can mostly be mitigated by applying building code requirements that provide minimum requirements for building construction and grading on sloping ground as those areas are not known to be underlain by large landslide features or unstable formations. A combination of multiple heavy rain events, the lack of maintenance on the Arroyo Grande creek levee, and steep hillsides near the city center have caused chunks of sand, mud, and debris to flow into the surrounding community and ocean during levee failure. Additionally, as development moves into those areas, there could be greater potential for slope stability related concerns. A thorough geologic/geotechnical study should be prepared prior to development for projects planned in those areas.

Title 7, Chapter 1, of the Arroyo Grande Municipal Code provides development standards adopted by the City pertaining to excavation, grading, erosion, and sediment control. This section specifies performance standards and other requirements intended to protect public health and safety and minimize hazards from excavation and filling activities.

Atascadero: Development in Atascadero has occurred in two areas: along the alluvial valley of the Salinas River and Highway 101, and in the relatively steeply sloping terrain of the Santa Lucia Mountains west of Highway 101. The primary bedrock geologic units exposed in the area include the Tertiary-age Santa Margarita, Vaqueros, and Monterey formations, and Cretaceous-age unnamed, Franciscan, Toro, and Atascadero formations. The potential for slope instability

in the alluvial valleys is low to moderate because of gentle slopes. Developments in steeper hillside areas have a known history of slope instability, and a moderate to very high hazard potential for slope instability problems. Areas such as those that surround Highway 41 are documented as having steep and unstable slopes, with landslides being document in this area following heavy rain events. Appropriate geologic studies should be performed prior to development to evaluate this increased level of risk.

The Franciscan and upper Cretaceous formations are exposed along the eastern flank of the Santa Lucia Mountains. These formations are the predominant geologic unit in the hilly southwestern portion of the City. In this area, 50 separate landslides have been mapped, encompassing 268 acres. The City has recently made repairs in this area to roadways damaged from land sliding. Although some of the mapped landslides may now be stable, the concentration of old and recent landslides is indicative of relatively unstable slope conditions. This area is considered to have a high to very high potential for slope instability. Thorough geologic/geotechnical study should be prepared prior to development for projects planned in those areas.

Sections 9-4.138 through 9-4.146 of the Atascadero Zoning Ordinance provide development standards adopted by the City pertaining to excavation, grading, erosion, and sediment control. These sections specify performance standards and other requirements intended to protect public health and safety and minimize hazards from excavation and filling activities. In Atascadero, any grading on slopes at or exceeding ten percent must undergo environmental review pursuant to the California Environmental Quality Act (CEQA).

Grover Beach: Grover Beach is characterized by gently inclined slopes with gradients of less than 50 percent on slopes consisting of older alluvium and late Pleistocene dune sands. The potential for slope stability concerns is low. Locally, there may be a potential for shallow slope failures in loose dune sands on areas of steep terrain. The potential for slope instability in the sloping terrain can mostly be mitigated by applying building code requirements that provide minimum requirements for building construction and grading on sloping ground as these areas are not known to be underlain by large landslide features or notoriously unstable formations.

Sections 8400 through 8423 of the Grover Beach Municipal Code provides for the development standards adopted by the city pertaining to excavation, grading, erosion, and sediment control. These sections specify performance standards and other requirements intended to protect public health and safety and minimize hazards from excavation and filling activities.

Morro Bay: Numerous studies have documented unstable, landslide prone slopes in the Morro Bay area east of Highway 1 and north of Highway 41. Many of the landslides mapped in the area are associated with the Franciscan mélange. The landslide hazards that have impacted residential development and lifeline facilities are most prevalent on west-facing slopes. Although some of the mapped landslides may now be stable, the concentration of old and recent landslides is indicative of relatively unstable slope conditions. This area is considered to have a high to very high potential for slope instability. Thorough geologic/geotechnical study should be prepared prior to development for projects planned in those areas.

General Plan Policies S-6.1 and S-7.1 and Coastal Plan Policies 9.04 and 9.07 require that geology and soils reports be prepared to identify and evaluate potential adverse conditions from grading activities in specific areas of the City.

Paso Robles: Most of the existing development in Paso Robles is located in areas of gently rolling hills with slope inclinations between 50 percent to 20 percent or less. The primary bedrock geologic unit in the area is the Paso Robles Formation. However, the Paso Robles Formation contains localized areas of weak clay units, which are susceptible to small- to large-

sized landslides. These landslides are not well mapped regionally but are often identified by site-specific studies.

The Salinas River flood plain is also an area of extensive development in the Paso Robles area. Because of the gentle slopes, the potential for slope stability concerns in this area is generally low. The layered bedrock is folded and faulted and is subject to localized undercutting by streams or development. If the bedding becomes laterally unsupported, there is an increased potential for instability. Appropriate geologic studies should be performed prior to development to evaluate this increased level of risk.

Title 20 of the Paso Robles Municipal Code provides development standards that have been adopted by the City pertaining to excavation, grading, erosion, and sediment control. These sections specify performance standards and other requirements intended to protect public health and safety and minimize hazards from excavation and filling activities.

Pismo Beach: The potential for landslides is present on the hill sides to the north of highway 101 and along the Price Canyon corridor. The potential slope instability is greatest on the west facing slopes directly adjacent to the freeway and Price Canyon Road. The potential for slope instability in the sloping terrain can mostly be mitigated by applying building code requirements that provide minimum requirements for building construction and grading on sloping ground, as these areas are not known to be underlain by large landslide features or notoriously unstable formations. The City of Pismo Beach's Safety Element provides information on their policies related to land areas subject to hazards associated with steep slopes.

City of San Luis Obispo: Most of the development in San Luis Obispo is in the valley area with a low to very low potential for slope instability. However, the hillside areas to the east, north and west of the City, as well as along the flanks of the Morros, are underlain by the Franciscan mélange, which is a source of significant slope instability.

Surrounding area: Landslides in neighboring counties can have indirect consequences in San Luis Obispo County, notably in Monterrey County to the north in the vicinity of Big Sur and Highway 1.

5.3.12.3 Extent (Magnitude/Severity)

The extent of landslide hazards can be measured on the Alexander Scale for Landslide Damage. Based on recent experience in San Luis Obispo County with landslide and debris flows (Section titled *Previous Occurrences)* the highest extent level expected is 7 (Total Collapse). However, this is likely to be isolated to areas with slope instability such as along the Santa Lucia Mountains. According to the United States Geologic Survey, the Santa Lucia Mountain range contains abundant active landslides with the most recent landslides effecting transportation corridors such as Highway 101.

The severity of landslides depends on the amount of material (soil, debris, or rocks) and where it stops moving (e.g., on a roadway). Although the extent of the hazard is geographically small within this county, the severity of landslides and debris flows can be critical with past occurrences in the county causing severe injuries, shutting down transportation corridors to critical infrastructure, and damaging property.

The variability of extent throughout the county has not been quantified, but mountainous areas found inland have more potential for a serious slide than coastal areas.

Table 5-126 Alexander Scale for Landslide Scale Damage

LEVEL	DAMAGE	DESCRIPTION
0	None	Building is intact

LEVEL	DAMAGE	DESCRIPTION
1	Negligible	Hairline cracks in walls or structural members; no distortion of structure or detachment of external architectural details
2	Light	Buildings continue to be habitable, repair not urgent. Settlement of foundations, distortion of structure, and inclination of walls are not sufficient to compromise overall stability.
3	Moderate	Walls out of perpendicular by one or two degrees, or there has been substantial cracking in structural members, or the foundations have settled during differential subsidence of at least 6 inches; building requires evacuation and rapid attention to ensure its continued life.
4	Serious	Walls out of perpendicular by several degrees; open cracks in walls; fracture of structural members; fragmentation of masonry; differential settlement of at least 10 inches compromising foundations; floors may be inclined by one or two degrees or ruined by heave. Internal partition walls will need to be replaced; door and window frames are too distorted to use; occupants must be evacuated, and major repairs carried out.
5	Very Serious	Walls out of plumb by five or six degrees; structure grossly distorted; differential settlement has seriously cracked floors and walls or caused major rotation or slewing of the building [wooden buildings are detached completely from their foundations]. Partition walls and brick infill will have at least partly collapsed; roofs may have partially collapsed; outhouses, porches, and patios may have been damaged more seriously than the principal structure itself. Occupants will need to be re-housed on a long-term basis, and rehabilitation of the building will not be feasible.
6	Partial Collapse	Requires immediate evaluation of the occupants and the cordoning off of the site to prevent accidents with falling masonry.
7	Total Collapse	Requires clearance of the site.

Source: FEMA

5.3.12.4 Previous Occurrences

Over the last five years San Luis Obispo has experienced multiple landslides, due to the winter storms that occurred in 2023 and 2024. Some specific landslides to note are as follows:



December 2021: Highway 1 experienced multiple road closures due to fallen rocks and debris. On December 29th, 2021, a 45-mile stretch was closed beginning at Ragged Point in San Luis Obispo County and ending in Monterey County due to fallen debris.

Source: Bay City News

January 9, 2023: San Luis Obispo County closed off multiple roads, including Highway 101, due to debris flow and flooding following heavy rainfall. One casualty was reported in Paso Robles, caused by the flooding.

Source: County of San Luis Obispo Website



December 27, 2022: An atmospheric river struck the state of California setting off multiple landslides and debris flows. On January 14th, 2023, President Biden declared a major disaster when a stretch of Highway 1 called Paul's Slide was shut down due to a landslide that caused power outages, structural damage, fallen trees, and overflowing creeks. This landslide occurred at the Monterey-San Luis Obispo County line of Big Sur, California. This stretch of Highway 1 was closed until June 2024 and crews estimate that over 500,000 cubic yards of debris was removed from the area.



Landslide along Highway 1. Source: The San Luis Obispo Tribune.

February 10, 2023: debris flow caused a bluff to collapse at Ebb Tide Park in Northern Pismo Beach. It was one of three landslides in the area that month causing the repetitive closure of multiple recreational beach spots.



Landslide at Ebb Tide Park. Source: The San Luis Obispo Tribune.



March 14, 2023: a debris flow took down trees and powerlines and shut down three miles of Highway 41 from San Gabriel Road to Los Altos Road between Atascadero and Morro Bay. The road was reopened March 28th, 2023.

Debris flow on Highway 41. Source: The San Luis Obispo Tribune.

April 13, 2024: President Biden declared a major disaster for San Luis Obispo County for multiple hazards including landslides and debris flows that occurred January through March of 2024. Three large landslides were reported on Highway 1 just north of Paul's Slide. One was reported on the Dolan Point Slide, and one was reported on the Regent's Slide side. The third is the one that began in January 2023.



Landslide north of Paul's Slide. Source: The San Luis Obispo Tribune

In May 2017, the Mud Creek Slide buried a quarter mile section of scenic Highway 1 approximately nine miles north of the San Luis Obispo-Monterey County line. Caltrans estimates that over one million tons of rock and dirt fell during the slide, which is actually a combination of five slides. The affected section of Highway 1 was covered by a layer of dirt and rock about 35 to 40 feet deep. The section of Highway 1 closed by the slide re-opened in July 2018 (CA SHMP 2018).

In 2016 the Chimney Fire burned in San Luis Obispo County. Heavy rains in January 2017 lead to debris flows into Nacimiento Reservoir; Nacimiento Reservoir water is the only source of potable water for Heritage Ranch CSD (Heritage Ranch HM Planning Workbook 2019).

2/20/1996 – 4 to 6 inches of rain in the San Luis Obispo Co. Mountains caused Urban and small stream flooding and associated mudslides in the steep terrain and along Hwy 1 and 101 (NCEI).

The 2019 HMPC provided the following comments on previous landslide and debris flow incidents:

- Avila Beach Drive has been a problem area. The County has done repairs and improvements.

- Fremont Hall, a dorm on Cal Poly's campus remained closed for the 2018-2019 school years due to a potentially hazardous hillside behind the dorm. The dorm had previously been closed since February 2017 after heavy rainfall caused a mudslide that threatened the building (San Luis Obispo Tribune, 2017).
- The Cambria Community Healthcare District facility in Cambria was impacted by a landslide.
- County roads along Santa Rosa Creek are considered at risk by the County.
- Highway 41 between Morro Bay and Atascadero has been closed periodically due to rockslides.
- Impacts to high mountain roads in Poso and Lopez area has affected fire response as well as in Road 166, City of Atascadero and San Simeon
- Areas near the Hearst Castle have also seen movement.

5.3.12.5 Probability of Future Occurrences

Based on historical data and given the presence of landslide-susceptible geology and steep slopes in the planning area, landslides hazards are likely to continue on an annual basis (highly likely), with damaging landslides less frequently, giving this section a "likely" rating in Table 5-2. Landslides are usually a cascading effect of severe weather. The probability for more severe and damaging landslides increases during El Nino years or severe winter storms. The potential for debris flows dramatically increases following a wildfire. California continues to experience a phenomenon called "atmospheric rivers" in which moisture travels from the equator to higher latitudes and causes more intense and prolonged rainfall. Over the last decade California has seen an increase in rainfall due to atmospheric rivers, with an increase in incidences highly likely moving forward.

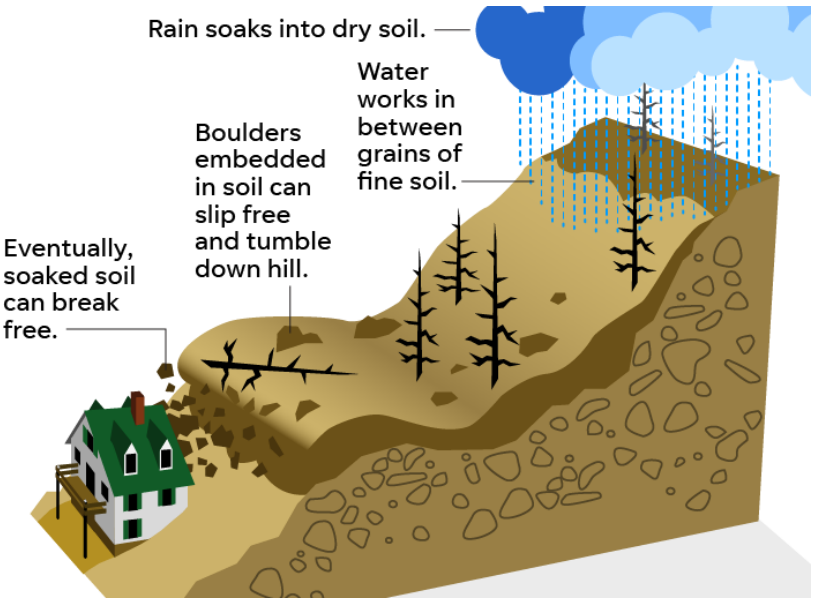
Other hazards such as earthquakes, wildfires, droughts and flooding can trigger or contribute to landslides and debris flows throughout the county.

5.3.12.6 Climate Change Considerations

Several factors including wet and dry cycles contribute to the intensity and frequency of landslides and debris flow, with certain factors set to become more frequent in the upcoming years. According to the Fifth National Climate Assessment droughts are projected to increase in intensity, duration, and frequency in the upcoming years, with temperatures also increasing 2-4 degrees by 2050. Additionally, according to the National Oceanic and Atmospheric Administration, atmospheric rivers and more intense rainfall events are also likely to increase in intensity and frequency throughout the county.

The Fifth National Climate Assessment (NCA5) documents projections for key factors that affect the severity of landslide hazards. Climate change drives volatile precipitation patterns with more intense droughts followed by storms that drop large amounts of rain in a short amount of time. According to the United States Geologic Survey, landslides and debris flow are hydrologically driven, with intense shifts from dry to wet conditions creating ideal conditions for landslides to occur. These factors along with slope stability, soil health, and vegetation can also contribute to changes in landslide intensity, frequency, and location. The stability of any slope depends on the interaction between rainfall characteristics and soil properties, with conditions following drought or wildfire leaving soils unable to handle rainwater infiltration and storage. Debris flows related to fire scars are anticipated to increase because of this. Drought, followed by intense downpours, makes soils more susceptible to landslides, as shown below:

Figure 5-88 Illustration of Extreme Dry and Wet Cycles on Landslide Susceptibility



Source: US Geological Survey, USA TODAY Research

According to the National Weather Service, the years of 2020-2022 were the driest in state history, characterized by extreme heat and lack of precipitation. Immediately following those years, 2023 was one of the wettest years in county history, characterized by an atmospheric river event that caused heavy rainfall in the county. In 2023 intense rainfall exceeded holding capacities for infrastructure such as the Arroyo Grande Creek Levee, resulting in levee failure and causing chunks of sand, mud, and debris to flow into the surrounding community of Arroyo Grande. As mentioned in the Previous Occurrences section, this rainfall event also resulted in a Presidential disaster being declared in January of 2023, when a stretch of Highway 1 called Paul's Slide was shut down due to a landslide that caused power outages, structural damages, fallen trees, and overflowing creeks.

5.3.12.7 Vulnerability

The landslide Vulnerability Assessment identifies assets that are exposed to landslide hazards, potentially susceptible to damage from that exposure, and the consequences/impacts. In this context, *assets* are (1) people, (2) structures, (3) critical facilities and lifelines, (4) the economy, (5) historic and cultural resources, and (6) natural resources. *Exposure* indicates potential overlap with landslide hazard areas. *Likely to be exposed* indicates a presence in areas deemed to be especially likely to experience landslide hazards. *Susceptible* indicates a strong likelihood of damage from exposure to landslide hazards and is described in greater detail in, subsection titled *Vulnerability Assessment*. Climate change is considered a special concern for landslide hazards in the county (see section titled *Climate Change Considerations*, above).

Structures

During the 2025 update of this plan a GIS analysis of exposure to landslide hazard areas was performed. Table 5-127 summarizes landslide exposure by jurisdiction in the low and above categories, based on an intersect of improved parcel centroids with landslide hazard areas. GIS analysis indicates approximately $3.3 billion of property improvements exposed, which considers improved values and estimated contents of properties. Based on Table 5-16 the analysis there is a total of 52,104 developed properties potentially within landslide hazard areas rated Moderate to Very High; 240 of these properties are in Very High potential hazard areas and 34,017 in high potential areas. The unincorporated areas and the cities of Paso Robles,

Atascadero, Morro Bay, Pismo Beach and the City of San Luis Obispo have the most properties in High or Very High landslide potential areas.

Similar to Table 5-127, Table 5-128 below summarizes landslide exposure by property type in the low and above categories, based on an intersect of improved parcel centroids with landslide hazard areas. The greatest exposure of structures summarized in High and Very High in Table 5-127 are generally residential properties, though the number of government/utilities properties in High and Very High landslide potential areas is also significant; note that the lack of replacement value for these parcels is due to these properties being exempt for tax assessment purposes. More specifics on the developed parcels exposed are included in applicable jurisdictional annexes, including additional details on property types.

Table 5-127 Improved Parcels Exposed to Landslide Potential by Jurisdiction Summary

JURISDICTION	STRUCTURE COUNT VERY	STRUCTURE COUNT HIGH	STRUCTURE COUNT MODERATE	STRUCTURE COUNT LOW	TOTAL STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	POPULATION
Arroyo Grande	-	548	1,587	111	2,246	$966,380,583	$561,070,884	$1,527,451,467	5,022
Atascadero	25	5,725	2,778	72	8,600	$2,674,107,696	$1,541,596,206	$4,215,703,902	19,224
Grover Beach	12	1	-	77	90	$46,778,294	$28,634,178	$75,412,472	146
Morro Bay	-	1,018	-	82	1,100	$337,434,393	$185,694,432	$523,128,825	2,296
Paso Robles	-	4,837	5,260	5	10,102	$3,620,600,850	$2,259,835,865	$5,880,436,715	23,687
Pismo Beach	-	3,514	1,185	1	4,700	$1,908,673,970	$1,153,129,262	$3,061,803,232	8,235
San Luis Obispo City	-	4,210	-	1,109	5,319	$2,423,045,141	$1,486,136,680	$3,909,181,821	11,290
Unincorporated	203	14,164	7,037	724	22,128	$9,467,844,716	$5,023,536,202	$14,491,380,918	49,079
Avila Beach	-	38	60	10	108	$63,048,153	$37,898,016	$100,946,169	222
Cambria	-	1,712	-	7	1,719	$697,241,393	$404,182,866	$1,101,424,259	3,833
Ground Squirrel Hollow	-	-	377	-	377	$116,079,538	$58,125,270	$174,204,808	926
Heritage Ranch	15	1,655	271	-	1,941	$431,028,120	$221,004,197	$652,032,317	4,290
Los Osos	-	-	-	28	28	$20,833,546	$12,294,161	$33,127,707	62
Nipomo	-	779	-	113	892	$218,455,406	$127,097,234	$345,552,640	1,922
Oceano	-	-	-	34	34	$16,476,088	$9,532,717	$26,008,805	77
San Miguel	-	95	28	97	220	$51,095,061	$27,053,390	$78,148,451	526
San Simeon	-	186	-	-	186	$70,628,899	$52,652,836	$123,281,735	398
Templeton	-	2,214	100	2	2,316	$905,798,589	$539,962,668	$1,445,761,257	5,147
Total	255	40,696	18,683	2,472	62,106	$24,035,550,436	$13,729,437,059	$37,764,987,495	136,382

Source: San Luis Obispo Assessor Data November 15, 2024, WSP GIS Analysis

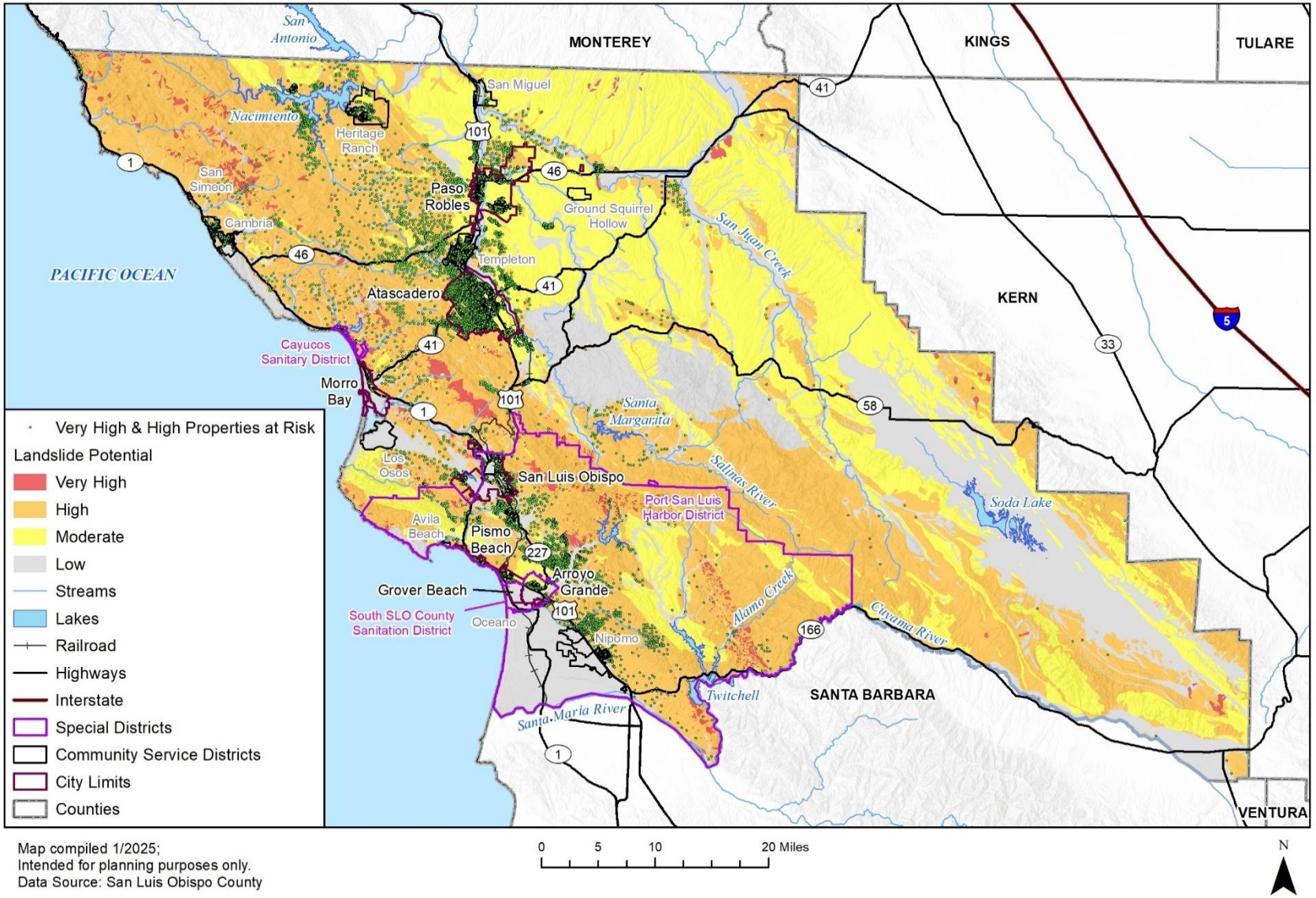
Table 5-128 Improved Parcels Exposed to Landslide Potential by Property Type Summary

PROPERTY TYPE	STRUCTURE COUNT VERY HIGH	STRUCTURE COUNT HIGH	STRUCTURE COUNT MODERATE	STRUCTURE COUNT LOW	TOTAL STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	POPULATION
Agricultural	5	224	81	-	310	$432,584,027	$432,584,027	$865,168,054	-
Commercial	1	1,701	228	43	1,973	$1,923,646,159	$1,923,646,159	$3,847,292,318	-
Exempt	1	181	44	-	226	$139,108,198	$139,108,198	$278,216,396	-
Industrial	-	162	21	11	194	$265,112,641	$397,668,962	$662,781,603	-
Mining	-	1	-	-	1	$680,070	$1,020,105	$1,700,175	-
Mixed Use	-	1,187	213	181	1,581	$536,669,994	$536,669,994	$1,073,339,988	-
Mobile/Manufactured Homes	5	1,423	896	29	2,353	$425,425,952	$212,712,976	$638,138,928	5,862
Multi-Family Residential	2	1,234	228	44	1,508	$1,060,091,282	$530,045,641	$1,590,136,923	3,693
Residential	217	27,275	15,478	1,873	44,843	$16,132,355,288	$8,066,177,644	$24,198,532,932	109,423
Vacant Improved	9	629	658	-	1,296	$529,192,032	$0	$529,192,032	-
Total	240	34,017	17,847	2,181	54,285	$21,444,865,643	$12,239,633,706	$33,684,499,349	118,978

Source: San Luis Obispo Assessor Data November 15, 2024, WSP GIS Analysis

Landslides directly damage engineered structures in two general ways: 1) disruption of structural foundations caused by differential movement and deformation of the ground upon which the structure sits, and 2) physical impact of debris moving downslope against structures located in the travel path. Figure 5-89 below shows the structures within high or very high landslide potential areas. A more site specific analysis would be needed to further determine risk in these areas, but this planning-level analysis provides a first step in identifying and quantifying vulnerability. Climate change could also further increase the vulnerability of some properties to the impacts of landslides with more intense and frequent landslides, droughts and wildfires. As discussed in the *Climate Change Considerations* section structures closer to the coast as well as along mountain ranges are more vulnerable to landslides and debris flow.

Figure 5-89 Improved Parcels Within High or Very High Landslide Potential Areas



People

People could be susceptible if they are caught in a landslide or debris flow, potentially leading to injury or death. There is also a danger to drivers operating vehicles, as rocks and debris can strike vehicles passing through the hazard area or cause dangerous shifts in roadways. On January 9, 2023, a truck was swept away by debris flow that was only a foot high. The driver of the truck was able to escape the vehicle, but a passenger was taken by the current and was unable to survive. The analysis of structures in the previous section projects that an estimated 118,978 people reside in potential landslide areas.

Social Vulnerability

In general, the areas for high landslide potential fall outside of the municipalities and census designated places, thus it is difficult to pinpoint specific areas of social vulnerability. Census tract data indicates coincidence of high and moderate landslide potential west of Paso Robles. Since landslide occurrence can be linked to earthquake and general seismic activity, it is possible that landslide and debris flow hazards may cause similar risks as those tied to earthquake. This can result in the inability for disabled or vulnerable populations to evacuate in a timely manner, inability to communicate critical information to those who may not speak English well, potential for populations to lose access to key resources such as life support technology or medicine.

Critical Facilities and Lifelines

In addition to buildings, utilities and transportation structures are vulnerable to the impact and ground deformation caused by slope failures. They present a particular vulnerability because of their geographic extent and susceptibility to physical distress. Lifelines are linear structures that, because of their geographic extent, have a greater chance of being affected by ground failure due to greater hazard exposure.

Extension, bending, and compression caused by ground deformation can break lifelines. Failure of any component along the lifeline can result in failure to deliver service over a large region. Once broken, transmission of the commodity through the lifeline ceases, which can have catastrophic repercussions down the line: loss of power to critical facilities such as hospitals, impaired disposal of sewage, contamination of water supplies, disruption of all forms of transportation, release of flammable fuels, and so on. Therefore, the overall impact of lifeline failures, including secondary failure of systems that depend on lifelines, can be much greater than the impact of individual building failures.

Table 5-129 Critical Facility Assets Exposed to Landslide Potential Hazards by Jurisdictions

JURISDICTION	VERY HIGH	HIGH	MODERATE	LOW	TOTAL COUNT
Arroyo Grande	-	5	2	38	45
Atascadero	-	35	12	31	78
Grover Beach	-	-	-	16	16
Morro Bay	-	1	-	33	34
Paso Robles	-	46	11	18	75
Pismo Beach	-	23	2	6	31
San Luis Obispo City	-	19	-	117	136
Unincorporated	7	366	87	448	908
Total	7	495	114	707	1,323

Source: San Luis Obispo County, CalARP, HIFLD, NBI, NID, FCWCD, WSP Analysis

Table 5-130 Critical Facility Assets Exposed to Landslide Potential Hazards by CSD

COMMUNITY SERVICE DISTRICT	VERY HIGH	HIGH	MODERATE	LOW	TOTAL COUNT
Avila Beach	-	-	2	2	4
Cambria	-	35	-	21	56
Ground Squirrel Hollow	-	-	1	-	1
Heritage Ranch	-	5	-	-	5
Los Osos	-	-	-	18	18
Nipomo	-	12	-	18	30
Oceano	-	-	-	24	24
San Miguel	-	5	-	15	20
San Simeon	-	2	-	-	2
Templeton	-	35	1	10	46
Total	0	94	4	108	206

Source: San Luis Obispo County, CalARP, HIFLD, NBI, NID, FCWCD, WSP Analysis

Table 5-131 Jurisdictional Critical Facility Assets Exposed to Landslide Potential Hazards by FEMA Lifeline Summary

LANDSLIDE POTENTIAL	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Very High	2	1	-	-	1	1	2	-	7
High	171	19	11	11	30	125	99	29	495
Moderate	49	2	-	3	9	25	20	6	114
Low	115	21	14	22	43	147	321	24	707
Total	337	43	25	36	83	298	442	59	1,323

Source: San Luis Obispo County, CalARP, HIFLD, NBI, NID, FCWCD, WSP Analysis

Table 5-132 CSD Critical Facility Assets Exposed to Landslide Potential Hazards by FEMA Lifeline Summary

LANDSLIDE POTENTIAL	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL
Very High	-	-	-	-	-	-	-	-	0
High	29	1	3	0	6	44	8	3	94
Moderate	3	-	-	-	-	1	-	-	4
Low	28	1	5	4	5	36	27	2	108
Total	60	2	8	4	11	81	35	5	206

Source: San Luis Obispo County, CalARP, HIFLD, NBI, NID, FCWCD, WSP Analysis

Table 5-133 Bridges Exposed to Landslide Potential by Risk and Type

LANDSLIDE POTENTIAL	BRIDGE TYPE	COUNT
Very High	Non-Scour Good Condition Bridge	2
	Total	2
High	Non-Scour Fair Condition Bridge	32
High	Non-Scour Good Condition Bridge	48
High	Non-Scour Poor Condition Bridge	9
High	Scour Fair Condition Bridge	3
	Total	92
Moderate	Non-Scour Fair Condition Bridge	9

LANDSLIDE POTENTIAL	BRIDGE TYPE	COUNT
Moderate	Non-Scour Good Condition Bridge	6
Moderate	Scour Fair Condition Bridge	3
	Total	18
Low	Non-Scour Fair Condition Bridge	147
Low	Non-Scour Good Condition Bridge	125
Low	Non-Scour Poor Condition Bridge	16
Low	Scour Fair Condition Bridge	21
Low	Scour Poor Condition Bridge	3
	Total	312
	Grand Total	**424**

Source: San Luis Obispo County, National Bridge Inventory (2024), WSP Analysis

Economy and Community Values

Economic impacts typically center around transportation routes temporarily closed by debris flow or landslide activity. These roads may be used to transport goods across the county or provide access by visitors and tourists. Depending on the amount of damage, the road may simply need to be cleaned off or may need some level of reconstruction. Periodic closures of the landslide-prone coastal Highway 1 in San Luis Obispo and Monterey counties have caused indirect economic impacts by limiting visitor travel along the corridor.

Historic, Cultural, and Natural Resources

GIS indicates that 85 historical properties are potentially at risk to wildfires; 41 are located in the High or Very High Potential Zones. Details on the specific properties at risk are found in Appendix E.

San Luis Obispo County has multiple natural resources potentially at risk from landslides and debris flow. Creeks and rivers overflowing due to excessive rainfall can cause debris flow and flooding into surrounding ecosystems, as seen with the winter storms in 2023 and 2024. Coastal ecosystems are susceptible to bluff collapse which can cause landslides and debris to flow into the Pacific Ocean. Additionally, areas surrounding highways throughout the county experience unstable slopes, especially following wildfires, that can cause landslides into areas at lower elevations.

The protection and maintenance of waterways and other natural resources may be used to leverage additional funding for mitigation projects that also contribute to community goals for protecting ecosystems throughout the county. Multiple ecosystem services, including cultural ones such as recreation and education, rely on the protection of natural resources. Including natural resources in benefit-cost analysis will help prioritize cultural and historical resources as well.

Development Trends

The severity of landslide problems is directly related to the extent of human activity in hazard areas. Human activities such as property development and road construction can also exacerbate the occurrence of landslides. Future development should take place carefully to prevent landslide damage to property or people. Adverse effects can be mitigated by early recognition and avoiding incompatible land uses in these areas or by corrective engineering. Improving mapping and information on landslide hazards and incorporating this information into the development review process could prevent siting of structures and infrastructure in

identified hazard areas. Sections 22/23.05.020 of the San Luis Obispo County Land Use Ordinance and Coastal Zone Land Use Ordinance, Titles 22 and 23 of the County Code, contain the county's grading ordinance. This ordinance outlines specific requirements for grading permits, procedures for reviewing and approving grading permits, inspection requirements for completed grading projects, and erosion and drainage requirements. Section 22/ 23.07.080 defines general requirements for identifying Geologic Study Areas (GSA) that would require a geology report to address landslide hazards. This section should help mitigate risk to future development.

Recent development was evaluated based on parcels with improvements between 2019 to November 2024 (see Section 5.2.2) overlayed using GIS on the landslide hazard layer. This assessment provides a general estimate of development within landslide potential areas (see Table 5-134). While the analysis indicates a potential increase in vulnerability, particularly in the unincorporated areas, Atascadero, Paso Robles and Pismo Beach, it does not account for any siting or mitigation that may have occurred during the development.

Table 5-134 Properties at Risk to Landslide Potential Areas from 2019-2024

LANDSLIDE POTENTIAL	JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE
Very High	Atascadero	1	$626,841
	Unincorporated	4	$3,106,116
	Total	5	$3,732,957
High	Arroyo Grande	15	$19,967,838
	Atascadero	145	$94,090,452
	Morro Bay	14	$5,770,884
	Paso Robles	157	$239,608,893
	Pismo Beach	102	$132,833,054
	San Luis Obispo City	382	$212,865,250
	Unincorporated	403	$421,878,386
	Total	1,218	$1,127,014,757
Moderate	Arroyo Grande	18	$13,512,523
	Atascadero	72	$42,641,317
	Paso Robles	83	$68,328,986
	Pismo Beach	5	$4,563,184
	Unincorporated	270	$225,395,806
	Total	448	$354,441,816
Low	Arroyo Grande	111	$80,684,890
	Atascadero	72	$32,715,281
	Grover Beach	77	$44,952,284
	Morro Bay	82	$39,778,730
	Paso Robles	5	$3,604,000
	Pismo Beach	1	$9,020,268
	San Luis Obispo City	1,109	$760,711,267
	Unincorporated	724	$434,281,743

LANDSLIDE POTENTIAL	JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE
	Total	2,181	$1,405,748,463
Grand Total		3,852	$2,890,937,993

Source: San Luis Obispo County Assessor Data November 15, 2024, WSP GIS Analysis

Risk Summary

The overall significance of landslides and debris flows in San Luis Obispo County is Medium. These events are recurring in nature and periodically affect county infrastructure, particularly road networks.

- The geologic formations commonly associated with slope stability problems in San Luis Obispo County, include the Franciscan, Rincon, Toro, and Monterey formations. Of these, the Franciscan is the most well-known formation known for slope instability.
- Numerous landslides within the Franciscan complex are observable along the Highway 1 corridor from San Luis Obispo to San Simeon.
- *Effects on People:* People and property are at risk from landslides and debris flow in San Luis Obispo County. Past incidents have resulted in one casualty in San Luis Obispo County.
- *Effects on Property:* Property loss is rare but is usually significant when it occurs; a high number of structures are built on or near landslide potential areas based on GIS analysis.
- *Effects on Economy and Community Values:* Landslides and debris flows in adjacent counties can disrupt major transportation corridors along Highway 1, affecting the local tourist economy.
- *Effects on Critical Facilities and Lifelines:* Landslides and debris flows can result in the destruction of infrastructure such as water and sewer lines, electrical and telecommunications utilities and drainage. Disrupted transportation routes occur occasionally, usually during heavy rainstorms, and cause considerable inconvenience. Based on GIS analysis, there are 10 critical facilities found within very high landslide susceptibility zones, 227 facilities in high landslide susceptibility zones, and 234 in moderate landslide zones, for a total of 471 facilities at risk of this hazard. The majority are in the unincorporated portions of the County (437), with 13 in City of San Luis Obispo, 11 in Paso Robles, 5 in Atascadero, 4 in Pismo Beach, and 1 in Morro Bay.
- *Related Hazards:* Earthquake, Coastal Storm/Coastal Erosion/Sea Level Rise, Adverse Weather, Wildfire

Table 5-135 Hazard Risk Summary - Landslide and Debris Flow

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY (EXTENT)	OVERALL SIGNIFICANCE
San Luis Obispo County	Significant	Likely	Critical	Medium
City of Arroyo Grande	Significant	Likely	Critical	N/A
City of Atascadero	Limited	Likely	Limited	Medium
City of Grover Beach	Significant	Likely	Critical	N/A
City of Morro Bay	Significant	Likely	Critical	Medium
City of Paso Robles	Significant	Likely	Critical	High
City of Pismo Beach	Significant	Likely	Critical	Medium

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY (EXTENT)	OVERALL SIGNIFICANCE
City of San Luis Obispo	Significant	Likely	Critical	Low
Avila Beach CSD	Significant	Likely	Critical	Medium
Cambria CSD	Significant	Likely	Critical	Medium
Ground Squirrel Hollow CSD	Significant	Likely	Critical	Medium
Heritage Ranch CSD	Significant	Likely	Critical	High
Los Osos CSD	Significant	Likely	Critical	N/A
Nipomo CSD	Significant	Likely	Critical	Low
Oceano CSD	Significant	Likely	Critical	Medium
San Miguel CSD	Significant	Likely	Critical	Medium
San Simeon CSD	Significant	Likely	Critical	N/A
Templeton CSD	Significant	Likely	Critical	Low
Cayucos Sanitary District	Significant	Likely	Critical	Medium
Port San Luis Harbor District	Significant	Highly Likely	Critical	Medium
San Luis Obispo FCWCD	Significant	Likely	Critical	Medium
South San Luis Obispo Sanitary District	Limited	Unlikely	Limited	N/A

5.3.13 Land Subsidence

5.3.13.1 Hazard/Problem Description

Land subsidence is defined as the vertical sinking of the land over natural or manmade underground voids. Subsidence is common in several areas of California, usually as a result of groundwater pumping, peat loss, or oil and gas extraction. Fluctuations in the level of underground water caused by pumping or by injecting fluids into the earth can initiate sinking to fill the empty space previously occupied by water or soluble minerals. Weight, including surface developments such as roads, reservoirs, and buildings, and manmade vibrations from such activities as blasting and heavy truck or train traffic can accelerate the natural processes of subsidence, or induce subsidence over manmade voids.

California has divided subsidence into three categories:

Category 1: This category includes areas with the highest risk of future subsidence if groundwater levels drop. These regions, identified through public data and consultant reports, contain young organic soil, particularly around Los Osos Valley Road, Laguna Lake, and wetland areas near Tank Farm Road. These areas have a history of subsidence or contain soft or organic soil, making them susceptible to further subsidence due to groundwater extraction.

Category 2: These are low-lying areas in the Basin with young alluvial soil that might have soft or organic soil layers, potentially leading to subsidence if groundwater levels decrease. However, there is no historical or subsurface data to confirm this. These areas are along Prefumo Creek, San Luis Obispo Creek, and the western end of Edna Valley near Price Canyon.

Category 3: This category includes areas mapped as bedrock or older surface sediments, which do not have young organic soil or young alluvium underneath. These regions are not

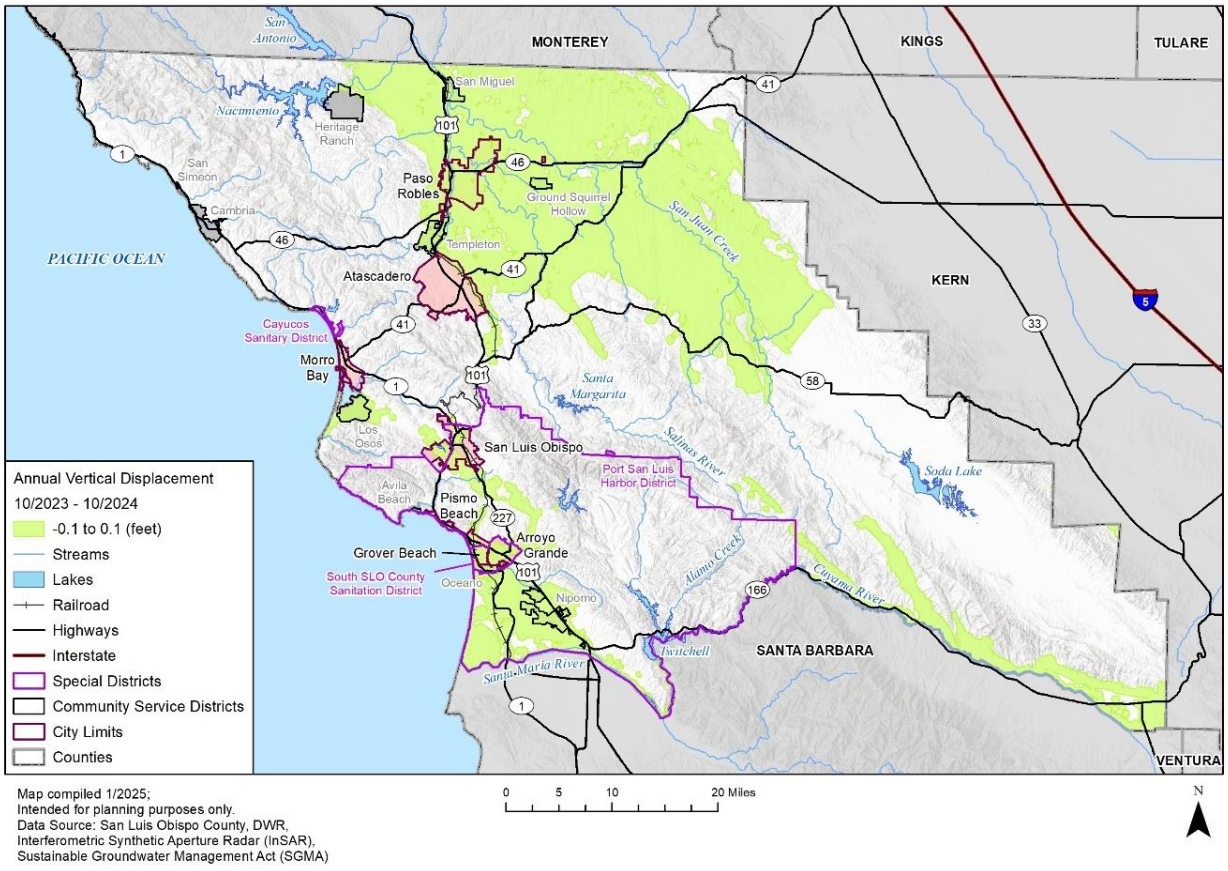
considered susceptible to subsidence from groundwater pumping. Typically, these are upland areas with shallow bedrock or bedrock at the surface, such as around the airport and Orcutt Road.

Subsidence can result in serious, localized structural damage to buildings, roads, irrigation ditches, canals, streams, underground utilities, and pipelines. The HMPC noted in the past, that sinkholes have occurred near a hospital as a result of groundwater pumping. Subsidence is addressed further in the SLO Groundwater Sustainability Plan. (https://www.slocounty.ca.gov/departments/groundwater-sustainability/groundwater-basins/san-luis-obispo-valley-groundwater-basin)

5.3.13.2 Geographic Area

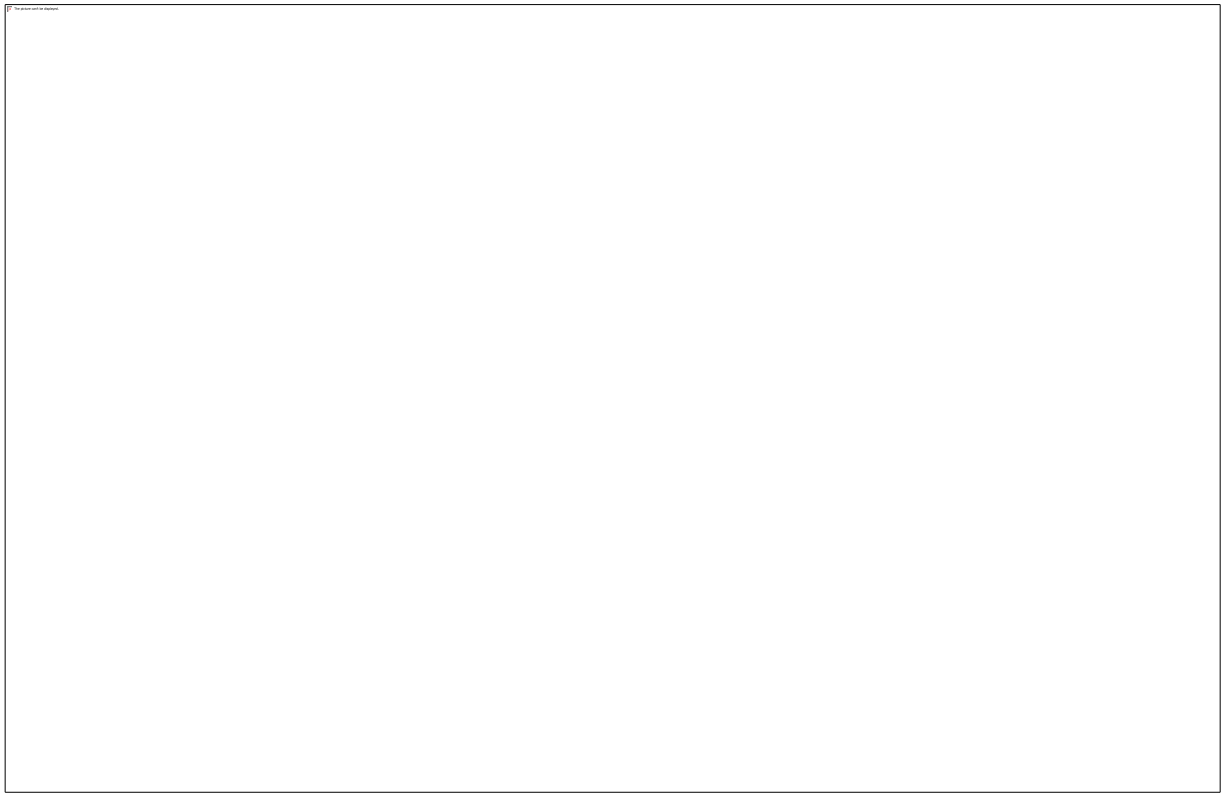
Figure 5-90 below shows areas of San Luis Obispo County that have a recent history of subsidence or are known to be at an increased risk of subsidence. Most studies and concern about land subsidence in California have focused on the Santa Clara Valley, San Joaquin Valley, Sacramento Valley, Antelope Valley, Coachella Valley, and Mojave River Basin Areas.

Figure 5-90 Land Subsidence Potential in San Luis Obispo County



Source: San Luis Obispo County Department of Water Resources

Figure 5-91 Land Subsidence Potential in San Luis Obispo Valley Basin



Source: SLO Basin Groundwater Sustainability Plan

A 2013 study conducted for the California Water Foundation by James W. Borchers and Michael Carpenter of Luhdorff & Scalmanni Consulting Engineers observed:

"As in much of California, the population of San Luis Obispo County has grown substantially. Land has been converted from dry farming and grazing to irrigated agriculture and urban development. Groundwater has been relied upon to make up for shortages of surface water." (Borchers & Carpenter, p65)

That study identified several locations in San Luis Obispo County that remain at an increased risk of land subsidence today, primarily the area surrounding Paso Robles. The City of San Luis Obispo and the village of Cambria have also experienced significant land subsidence, as described below under Previous Occurrences.

5.3.13.3 Extent (Magnitude/Severity)

A lack of data makes it difficult to predict the magnitude of future land subsidence incidents in San Luis Obispo County. Most of the documented land subsidence in the county has been of 1" or less. However, that can still be enough to cause structural issues. The largest documented land subsidence measured in San Luis Obispo was a one-time drop of 12" that occurred in the City of San Luis Obispo in 1991. Ongoing displacements of as much as 12" per year have been documented in other parts of the state. The possibility of similar subsidence issues developing in San Luis Obispo County in the future cannot be ruled out.

5.3.13.4 Previous Occurrences

Land Subsidence had been an occasional issue in San Luis Obispo County for decades. The 2013 Borchers & Carpenter study listed three documented instances of significant land subsidence in San Luis Obispo County:

1976-1977, Cambria

> "[E]arth fissures resulting from substantial decline of groundwater levels during the 1976-1977 drought damaged buildings and other infrastructure. Subsequently, the [Village] of Cambria developed additional sources of water for public supply; since then, groundwater levels have not returned to historical low levels and fissuring has not reoccurred." (Borchers & Carpenter, p67)

1991, City of San Luis Obispo:

> "The [City] of San Luis Obispo… is dependent on local water sources, including surface reservoirs and groundwater, for municipal water supplies. Water shortages became severe during the 1987-1992 drought. Mandatory water rationing was enforced in 1989. When one of the two surface-water reservoirs dropped to its minimum pool elevation in 1990, the city increased groundwater extraction dramatically to meet water demands…. In 1991, tenants and owners of businesses near two of the city wells began to notice unusual effects on their infrastructure. The Bear Valley Shopping Center, a strip mall on Los Osos Valley Road, experienced differential subsidence; floors were shifted unevenly. The middle of the long, narrow mall subsided less than either end of the building so that the floor had an inverted V-shape in its long dimension. Doors and windows would not close properly, and sidewalks sloped back toward the building so that slot drains had to be cut in order to remove pooling precipitation. A surveyor measured a 12-inch drop in the floor along the 45-foot length of one store. After the floor was leveled, a 1-foot step had to be built to allow safe access to the store…. The adjacent building housing the Sunset Honda dealership had to be razed and completely rebuilt. Many homes in the nearby development were damaged. Owners of the strip mall successfully sued the city and were awarded $1 million in damages) …. After that settlement, the automobile dealership and many homeowners filed claims with the city. Total cost of the claims was about $2 million." (Borchers & Carpenter, p66-67)

1997, Paso Robles:

> "[T]hree areas northeast of Paso Robles and one area northeast of Atascadero subsided during March 28-August 15, 1997. The maximum downward displacement northeast of Paso Robles during this 6-month period was 2 cm (0.8 in), whereas groundwater levels declined about 18 m (60 ft) during the same period (Valentine et al., 2001). It is likely that concentrated pumping is responsible for localized land subsidence. The small area of deformation in the Atascadero area subsided 2.8 to 5.6 cm (about 1 to 2 in), coincident with seasonal water-level declines of about 16 m (54 ft). Small amounts of subsidence owing to seasonal changes in groundwater levels may be elastic and recoverable. However, during 2013 declining groundwater levels have been reported. Many formerly reliable wells have gone dry. Interferograms spanning 1997-2013 could indicate whether declining groundwater levels have triggered inelastic compaction of aquifer sediments and permanent subsidence in Paso Robles area." (Borchers & Carpenter, p66)
>
> Additionally, the 2015 City of Atascadero Local Hazard Mitigation Plan noted that Highway 1 west of Atascadero closes every winter due to land subsidence. The HMPC also noted that in San Simon there has been a sinkhole problem near a hotel parking lot. The HMPC also noted that heavy groundwater pumping in the Los Osos Valley Road area has led to significant subsidence, causing damage to homes and businesses in 1991.

5.3.13.5 Probability of Future Occurrences

Land subsidence has been a recurring issue in San Luis Obispo County for decades and can be expected to continue in the future. The frequency of future land subsidence incidents in the county will be dependent on the mitigation actions and pumping regulations initiated by the state, the county, and local regulations.

5.3.13.6 Climate Change Considerations

The impact that climate change will have on land subsidence risk is the potential for extended and severe drought, which could likely result in more groundwater pumping and human-induced subsidence. During periods of drought, water levels may be drawn too low, which results in an irreversible compaction of aquitards. The water cannot recharge the layers, causing permanent subsidence and diminishment of groundwater storage capacity

5.3.13.7 Vulnerability

Structures

The lack of detailed data on land subsidence in San Luis Obispo County makes it difficult to quantify potential losses. Most subsidence instances result in minor damage and settling of buildings. But in some cases, subsidence can result in serious structural damage to buildings, roads, irrigation ditches, underground utilities, and pipelines. Damages associated with the 1991 subsidence in the City of San Luis Obispo resulted in $2 million worth of insurance claims. Subsidence can also disrupt and alter the flow of surface or underground water, as well as reducing the future capacity of aquifers.

People

This hazard typically results in property damage, not risk to human life.

Social Vulnerability

Due to the gradual nature of land subsidence, it is not anticipated to have social vulnerability consequences. Earthquake-induced ground failure and subsidence is considered in that hazard's impacts.

Critical Facilities and Lifelines

Linear infrastructure (roads, buried pipelines) tends to have the most risk to land subsidence and there have been isolated and anecdotal evidence of some of this type of damage within the county. Statewide, subsidence has caused damage to dams and levees, canals, roads and bridges, water and sewer lines, pipelines, well casings, and aircraft runways, in addition to a variety of buildings and other structures. The threat to the California Aqueduct has been identified as a significant concern for the state.

Economy and Community Values

Damage resulting from land subsidence can cause direct economic losses in the form of needs structural repairs to affected buildings and facilities. As seen in the 1991 City of San Luis Obispo incident, subsidence can disrupt individual businesses causing temporary closures and sometimes necessitating significant repairs. It can also result in indirect losses, such as from increased taxes and decreased property values. However, the localized nature of most subsidence events limits their overall economic impact at the jurisdictional level.

Historic, Cultural, and Natural Resources

Historic and cultural facilities are just as susceptible to subsidence-related damage as other structures. However, there is not sufficient data to identify specific historical or cultural facilities at increased risk from this hazard.

Typically, there is little impact to the natural environment from land subsidence. However, it is possible for subsidence events to disrupt and alter the flow of surface or underground water, an impact that may not be noticed until long after the fact. Furthermore, soil compaction resulting from subsidence can permanently reduce aquafer capacity, impacting water supplies long into the future.

Development Trends

While vulnerability to this hazard has not changed to any of the jurisdictions within the period of 2019-2024. is not anticipated to increase with new development, increased water pumping resulting from new development has the potential to increase the frequency and severity of subsidence. This could be especially important in Paso Robles, given that area has higher subsidence potential and is projected to experience above-average growth. Increased efforts to monitor and manage groundwater pumping, increased accuracy of mapping, and emphasis on appropriate grading and ground compaction during development will help alleviate vulnerability for future development in unknown areas of risk.

Risk Summary

While a significant portion of San Luis Obispo County is potentially at risk from land subsidence, the localized nature of these incidents makes the overall significance of this hazard Low.

- The localized nature of land subsidence incidents limits their overall impact at the county level.
- While land subsidence can potentially occur throughout the planning area, the Paso Robles area has been identified as having a higher risk for the hazard. Historical subsidence incidents have also been documented in the City of San Luis Obispo.
- There is a shortage of data on this hazard in San Luis Obispo County. Most studies on land subsidence in California have focused on the Santa Clara Valley, San Joaquin Valley, Sacramento Valley, Antelope Valley, Coachella Valley, and Mojave River Basin Areas.
- Increased drought conditions resulting from climate change has the potential to result in more groundwater pumping, which could lead to more human-induced subsidence.
- Land subsidence can alter the flow of surface or underground water, an impact that may not be noticed until long after the fact.
- *Related Hazards:* Drought

Table 5-136 Hazard Risk Summary - Subsidence

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY (EXTENT)	OVERALL SIGNIFICANCE
San Luis Obispo County	Significant	Occasional	Negligible	Low
City of Arroyo Grande	N/A	N/A	N/A	N/A
City of Atascadero	Limited	Occasional	Negligible	Low
City of Grover Beach	N/A	N/A	N/A	N/A
City of Morro Bay	N/A	N/A	N/A	N/A
City of Paso Robles	Significant	Occasional	Negligible	Low
City of Pismo Beach	N/A	N/A	N/A	N/A
City of San Luis Obispo	Significant	Occasional	Negligible	Low
Avila Beach CSD	N/A	N/A	N/A	N/A
Cambria CSD	Significant	Occasional	Negligible	N/A
Ground Squirrel Hollow CSD	N/A	N/A	N/A	N/A
Heritage Ranch CSD	N/A	N/A	N/A	N/A
Los Osos CSD	N/A	N/A	N/A	N/A

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY (EXTENT)	OVERALL SIGNIFICANCE
Nipomo CSD	N/A	N/A	N/A	N/A
Oceano CSD	N/A	N/A	N/A	N/A
San Miguel CSD	N/A	N/A	N/A	N/A
San Simeon CSD	N/A	N/A	N/A	N/A
Templeton CSD	Significant	Occasional	Negligible	Low
Cayucos Sanitary District	N/A	N/A	N/A	N/A
Port San Luis Harbor District	N/A	N/A	N/A	N/A
San Luis Obispo FCWCD	N/A	N/A	N/A	N/A
South San Luis Obispo Sanitary District	N/A	N/A	N/A	N/A

5.3.14 Tsunami and Seiche

5.3.14.1 Hazard/Problem Definition

A *tsunami* is a wave, or a series of waves, caused by a displacement of the ocean floor, most commonly by movement along an earthquake fault, however they can also be triggered by underwater volcanic eruptions, glacier calvings, or underwater landslide. These events are also often referred to as tidal waves or seismic sea waves. In deep ocean water, tsunamis may travel as fast as 600 miles per hour. As they approach the shore and shallower waters, waves decrease in speed but often increase in height, with the ability to reach far inland and cause extensive damage to coastal communities.

Tsunamis typically consist of multiple waves that rush ashore like a fast-rising tide with powerful currents. If a disturbance which triggers a tsunami occurs close to the coastline, the resulting tsunami can reach coastal communities within minutes. According to the USGS, a rule of thumb is that if you see the tsunami, it is too late to outrun it. Even small tsunamis (6 feet in height, for example) are associated with extremely strong currents, capable of knocking someone off their feet, sweeping away vehicles, and damaging buildings. As a result of complex interactions with the coast, tsunami waves can persist for many hours.

Withdrawal of the sea may be a precursor to the arrival of the first wave. After the first wave appears, waves may continue to arrive at internals for several hours. Intervals between successive waves may be similar. If the second wave appears 20 minutes after the first, it is likely that a third wave (if there is one) would arrive 20 minutes after the second. The first wave may not be the biggest. Yet the largest wave usually occurs within the first ten waves. The height the sea level rises above mean high tide line is referred to as runup.

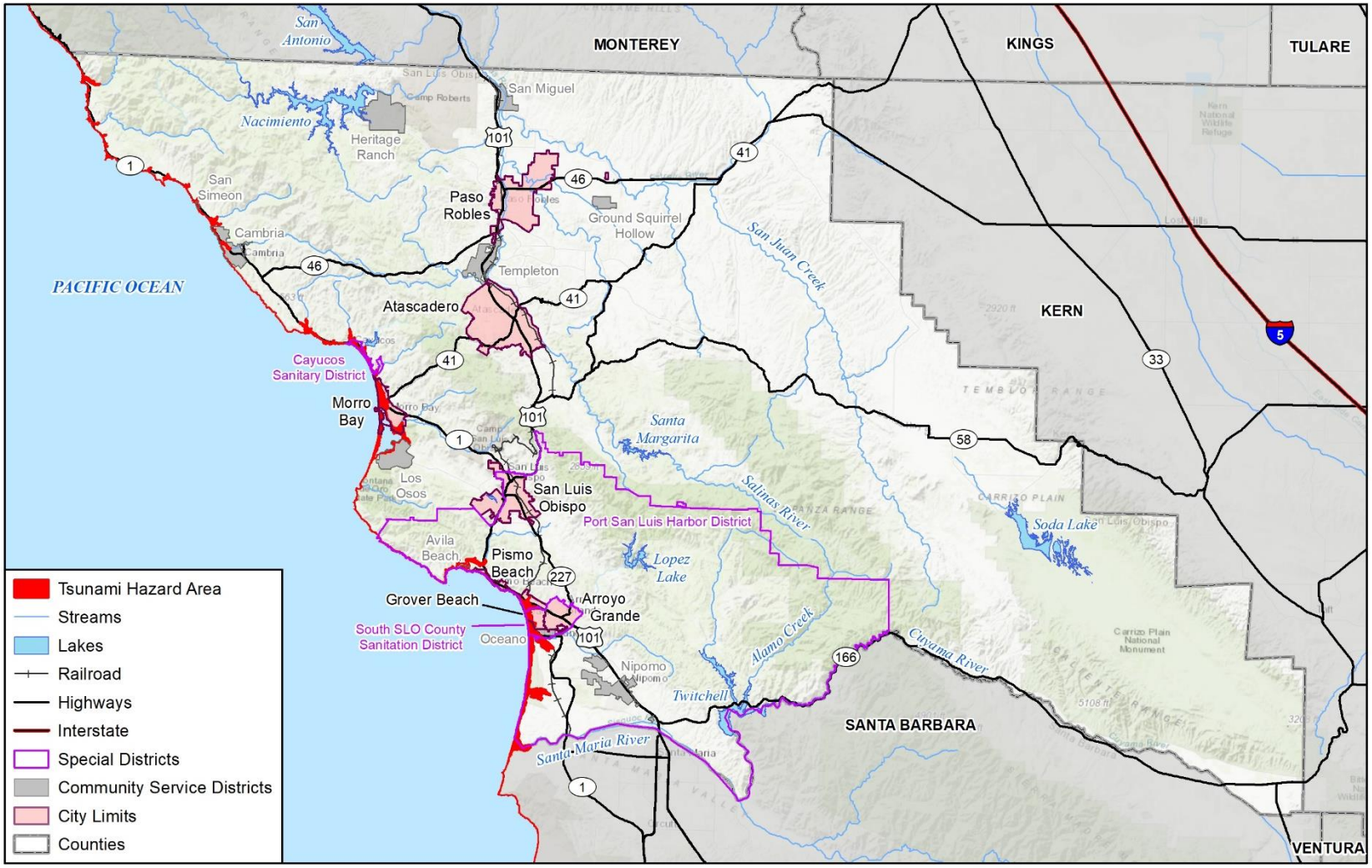
Seiche (pronounced “SAYSH”) is defined as oscillations of enclosed and semi-enclosed bodies of water, such as bays, lakes, or reservoirs, due to strong ground motion from seismic events, wind stress, volcanic eruptions, and local basin reflections of tsunami. Seiches can result in the creation of long-period waves which can cause water to overtop containment features or cause seiche runup on adjacent land masses, similar to tsunami runup.

5.3.14.2 Geographic Area

Earthquake faults are located all over the county as displayed in Figure 5-92 the maps in the Earthquake, Faults and Liquefaction section. Offshore faults and related seismic activity could cause tsunamis off the coast of San Luis Obispo County, even faults thousands of miles away.

Other earthquake faults, such as those near some of the bigger reservoirs and lakes like the Nacimiento Reservoir on the north (to the west of the Rinconada Fault Zone), Twitchell Reservoir (crossed by the West Huasna Fault Zone), and Soda Lake (near active or potentially active Fault Zones like San Juan) could affect these and other bodies of water and cause seiches, if they experienced seismic activity. As such, seiche hazards could occur in any reservoir or closed water body in the County, as well as in Morro and San Luis Bays. displays the tsunami-specific inundation zones, as determined by the California Department of Conservation. Tsunami inundation affects most of the county's coastal areas since flooding would originate from earthquake or fault movement in the Pacific Ocean.

Figure 5-92 Tsunami Inundation Areas on the Coast of San Luis Obispo County



Map compiled 1/2025;
Intended for planning purposes only.
Data Source: San Luis Obispo County,
California Geological Survey, Department of Conservation

According to the Tsunami Response Plan for San Luis Obispo County, the local threat of tsunami related damage is primarily confined to low-lying coastal areas which are 50 feet or less above mean sea level. In general, much of the coast of the County is protected by wide beaches, coastal dunes, or sea cliffs that provide protection for coastal developments. Areas most vulnerable to the tsunami hazard are developments or infra-structure near the mouths of streams that drain into the Pacific Ocean. They include:

- San Simeon Creek in San Simeon
- Santa Rosa Creek in Cambria
- Cayucos Creek, Little Cayucos Creek, Old Creek and Willow Creek in Cayucos,
- Morro and Avila Paul Creeks in Morro Bay, Chorro Creek in Morro Bay/ South Bay area
- San Luis Obispo Creek in Avila Beach
- Pismo Creek in Pismo Beach, and
- Meadow Creek and Arroyo Grande Creek in Oceano

5.3.14.3 Extent (Magnitude/Severity)

As noted in Table 5-137, the historic record shows that significant tsunamis typically have been generated from distant earthquake sources. It has been estimated that the 100- and 500-year tsunami runups in the study area are based on far-field source generation locations (such as the Aleutian or Chile-Peru Trenches). Estimated tsunami runup along the Cayucos/Morro Bay coastline is 9.5 feet to 24.2 feet for the 100-year and 500-year events, respectively. Those runups were calculated using astronomical high tides and compare well with recorded tsunamis that have occurred in other locations along the California Coast. However, the worst-case scenario would occur if a tsunami occurred during a meteorological high tide (storm surge), which would add an estimated 14.5 feet (4.5 meters) to the runup values calculated. Thus, with a worst-case scenario, the estimated tsunami runup for the 100-year and 500-year would be approximately elevation 24 and 39 feet above mean sea level, respectively.

When it comes to seiches, significant waves in waterbodies in the interior of San Luis Obispo County are not anticipated because they are simply not large enough.

5.3.14.4 Past Occurrences

Tsunamis have done great damage to communities located on the California Coast. A tsunami in 1964, following an earthquake in Alaska, killed 12 people in Crescent City and damaged piers and boats in Morro Bay as the bay emptied and filled every 15 minutes for over an hour.

On March 11, 2011, a great quake (9.0) struck northern Japan. Nearly 12 hours later, approximately $500,000 in damage was recorded to piers and docks in Morro Bay as a result of a tsunami from this earthquake. At the Center of Coastal Marine Science in Morro Bay (near the back of the bay), an oceanographer recorded a 6 ft. surge, while fisherman and Coast Guard personnel estimated an 8-9 ft. surge at the Coast Guard pier near the entrance to the harbor. Table 5-137 contains a summary of tsunami related events affecting the county from 1868 to January 2025.

Table 5-137 Historical Tsunamis in San Luis Obispo County

LOCATION	DATE OF INCIDENT	INTENSITY	DESCRIPTION
Morro Bay	1868	Unknown	Unknown
Cayucos	4/16/1877	Height: 3.6 meters	California
Morro Bay	1878 Reportedly overtopped sand spit between the bay and the ocean	Unknown	Unknown
Pismo Beach	1927	Height: 1.8 meters	California
Avila & Morro Bay	4/1/1946	Height: 1.3 meters Source Magnitude: (Ms) 7.3	Source location: Alaska Source Event: E. Aleutian Islands Travel time: 5 hours
Avila Beach	11/4/1952	Height: 1.4 meters Source Mag.: (Ms) 8.2 (Mw) 9	Source location: Russia Source event: Kamchatka Travel time: 8 hours
Pismo Beach	5/22/1960	Height: 1.4 meters Source Mag.: (Ms)9.5	Source location: Chile Source event: Central Chile
Avila & Morro Bay	3/28/1964	Height: 1.6 meters Source Mag.: (Ms)9.2	Source location: Alaska Source Event: Gulf of Alaska Travel time: 5 hours
Morro Bay	3/12/2011	Height: 1.5 meters Source Mag.: (Ms)9.0	Source location: Japan Source Event: Pacific Ocean near Honshu Travel time: 12 hours
Coast of San Luis Obispo County	9/16/2015	8.3 Magnitude	An 8.3 magnitude earthquake that struck off the coast of Chile, which led the National Tsunami Warning Center to issue a tsunami advisory at 1743 PST for a swath of California, from Orange County to north of San Luis Obispo. All beaches, harbors, piers, and marinas in the Cities of Seal Beach, Huntington Beach, Newport Beach, Laguna Beach, Dana Point and San Clemente, including County and State beaches were closed through 0500 PST on the 17th. Tsunami wave heights were observed to be just under one foot along the Orange County coast. The Orange County EOC reported no significant coastal flooding, but to be aware of the high likelihood of strong currents and waves dangerous to persons in or near the water. The advisory was lifted around 1100 PST on the 17th.

Source: County of San Luis Obispo Hazard Mitigation Plan 2019; NOAA's NCEI Storm Database 2019

5.3.14.5 Probability of Future Occurrences

Though damaging tsunamis have occurred infrequently in California, they are a possibility that must be considered in coastal communities. It is possible that tsunami flooding hazards will

increase and worsen with sea level rise. The Central Coast is most vulnerable to a tsunami generated by an earthquake along the Aleutian-Alaska megathrust subduction zone (an oceanic trench along a convergent plate boundary which runs along the southern coastline of Alaska and the Aleutian Islands). Present day inundation risk maps combining multiple tsunami generation sources have been produced by the California Geologic Survey and Department of Conservation. In the 157 years since the first recorded tsunami that affected San Luis Obispo County there have been 10 events total. This amounts to a probability of tsunami activity once every 15 years on average; as such, the expected future occurrence for this hazard is occasional.

5.3.14.6 Climate Change Considerations

Coastal areas in San Luis Obispo County are likely to become more vulnerable to tsunamis over the long term due to sea level rise trends which could contribute to deeper and more destructive tsunamis capable of reaching further inland in the future (see the Coastal Hazards section for more details on sea level rise). Especially when coupled with higher tides that will be brought with sea level rise, the interplay between climate change, sea level rise, and the exact time of day at which a tsunami occurs could result in much greater tsunami risk and changing inundation zones in the coming years.

5.3.14.7 Vulnerability

Tsunamis can cause severe damage to many aspects of communities, including structures, properties, environmental damage, and cascading impacts arising from the disruption of services. In addition, people are often affected by being displaced, injured, or killed by the inundation and destruction following a tsunami. While seiches can be destructive as well, due to the lack of a GIS layer noting seiche-caused inundation or other damages and a lack of documented damaging past events, no further analysis is carried out to determine seiche vulnerability in the county, and the perceived vulnerability is low due to the relatively small water bodies that could be affected.

Structures

A tsunami event occurring along the coast could have devastating effects in terms of property damage to piers, docks, floats, and to moored boats. During the 2024 update of this plan, a GIS analysis of improved property exposure to tsunami inundation areas was performed. To find which parcels were in inundation areas, an intersect of improved parcel centroids was performed with tsunami inundation areas.

GIS analysis indicates approximately $1.3 billion in improved property values ($2.1 billion in total value including estimated building content values) was found to be located within the tsunami inundation layer. About $742 million of that improved value is within unincorporated areas in the county. Due to the extreme power and destructive nature of tsunami flooding, the assumption is that all properties and their contents within the inundation zone would be a complete loss.

Table 5-141 and Table 5-142 summarize the improved values, content values, total values, loss estimates, and population at risk of tsunami inundation in the county, broken up by jurisdiction in the first table and community service district in the second.

Table 5-138 Parcels in Tsunami Hazard Areas, by Jurisdiction

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	POPULATION
Grover Beach	255	$73,939,466	$72,605,053	$146,544,519	215
Morro Bay	638	$238,969,509	$139,511,606	$378,481,115	1,206

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	POPULATION
Pismo Beach	413	$259,492,809	$204,108,440	$463,601,249	628
Unincorporated	2,093	$741,635,286	$442,470,703	$1,184,105,989	4,466
TOTAL	3,399	$1,314,037,070	$858,695,801	$2,172,732,871	6,514

Source: San Luis Obispo County Assessor Data November 15, 2024; California Geological Survey, Dept. of Conservation, WSP GIS Analysis

Table 5-139 Parcels in Tsunami Hazard Areas, by Community Service District

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	POPULATION
Avila Beach	183	$119,518,861	$81,911,089	$201,429,950	316
Cambria	129	$68,613,946	$37,143,878	$105,757,824	309
Los Osos	201	$65,755,234	$35,843,682	$101,598,916	452
Oceano	407	$99,578,722	$59,800,138	$159,378,860	818
San Simeon	44	$13,705,962	$8,585,540	$22,291,502	99
Total	964	$367,172,725	$223,284,326	$590,457,051	1,993

Source: San Luis Obispo County Assessor Data November 15, 2024; California Geological Survey, Dept. of Conservation, WSP GIS Analysis

Table 5-140 Parcels in Tsunami Hazard Areas by Property Type

PROPERTY TYPE	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE
Agricultural	9	$333,926	$333,926	$667,852
Commercial	308	$269,512,874	$269,512,874	$539,025,748
Exempt	18	$7,155,988	$7,155,988	$14,311,976
Industrial	64	$34,133,169	$51,199,754	$85,332,923
Mixed Use	195	$72,479,082	$72,479,082	$144,958,164
Mobile Home	12	$26,467,688	$13,233,844	$39,701,532
Multi-Family Residential	171	$71,081,136	$35,540,568	$106,621,704
Residential	2,587	$818,479,530	$409,239,765	$1,227,719,295
Vacant Improved	35	$14,393,677	$0	$14,393,677
Total	3,399	$1,314,037,070	$858,695,801	$2,172,732,871

Source: San Luis Obispo County Assessor Data November 15, 2024; California Geological Survey, Dept. of Conservation, WSP GIS Analysis

Table 5-141 Parcels in Tsunami Hazard Areas, by Jurisdiction

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	POPULATION
Grover Beach	255	$73,939,466	$72,605,053	$146,544,519	215
Morro Bay	638	$238,969,509	$139,511,606	$378,481,115	1,206
Pismo Beach	413	$259,492,809	$204,108,440	$463,601,249	628
Unincorporated	2,093	$741,635,286	$442,470,703	$1,184,105,989	4,466
TOTAL	3,399	$1,314,037,070	$858,695,801	$2,172,732,871	6,514

Source: San Luis Obispo County Assessor Data November 15, 2024; California Geological Survey, Dept. of Conservation, WSP GIS Analysis

Table 5-142 Parcels in Tsunami Hazard Areas, by Community Service District

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	POPULATION
Avila Beach	183	$119,518,861	$81,911,089	$201,429,950	316
Cambria	129	$68,613,946	$37,143,878	$105,757,824	309
Los Osos	201	$65,755,234	$35,843,682	$101,598,916	452
Oceano	407	$99,578,722	$59,800,138	$159,378,860	818
San Simeon	44	$13,705,962	$8,585,540	$22,291,502	99
Total	964	$367,172,725	$223,284,326	$590,457,051	1,993

Source: San Luis Obispo County Assessor Data November 15, 2024; California Geological Survey, Dept. of Conservation, WSP GIS Analysis

Table 5-143 Parcels in Tsunami Hazard Areas by Property Type

PROPERTY TYPE	STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE
Agricultural	9	$333,926	$333,926	$667,852
Commercial	308	$269,512,874	$269,512,874	$539,025,748
Exempt	18	$7,155,988	$7,155,988	$14,311,976
Industrial	64	$34,133,169	$51,199,754	$85,332,923
Mixed Use	195	$72,479,082	$72,479,082	$144,958,164
Mobile Home	12	$26,467,688	$13,233,844	$39,701,532
Multi-Family Residential	171	$71,081,136	$35,540,568	$106,621,704
Residential	2,587	$818,479,530	$409,239,765	$1,227,719,295
Vacant Improved	35	$14,393,677	$0	$14,393,677
Total	3,399	$1,314,037,070	$858,695,801	$2,172,732,871

Source: San Luis Obispo County Assessor Data November 15, 2024; California Geological Survey, Dept. of Conservation, WSP GIS Analysis

Based on this analysis there are 6,514 structures within tsunami hazard areas in San Luis Obispo County. The greatest exposure of property summarized in the tables above is residential property types. The unincorporated portions of the county's coast have the greatest number of properties in tsunami inundation areas, followed by Morro Bay, Pismo Beach, and Grover Beach. There is a high level of uncertainty as to the actual risk to these exposed parcels (based on built properties' height above ground and other factors), thus a more specific loss estimation is not provided. A more detailed, site-specific analysis would be needed to assess actual risk within the identified parcels.

People

People who are caught in the path of a tsunami face high likelihood of severe injury or death. According to the NWS, it takes only six inches of fast-moving water to knock a full-grown adult off their feet. Tsunami waves have the potential to reach shore in heights of 6 feet or more, which is not only near impossible to swim to safety in but will be accompanied by strong currents carrying broken glass, vegetation, vehicles, and other debris that can inflict blunt-force trauma on individuals. Water from tsunami inundation is potentially even more dangerous as it returns to the sea in between waves, taking debris and people with it. A significant tsunami event could also lead to mass displacement of coastal communities. Per the parcel analysis summarized in Table 5-141, there are an estimated 6,514 people county-wide residing within mapped tsunami inundation zones. Beyond permanent residents, workers, commuters, and

tourists are also vulnerable to tsunami if in the inundation zone at the time of a tsunami. Tourists are perhaps one of the most vulnerable populations as they may not be familiar with the risk tsunamis pose, not understand or heed warnings, or be familiar enough with the area to know where to go for safety. The HMPC has noted that the population in Pismo and Grover Beach area swell with beachgoing visitors. The Oceano Dune State Park has as much as 10,000 to 40,000 visitors on a busy summer weekend and on holidays.

Social Vulnerability

Since tsunamis are coastal hazards, those communities along the shore and where social vulnerability indices are higher will be of most concern. These include San Simeon, Grover Beach, and Oceano in particular, followed by medium-high vulnerability in Morro Bay and Los Osos. Evacuation aid will be of highest priority in those high vulnerability and high hazard exposure areas discussed, as people who rely on assistance for displacement (e.g., those with accessibility needs), or who require translation services or other specialized resources would be most vulnerable.

Critical Facilities and Lifelines

In addition to buildings, some utilities and transportation infrastructure are vulnerable to tsunami inundation. Some of these community lifelines are particularly vulnerability because of their proximity to the coast, such as Highway 1, and susceptibility to flooding and damage. Failure of any component along major utility and transportation lifelines can result in failure to deliver services and disrupt the flow of people and goods throughout the region or (due to road closures, etc.). Loss of power to critical facilities such as hospitals, impaired sewage and wastewater facilities, contamination of water supplies, potential release of flammable fuels, and more could all result from a significant tsunami. The overall impact of failures of these critical facilities and lifelines, including secondary failure of systems that depend on lifelines, can significantly compound the impacts of physical damage to people and property by disrupting the ability of the community to respond and recover in the aftermath of an event.

The following table summarizes the number and types of critical facilities found to be at risk of tsunamis. These results were found by performing overlay analysis of the critical facilities and the tsunami inundation layers in GIS. Most of these facilities at risk are found in the unincorporated county and Morro Bay, though a few are also located in Pismo Beach and Grover Beach. Overall, a total of 81 critical facilities are found within tsunami inundation zones across the county.

Table 5-144 Critical Facility Assets Exposed to Tsunami Hazard Areas by Jurisdictions

JURISDICTION	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Grover Beach	-	-	-	1	-	-	1	1	3
Morro Bay	-	2	1	-	-	2	11	1	17
Pismo Beach	-	-	-	-	-	-	5	-	5
Unincorporated	8	-	-	2	-	11	32	3	56
Total	8	2	1	3	0	13	49	5	81

Source: San Luis Obispo County, California Geological Survey, Dept. of Conservation, CalARP, HIFLD, NBI, NID, WSP Analysis

Table 5-145 Critical Facility Assets Exposed to Tsunami Hazard Areas by Community Service District

JURISDICTION	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Avila Beach	1	-	-	-	-	1	-	-	2
Cambria	-	-	-	-	-	-	3	-	3
Oceano	2	-	-	2	-	1	4	1	10
San Simeon	1	-	-	-	-	-	-	1	2
Total	4	0	0	2	0	2	7	2	17

Source: San Luis Obispo County, California Geological Survey, Dept. of Conservation, CalARP, HIFLD, NBI, NID, WSP Analysis

The Diablo Canyon Power Plant is not considered to be at risk as it is located on a marine terrace 85 feet above the sea level. The cooling intakes and release structures for the plant, which are located at sea level, are protected by natural barriers and a concrete jetty.

Economy and Community Values

As noted in Table 5-141, there is over $2.1 billion in total property value exposed in tsunami inundation zones. This does not include the estimated replacement cost of public infrastructure such as utilities, ports, roads, and coastal park or recreation facilities. The direct economic impact of partial or complete loss of these assets could be severe in a large tsunami. Additionally, the business interruption impacts resulting from extended periods without utility service or transportation access could cripple the local economy of smaller coastal communities in the county that largely center around tourism.

Historic, Cultural, and Natural Resources

Tsunami inundation effects on the environment can be quite destructive, similar to flooding, with pollution and debris spread throughout the area contaminating soils and waterways Erosion and direct physical damage to vegetation and natural habitats could also be significant. For the most part the environment is resilient and would be able to rebound from damages inflicted, though this process could take years. GIS analysis indicates there are seven (7) historic properties potentially at risk to tsunami inundation, one in Morro Bay and the remaining six in unincorporated areas of the county.

Table 5-146 Historical Sites Exposed to Tsunami Hazard Zones by Jurisdiction

JURISDICTION	STRUCTURE COUNT
Morro Bay	1
Unincorporated	6
Total	7

Source: San Luis Obispo County, California Geological Survey, Dept. of Conservation, CalARP, WSP Analysis

Development Trends

Since the 2019 HMP there have been documented changes in exposure to tsunami based on the GIS analysis conducted for this vulnerability assessment. For this plan, a GIS overlay analysis of building construction permits for residential and commercial properties was additionally performed across the county, pulling from permits submitted from 2019 to November 2024, summarized in Table 5-147 below. This assessment provides a general idea of how development trends may be increasing vulnerability to tsunami in San Luis Obispo County. Areas slated for future development along the coast should consider potential impacts from tsunami inundation, particularly development of new critical facilities or vulnerable populations (e.g., schools).

Table 5-147 Properties Exposed to Tsunami Hazard Areas Built between 2019-2024

JURISDICTION	STRUCTURE COUNT	IMPROVED VALUE
Grover Beach	3	$5,246,696
Morro Bay	25	$10,414,035
Pismo Beach	8	$66,528,301
Unincorporated	55	$42,595,410
Total	91	$124,784,442

Source: San Luis Obispo Assessor Data November 15, 2024, California Geological Survey, Dept. of Conservation, WSP GIS Analysis

Risk Summary

The overall significance of tsunami inundation and seiche activity in San Luis Obispo County is Medium. These events happen every 15 years on average and have historically had relatively minimal impacts to San Luis Obispo County relative to other areas in California, however there is potential for the impacts to be severe. In addition, San Luis Obispo County has a rugged coastline with popular recreation areas along the coast. The areas of Pismo Beach, Avila Beach, Grover Beach, and Morro Bay harbor are vulnerable to tsunamis due to their location at the stream mouths of creeks draining into the Pacific Ocean.

- Based on historical evidence tsunamis have occurred in the county, though not frequently.
- *Effects on property:* Property loss can be significant depending on wave height; 3,399 structures are found in tsunami inundation areas based on GIS analysis, most of these in unincorporated county portions with concentrations in the cities of Morro Bay, Pismo Beach, and Grover Beach,
- *Effects on people:* An estimated 6,514 people reside in coastal inundation areas. Tourists in general may be particularly vulnerable to tsunamis.
- *Effects on Critical Facilities and Lifelines:* Tsunami inundation can result in the destruction of infrastructure such as water and sewer lines, electrical and telecommunications facilities, and transportation routes. Disrupted transportation routes are likely to cause considerable inconvenience, disrupt the flow of goods and services, and hinder emergency response efforts. Based on GIS analysis, there are a total of 14 critical facilities found within tsunami inundation areas, with most of them in Morro Bay (7), some in the unincorporated portions of the county (6), and 1 in Grover Beach.
- *Effects on Economy and Community Values:* The direct economic impact of tsunami damages could be severe in a large tsunami. Business interruption impacts could also compound the negative economic impacts.
- *Related hazards:* Earthquake, Coastal Storm/Coastal Erosion/Sea Level Rise.

Table 5-148 Hazard Risk Summary - Tsunami

JURISDICTION	GEOGRAPHIC AREA	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY (EXTENT)	OVERALL SIGNIFICANCE
San Luis Obispo County	Significant	Occasional	Limited	Medium
City of Arroyo Grande	N/A	N/A	N/A	N/A
City of Atascadero	N/A	N/A	N/A	N/A
City of Grover Beach	Limited	Occasional	Limited	Low
City of Morro Bay	Extensive	Occasional	Catastrophic	High
City of Paso Robles	N/A	N/A	N/A	N/A
City of Pismo Beach	Significant	Occasional	Critical	Medium
City of San Luis Obispo	N/A	N/A	N/A	N/A
Avila Beach CSD	Significant	Occasional	Critical	Medium
Cambria CSD	Limited	Occasional	Critical	Medium
Ground Squirrel Hollow CSD	N/A	N/A	N/A	N/A
Heritage Ranch CSD	N/A	N/A	N/A	N/A
Los Osos CSD	Significant	Occasional	Limited	Low
Nipomo CSD	N/A	N/A	N/A	N/A
Oceano CSD	Significant	Occasional	Limited	Medium
San Miguel CSD	N/A	N/A	N/A	N/A
San Simeon CSD	Limited	Occasional	Negligible	Low
Templeton CSD	N/A	N/A	N/A	N/A
Cayucos Sanitary District	Significant	Occasional	Critical	Medium
Port San Luis Harbor District	Significant	Occasional	Catastrophic	High
San Luis Obispo FCWCD	Significant	Occasional	Limited	Medium
South San Luis Obispo Sanitary District	Limited	Occasional	Limited	Low

5.3.15 Wildfires

5.3.15.1 Hazard/Problem Definition

A wildfire is an uncontrolled fire spreading through vegetative fuels, posing danger and destruction to property. While wildfires are often the direct result of lightning strikes, most are caused by powerlines or mechanical equipment, or are the result of human activities like debris burns, carelessness, or arson. Wildfires often start in undeveloped areas and public land areas, such as state and national forest lands, but can spread to urban areas where structures and other human development are more concentrated.

Communities throughout California are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural cycle of the ecosystem. Wildfire risk is predominantly associated with wildland-urban interface areas, a general term that applies to development adjacent to landscapes that support wildfire. However, significant wildfires can also occur in heavily populated areas.

Wildfire can quickly become a problem when it poses a danger to people, property, forest resources, and wildlife. Wildfires often start in undeveloped areas but can spread to urban areas where structures and other human development are more concentrated. Some wildfires result from natural processes such as lightning strikes, but most are caused by powerlines or mechanical equipment, or are the result of human activities like debris burns, carelessness, or arson.

Wildfires are also an important natural component of San Luis Obispo County's landscape. Periodic burning of wildlands facilitate natural processes that maintain the native ecosystem. Fuel management practices such as controlled burns, mowing, and cattle grazing are used to replicate wildfire-related ecosystem processes without creating wildfire hazards.

San Luis Obispo County Characteristics

SLO County is located on the California central coast and is home to a unique wildfire regime influenced by a combination of distinct micro-climates and weather patterns, fuels, topography, and human behavior. To better recognize these wildfire regimes throughout SLO County, individual firesheds have been developed to constitute concise planning units to capture the specific characteristics that influence a planning unit's wildfire behavior. The firesheds have been developed as planning units that will assist with regional and local planning, mitigation efforts, and management of wildfire threats and consequences. The firesheds will assist managers in the identification, assessment, and development of projects that will reduce, prevent, or eliminate the impacts of destructive wildfire.

There are several key countywide characteristics that contribute to the collective wildfire risk and behavior that span across fireshed boundaries.

These characteristics include:

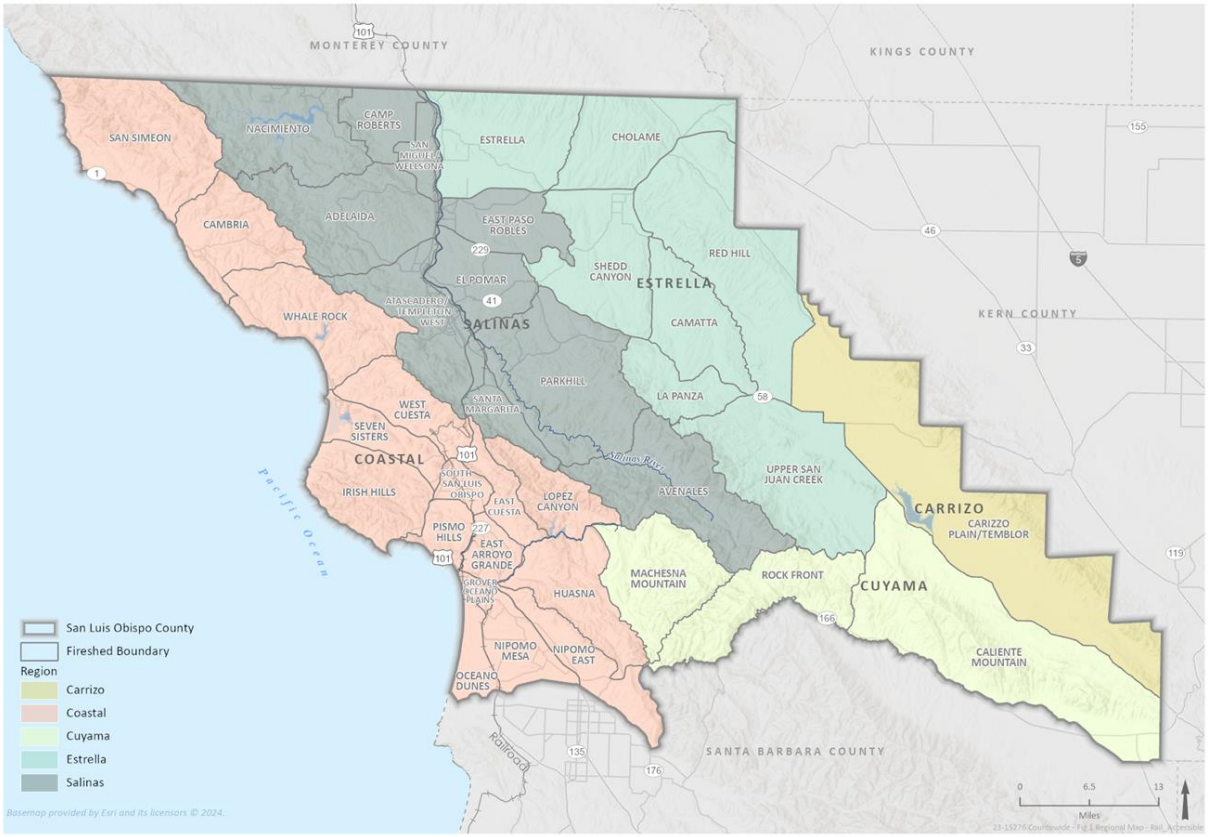
- Life Safety and Development Patterns
- Built Environment
- Emergency Planning
- Evacuation
- Natural Environment and Fire
- Socioeconomic Consequences of Wildfire
- Air Quality Concerns
- Cultural History
- Prescribed Fire History
- Topography
- Microclimates
- Wind
- Fire History
- Wildland Fatality Fires
- Firefighting Assets
- Fire Hazard Severity Zones
- Fuel Reduction Methodologies
- Climate Change Vulnerabilities

Effective project planning requires a detailed understanding of the existing socio-economic and environmental conditions at a site and the elements that may influence the project. By providing insight about these factors, beginning with the countywide elements and progressively narrowing the focus from the county level to the region within the county, to the individual firesheds within the region, this report provides context at a scale befitting understanding of fire impact and mitigation project development. Some elements such as wildfire history should be addressed at all levels of granularity, while others such as cultural history are generally applicable on a county-wide basis.

Firesheds Defined

The County has been undertaking an effort to define and map firesheds. The County has been divided into five regions based on general characteristics that all the firesheds within a region have. This is often based on the proximity to effects of the ocean, the predominant topographic features such as mountains or valleys and the climate. Each fireshed was created in a manner that the factors that both influence a wildfire's spread and the impacts that a wildfire would have are consistent with the entire fireshed defined area. By providing a consistent approach to developing firesheds, fire safe projects within a fireshed can better support past and future projects in mitigating the impacts, or improving the benefits, of a wildfire or prescribe fire. Expert knowledge of historical wildfire behavior was used to identify the appropriate criteria to accurately distinguish each unit's boundaries. Boundaries follow fixed geographic features such as mountain ranges, valleys, roads, ridgelines, and developed areas that act as natural barriers to fire. Thus, these barriers can be used to shape the natural borders between the different firesheds.

Figure 5-93 San Luis Obispo County Firesheds



Source: San Luis Obispo County Firesheds Report October 2024

5.3.15.2 Geographic Area

Fire Hazard Severity Zone Mapping

Virtually the entire county is potentially affected by wildfire. The severity of how a fire will burn will vary based on many factors.

The Fire Hazard Severity Zone (FHSZ) maps are developed using a science-based and field-tested model that assigns a hazard score based on the factors that influence fire likelihood and fire behavior. Many factors are considered such as fire history, existing and potential fuel (natural vegetation), predicted flame length, blowing embers, terrain, and typical fire weather for the area. There are three levels of hazard in the State Responsibility Areas (SRA): moderate, high, and very high. The SRA is defined in California Public Resources Code (PRC) 4102 as areas where the state assumes primary financial responsibility for fire prevention and suppression.

In California, a "Local Responsibility Area" (LRA) is an area where the financial responsibility for preventing and suppressing wildfires rests with a city, county, or district, rather than the state.

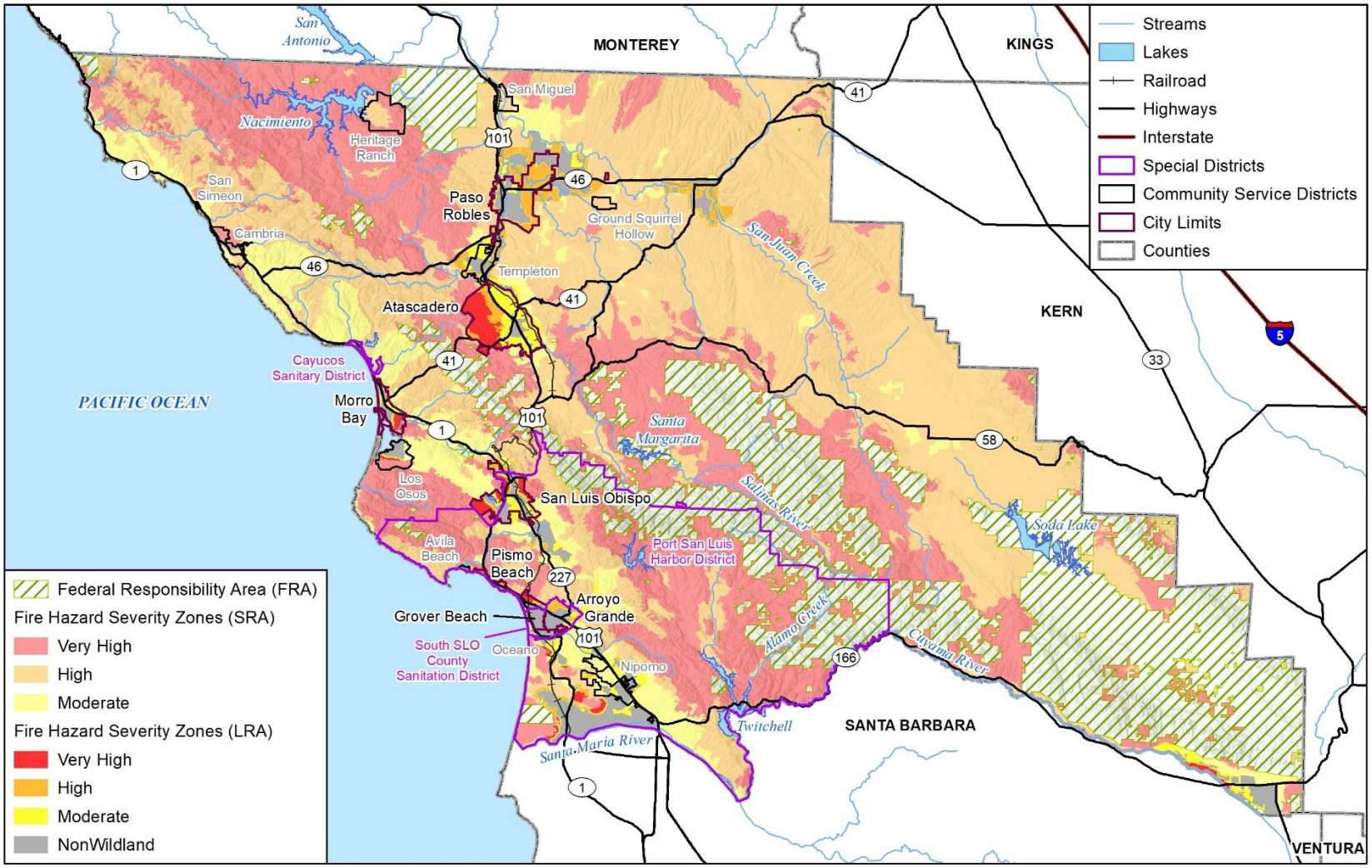
Fire Hazard Severity Zone maps evaluate “hazard,” not “risk”. They are like flood zone maps, where lands are described in terms of the probability level of a particular area being inundated by floodwaters, and not specifically prescriptive of impacts. “Hazard” is based on the physical conditions that create a likelihood and expected fire behavior over a 30 to 50-year period without considering mitigation measures such as home hardening, recent wildfire, or fuel reduction efforts. “Risk” is the potential damage a fire can do to the area under existing conditions, accounting for any modifications such as fuel reduction projects, defensible space, and ignition resistant building construction.

On March 10, 2025, the State Fire Marshal rolled out the updated LRA Zone Map for San Luis Obispo County. This map also identifies Very High, High and Moderate FHSZ. The designation for local jurisdictions is required by Government Code Section 51179 which states, “A local agency shall designate, by ordinance, very high fire hazard severity zones in its jurisdiction within 120 days of receiving recommendations from the director pursuant to subdivisions (b) and (c) of Section 51178.

The updated FHSZ mapping was used to analyze wildfire hazard exposure during the 2025 update of this LHMP and is shown below in Figure 5-94. Based on the above criteria, the CAL FIRE FHSZ mapping throughout the county is designated as “Very High,” “High,” or “Moderate”.

Fire Hazard Severity Zones viewer in the State Responsibility Area Effective April 1, 2024 can be referenced at: https://osfm.fire.ca.gov/what-we-do/community-wildfire-preparedness-and-mitigation/fire-hazard-severity-zones

Figure 5-94 Fire Hazard Severity Zones in State & Local Responsibility Areas

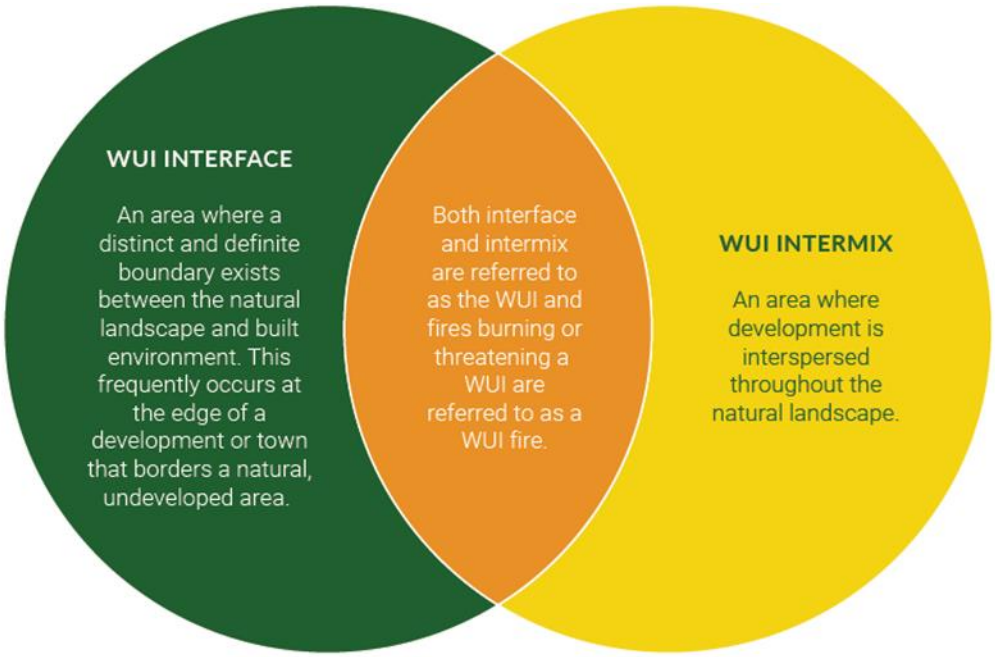


Map compiled 3/2025;
Intended for planning purposes only.
Data Source: San Luis Obispo County, CAL FIRE,
Phase 3 as Identified by the Office of the State Fire Marshal March 10, 2025,
FHSZSRA_23_3, FHSZLRA25_Phase3_v1

Wildland Urban Interface and Intermix (WUI)

The Wildland-Urban Interface (WUI) refers to areas where human development and natural wildlands meet, creating a unique zone where homes, communities, and infrastructure are in close proximity to forests, grasslands, and other undeveloped landscapes. Within the WUI, there are two primary types of development: intermix and interface. The "intermix" describes areas where homes and other structures are dispersed throughout wildland vegetation, often with significant natural fuel sources interwoven among the properties. In contrast, the "interface" refers to more densely populated communities or neighborhoods that directly border wildlands, where the boundary between developed areas and natural landscapes is more distinct. Both intermix and interface zones are particularly vulnerable to wildfires, as they combine human activity with flammable vegetation and the buildings become fuel for the fire, increasing the risk to life and property.

Figure 5-95 WUI Interface and Intermix Defined



Wildfires in the WUI require firefighters to use valuable firefighting resources defending structures instead of offensive action on the wildfire, thus allowing the fire to grow.

5.3.15.3 Extent (Magnitude/Severity and Fire Behavior)

The National Wildfire Coordinating Ground (NCWG) wildfire classification is based on the size of acres covered by the wildfire. The table below shows the classification scale. All ranges of wildfire sizes up to class G are possible in the County. In addition to fire size, there are three factors that influence fire behavior and thus magnitude/severity: fuel, weather, and topography.

Table 5-149 Fire Size Classification

VALUE	DESCRIPTION
A	Greater than 0 but less than or equal to 0.25
B	0.26 to 9.9
C	10.0 to 99.9
D	100 to 299
E	300 to 999

VALUE	DESCRIPTION
F	1,000 to 4,999
G	5,000 to 9,999

Source: National Wildfire Coordinating Ground (NCWG)

Fuel

A fuel's composition, including moisture level, chemical makeup, and density, determines its degree of flammability. Moisture level is the variable factor and changes daily, even hourly. Live trees usually contain a great deal of moisture and dead logs contain very little. The moisture content and distribution of these fuels define how quickly a fire can spread and how intense or hot a fire may become. High moisture content will slow the burning process because heat from the fire must first eliminate moisture.

In addition to moisture, a fuel's chemical makeup determines how readily it will burn. Some plants, shrubs, and trees contain oils or resins that promote combustion, causing them to burn more easily, quickly, or intensely than those without such oils. Finally, density of a fuel influences its flammability. If fuel particles are close together, they will ignite each other, causing the fuel to burn readily. But if fuel particles are so close that air cannot circulate easily, the fuel will not burn freely.

Soil types also must be considered because fire affects the environment above and below the surface. Soil moisture content, the amount of organic matter present, and the duration of the fire determine to what extent fire will affect soil.

Vegetation, also referred to as fuel, significantly influences wildfire behavior and affects the level of wildfire threat. Vegetation distribution across the county varies based on location, soil type, microclimate, and topography, with notable contrasts between the inland and coastal areas. The Santa Lucia mountains create the most significant topographical feature with the coastal area influenced by marine air and the inland area influenced by warmer dryer summertime conditions. The major vegetation categories are grassland, oak woodland, chaparral/shrubland and timber. Typically a fire in grass will burn faster with less intensity. Chaparral presents the most significant intensity and rates of spread. Timber fires burn slower but with greater intensity. Chaparral and timber can produce higher rates of flying embers. The largest and most damaging fire in San Luis Obispo County have occurred in chaparral/shrubland. All areas have exposure to wildfire risk. The conditions are influenced by time of year, daily weather changes and seasonal climate that influences temperature and wind patterns. Climate changes have extended the dry season and increased temperatures. This dries out vegetation earlier in the year, reaching critical conditions earlier and for longer periods.

Another factor that can increase the severity of wildfires in the county is areas with high percentages of dead trees, as discussed in subsection 5.3.5 on Agricultural Pest Infestation and Plant Disease. Droughts weaken trees, making them more susceptible to diseases and pathogens by reducing their ability to produce defensive chemicals and slowing wound healing, which can lead to increased pathogen infection

Weather

Weather conditions such as wind, temperature, and humidity also contribute to fire behavior. Wind is one of the most important factors because it can bring a fresh supply of oxygen to the fire and push the fire toward a new fuel source.

Temperature of fuels is determined by the ambient temperature because fuels attain their heat by absorbing surrounding solar radiation. The temperature of a fuel influences its susceptibility to ignition. In general, fuels will ignite more readily at high temperatures than at low temperatures.

Humidity, the amount of water vapor in the air, affects the moisture level of a fuel. At low humidity levels, fuels become dry and, therefore, catch fire more easily and burn more quickly than when humidity levels are high.

The single most important factor of wildfire spread is wind.

SLO County has several seasonal wind patterns that influence fire behavior. to extreme conditions These winds are direct result of the proximity of the Pacific Ocean and the effect on air masses (low and high pressure areas that determine wind direction and velocity. Summer winds are strongly influenced by the prevailing Northwesterly winds from the Pacific High centered west of the coastline. Fall and ate spring winds are influenced by the subsidence off shore wind direction caused by high pressure over Nevada and Great Basin.

Topography

Topography describes land shape. It can include descriptions of elevation with the height above sea level; slope, the steepness of the land; aspect, the direction a slope faces (e.g., the south side of a canyon will have a north-facing slope); features, such as canyons, valleys, rivers, etc.

Slope can determine how quickly a fire will move up or down hills. For example, if a fire ignites at the bottom of a steep slope, it will spread much more quickly upwards because it can pre-heat the upcoming fuels with rising hot air, and upward drafts are more likely to create spot fires.

More frequent droughts and higher temperatures put a strain on both native and non-native trees. The native Monterey and Bishop pines are more vulnerable to disease and pests, particularly beetles. The oaks can often suffer canopy dieback during a drought causing the shedding of leaves, impacting the root, branch and canopy systems, and even mortality. Chaparral can also suffer dieback during extended droughts. Further, during years of higher temperatures, the fuel moisture within the vegetation can drop to critical levels earlier in the year. In all cases this creates more available fuels that increases fire behavior conditions.

Intense wildland fires can completely destroy ground cover. If heavy rains follow a major wildfire, flash floods, heavy erosion, land subsidence, debris flows and mudflows can occur. After a wildland fire passes through an area, the land is often stripped of its protective vegetation cover and is susceptible to excessive run-off and erosion from winter storms. Intense heat from wildfires can create hydrophobic soil, meaning the soil becomes water-repellent. This reduces the soil's ability to absorb water, leading to increased surface runoff and erosion. These cascading effects can lead to additional hazards such as flash flooding and debris flows.

The May 2023 San Luis Obispo County Community Wildfire Protection Plan (CWPP) provides additional analysis of the extent and expected behavior of wildfires in SLO County.

5.3.15.4 Previous Occurrences

According to the National Interagency Fire Center (NIFC), 594 wildfires have been recorded in San Luis Obispo County between 1950 and 2024, as shown in Figure 5-96 below. Most of these fires burned from a few hundred to a few thousand acres.

Larger wildfires do occur, the largest wildfire over this time burned over 13,000 acres (~20 mi^2). The county does have a history of substantially larger wildfires, with 15 fires burning more than 20,000 acres each since 1900 (Table 5-150).

(Table 5-150). From 1950-2024 FEMA has issued two fire disaster declarations in San Luis Obispo County (Table 5-151). Wildfire burn history is depicted in Figure 5-96.

An analysis of 131 fire starts in the county from 2020 to 2024 where the cause of the fire could be determined found that powerlines and vehicle or equipment use accounted for 74% of ignitions (Table 5-152).

With exception, the major fires that have burned in SLO County have a general burn pattern from the northwest to the southeast. This is due to the alignment of the Santa Lucia Range and the dominant prevailing onshore wind pattern from the northwest. When mixed with the afternoon marine air spilling over the Santa Lucia Range (The Wind With No Name) fires spread in multiple directions on the lee side of the ridgeline. The exception to this is along the Cuyama River where the dominant effect of the river canyon funnels wind back and forth between the Pacific Ocean and the inland desert.

Since the early 1900s many large and damaging wildfires have been recorded in SLO County. The Parkhill-Pozo area of central SLO County experiences the most frequent large fires and burns with extreme intensity in July and August.

The 1996 Highway 58 Fire consumed 106,969 acres, thirteen homes, and many other structures and vehicles. The fire began near SR-58 and O'Donovan Road and was driven to the south and east into the Los Padres National Forest, dying near Branch Mountain southeast of Pozo.

The 1985 Las Pilitas Fire burned 84,271 acres and ten homes. It began on Las Pilitas Road north of Santa Margarita Lake and burned southwesterly into the Santa Lucia Range, to Lopez Lake, across East Cuesta Ridge and into the city of San Luis Obispo.

The 1994 Highway 41 Fire burned 50,729 acres in the Santa Lucia Range. It was ignited on SR-41 near Cerro Alto and the first evening, under offshore diurnal winds, was bearing down on the city of Morro Bay before shifting winds pushed it back toward Atascadero, Garden Farm, Santa Margarita, and into Cal Poly, the Men's Colony, and City of San Luis Obispo. The fire destroyed 42 homes, 61 other structures and 91 vehicles. A strike team of five fire engines with 20 firefighters were nearly overrun along Tassajara Creek Road when the afternoon "Wind With No Name" pushed the fire in their direction. The Highway 41 fire burned at the most extreme rate of any fire in California, consuming 6,000 acres per hour at its peak.

The 1950 Pilitas 1, 2 & 3 fires burned together and burned 30,100 acres in the Parkhill area. 23 firefighters were overrun when the Pilitas 2 fire burned into the Pilitas 1 fire trapping the firefighters and killing four of them. The Pilitas 1 fire started near the dam for the Salinas Reservoir (Santa Margarita Lake) and burned to the northeast across Pilitas Road toward Huer Huero Road. While hand crews were constructing hand line on this fire, a new fire (Pilitas 2) began on Parkhill Road at Seven Oaks Road from a debris burn escape when a sudden wind shift occurred. This new fire burned to the southeast and trapped the firefighters between the two fires at Huer Huero Road north of Parkhill Road. The third fire (Pilitas 3) was caused by arson at SR-58 and Parkhill Road and burned easterly along SR-58. The three fires burned together and reached Black Mountain.

1979 Spanish Ranch fire along SR-166 west of Cuyama resulted in the death of four firefighters when the marine wind (Wind with No Name) pushed inland through the Cuyama River pass and caused the fire intensity to change trapping and killing four firefighters and injuring two more.

The 1997 Logan Fire burned 49,490 acres in remote areas off SR-166 in the Cuyama River pass and resulted in near miss entrapments of firefighters on the east and west sides of the fire due to the afternoon winds. This fire burned both in easterly and westerly directions based on the wind with no name wind flow direction in the Cuyama River drainage. The following winter three people died in flood waters as a result of the burned slops that eroded away Highway 166. Two were Highway Patrol Officers.

The 2016 Chimney Fire burned 46,233 acres near Lake Nacimiento, burning through the Santa Lucia Range and coming within two miles of Hearst Castle. It destroyed 49 homes and 21 other structures. The Chimney Fire burned in nearly the same footprint as the 1960 Weferling Fire. The Weferling Fire After Action Report mentioned "Crazy winds" (Wind with No Name) as a factor in the severe fire spread.

The 2017 Alamo Fire burned 28,687 acres near Twitchell Reservoir (Cuyama River drainage) in SLO County, though the majority of acreage was in neighboring Santa Barbara County. It destroyed one home and thirteen other structures.

The 1989 Chispa Fire burned 9,750 acres near Chalk Mountain Golf Course in Atascadero and burned south and east toward Santa Margarita and Creston. It destroyed twelve homes and many other structures in its wake.[5] Cumulatively, these large fires, destroyed dozens of structures, and caused millions of dollars of social, environmental, built and economic damages.[6, 7] Resource drawdown and competition with other simultaneous ongoing large fires in the state at the time may have contributed to the levels of destruction wrought by the worst fires in SLO County.

Table 5-150 Large Wildfire History (Fires Greater Than 20,000 Acres)

FIRE NAME	YEAR	APPROX. ACRES BURNED	DAMAGES
Avenal's Fire	1917	21,242	Unknown
Unnamed Fire	1921	63,909	Unknown
Unnamed Fire	1922	25,637	Unknown
Machesna Fire	1939	28,313	Unknown
Pilitas #1 Fire	1950	22,844	Unknown
Sam Jones Fire	1953	35,455	Unknown
Big Dalton Fire	1953	67,701	Unknown
Weferling Fire	1960	51,451	Unknown
Buckeye Fire	1970	42,307	Unknown
Las Pilitas Fire	1985	84,271	Destroyed 10 homes
Highway 41 Fire	1994	50,729	Destroyed 42 homes, 61 other structures, and 91 vehicles
Highway 58 Fire	1996	106,969	Destroyed 13 homes, numerous other structures & vehicles
Logan Fire	1997	49,490	None (remote, unpopulated area)
Chimney Fire	2016	46,344	Destroyed 49 homes and 21 other structures
Alamo Fire	2017	28,834	Destroyed one home and 13 other structures

Source: FRAP

5 Vaughn, M. San Luis Obispo Tribune. Dec. 11, 2017. The 7 Largest Wildfires in SLO County History. Accessed Feb 20, 2024. from https://www.sanluisobispo.com/article189260279.html#storylink=cpy .
6 San Luis Obispo County Fire Department. July 2019. Community Wildfire Protection Plan. San Luis Obispo County. https://www.slocounty.ca.gov/Departments/County-Fire-Department/Publications/Community-Wildfire-Protection-Plan.pdf.
7 San Luis Obispo County Public Works. Apr. 28, 2022. CAL FIRE Unit Strategic Fire Plan. San Luis Obispo County. https://www.slocounty.ca.gov/Departments/Public-Works/Forms-Documents/Projects/SLO-Watershed-Project/Resources/CAL-FIRE-Unit-Strategic-Fire-Plan.pdf.

Table 5-151 State and Federal Disaster Declarations in San Luis Obispo County, 1950-2024.

DISASTER NUMBER	DECLARATION DATE
FM-5146-CA	08/14/2016
DR-739-CA	07/18/1985

Source: FEMA

Table 5-152 Ignition History in San Luis Obispo County, 2020-2024

IGNITION CAUSE	NUMBER	PERCENTAGE
Powerline/Vehicle/Equipment Use	97	74%
Debris Burning	11	8%
Campfire	5	4%
Arson	4	5%
Lightning	7	5%
Smoking	2	1.5%
Playing w/ Fire	5	4%

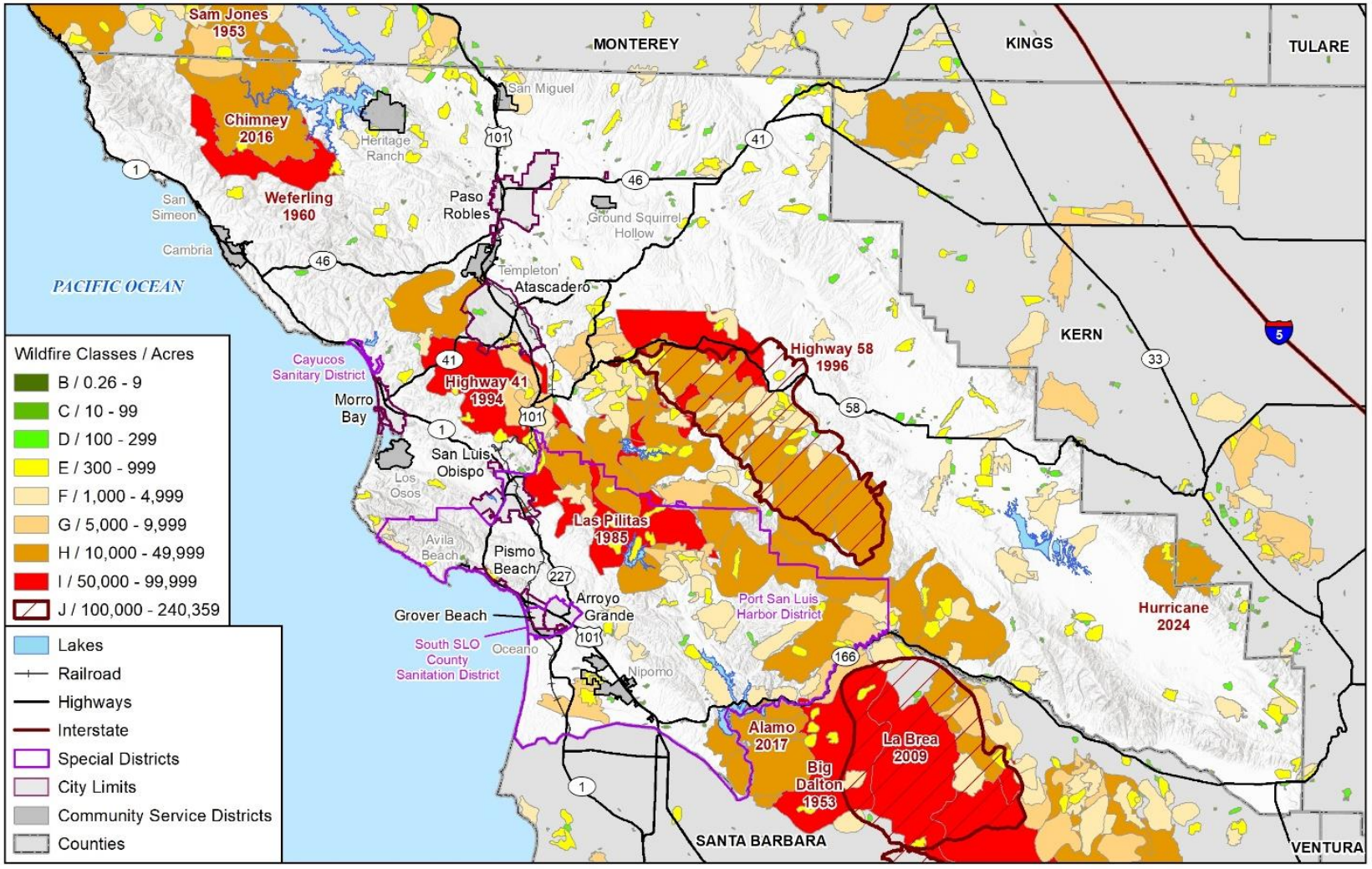
Source: SRA Ignition History for San Luis Obispo County (2020-2024)

5.3.15.5 Probability of Future Occurrences

Wildfires occur somewhere in the county annually thus the probability of future occurrences of wildfire in the planning area is rated as **highly likely.** Wildfire in the planning area is more frequent for relatively small fires and less frequent for large fires, and the chance of occurring is variable throughout the county. Overall, wildfire occurs regularly and is a chronic natural hazard. The achieved and statewide goal for CAL FIRE is to contain 95% of all fires to less than 10 acres in size.

From 2020-2023, 142 wildfires of 1.0 acres or larger have occurred in SLO County, an average of 35 per year. The majority of these wildfires are modest in size, though the largest wildfire over this time period burned nearly 3,000 acres (~4.5 mi^2). The county has experienced five wildfires over 20,000 acres (~30 mi^2) in size since 1990, an average of one per seven years (see section Previous Occurrences). HMPC review noted that the Cal Fire Redbook shows an even higher rate for the County.

Figure 5-96 Wildfires in San Luis Obispo County from 1912 to 2024



5.3.15.6 Climate Change Considerations

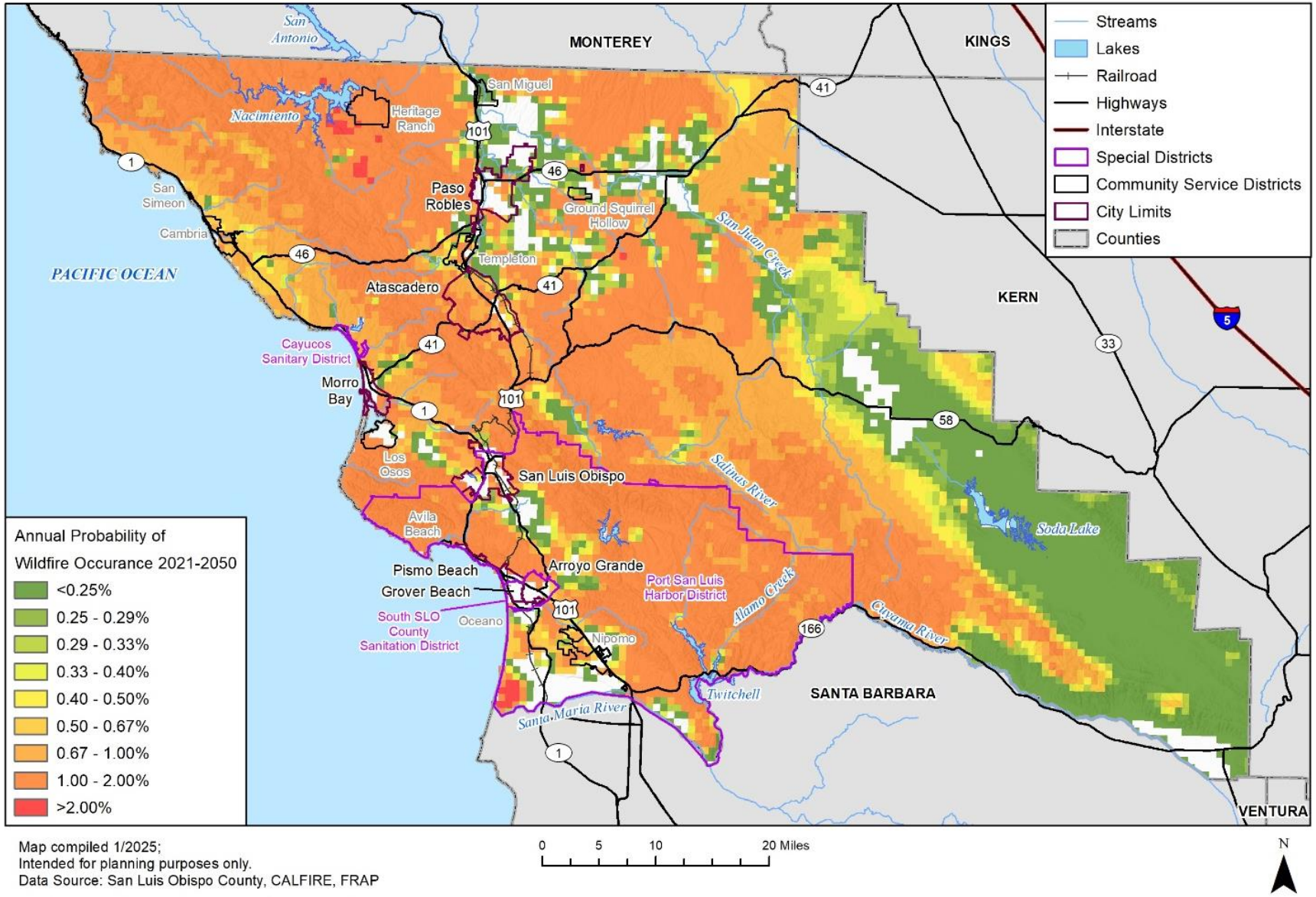
Climate change is, and will continue to, increase wildfire frequency and amplify its ability to spread rapidly. The Fifth National Climate Assessment (NCA5) chapter 28 (Southwest) explicitly documents that climate change has caused wildfires to become larger, more frequent, and more severe in the region.[8] This report notes that in 2020-2021, seven of the 10 largest wildfires in the U.S. occurred in California. More recently, CAL FIRE has documented the eight largest wildfires in California history have all occurred since 2018.[9] More recently, CAL FIRE has documented that 19 of the largest wildfires in California history have all occurred since 2003, 10 of them since 2020[10]. Similar statistics exist for the most destructive fires. The four most destructive are the 2018 Camp fire in Butte County that damaged and destroyed 18,804 structures and in January 2025 two fires in Los Angeles County that burned at the same time have combined damaged or destroyed 16,246 (preliminary) structures. In 2017 the Tubbs fire in Napa and Sonoma County damaged and destroyed 5,636 structures.

Recent study has found fire **behavior** in California is also being affected by climate change. For example, one well publicized study published in the journal ***Nature*** showed climate change is responsible for a 25% increase in the chance of extreme wildfire growth (>10,000 acres/day) in the state of California, relative to pre-industrial conditions.[11] The study then looked to the future and predicted increased risk of extreme wildfire growth by the year 2100 relative to what was observed from 2003-2020. Depending on the climate change scenario modeled, risk of extreme wildfire growth is projected to increase between 21% (low emissions scenario SSP1-2.6) and 107% (very high emissions scenario SSP5-8.5), relative to observed 2003-2020 conditions. The study applies to the state of California as a whole and the authors did not comment on variability in increased risk within the state. Similar to the rest of the global temperatures, California has been trending hotter average temperatures this decade. The summer of 2024 was officially California's hottest in the last 130 years.

Finally, CAL FIRE has a collaborative project with researchers from the University of California and George Washington University that provides the “Carbon Accounting Viewer” web page. This product maps projections of the probability of wildfire occurrence throughout California in coming decades (Figure 5-97). The CAL FIRE project exists to project the benefits of fuel-reduction efforts for GHG emissions from forest fires and is funded under the CAL FIRE CCI Forest Health Program, but the fire probability map product is useful for wildfire hazard planning purposes.

8 Fifth National Climate Assessment, 2021. Chapter 28: Southwest. https://nca2023.globalchange.gov/chapter/28/. p. 28-26 to 28-27.
9 CalFire (2024) *Top 20 Largest California Wildfires*. California Department of Forestry and Fire Protection. Accessed 12/20/2024 from CalFire Statistics webpage, https://www.fire.ca.gov/our-impact/statistics.
10 https://www.fire.ca.gov/our-impact/statistics
11 Brown, P. T., Hanley, H., Mahesh, A., Reed, C., Strenfel, S. J., Davis, S. J., ... & Clements, C. B. (2023). Climate warming increases extreme daily wildfire growth risk in California. *Nature*, *621*(7980), 760-766.

Figure 5-97 Annual Probability of Wildfire in San Luis Obispo County, 2021-2050



5.3.15.7 Vulnerability

The vulnerability of assets depends on their exposure to wildfire hazards and their susceptibility to damage from that exposure. Exposure to wildfire hazards in San Luis Obispo County is extensive. High fuel loads in the planning area along with geographical and topographical features create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, low relative humidity, and periodic winds, can result in frequent and sometimes intense, wide-spreading fires. Even the relatively flat and more urbanized parts of the county are not immune to fire; hot and sometimes windy weather combined with dry vegetation and a denser population can result in an increase in the number of ignitions.

Assets at Risk

Many people and infrastructure are vulnerable to wildfire risk throughout SLO County. Some communities are at greater risk due to the natural environmental conditions and built environmental conditions that are present in their area. Human life and safety is the primary priority of most wildfire hazard reduction projects occurring in SLO County. Environmental restoration projects are of vital importance as well, although they are commonly developed in strategic locations to provide risk reduction to buildings or infrastructure and to provide improved ecological health. Identifying assets at risk within SLO County allows project planners to develop wildfire risk reduction projects strategically to achieve multiple benefits. A non-comprehensive list of examples of major assets at risk:

- Population Hubs: San Luis Obispo, Paso Robles, Atascadero, the Five Cities area, Cambria, Los Osos, Morro Bay, Templeton, San Miguel, Shandon, Nipomo, Santa Margarita, and Cayucos
- Institutional Assets: California Polytechnic State University-San Luis Obispo (Cal Poly SLO), Cuesta College, California Men's Colony, Atascadero State Mental Hospital, California National Guard-Camp SLO, California National Guard-Camp Roberts, schools and hospitals
- Infrastructure Assets: Diablo Canyon Nuclear Power Plant, Union Pacific Railroad, utility lines, underground gas and petroleum pipelines, water treatment facilities, state water project, energy extraction sites, highways, communication sites, and roads
- Economic Assets: Business, industry, historic sites, jobs, Hearst Castle, tourism, wine, and agriculture
- Natural Assets: Oceano Dunes, Los Padres National Forest, Montaña de Oro State Park, BLM-Carrizo Plains National Monument, wildlife refuges and recreational beaches

The susceptibility of six classes of assets to damage from exposure to wildfire hazards is variable and is discussed addressed below in asset-specific subsections.

People

Estimates of populations at risk were based on a parcel-analysis and the count of residential structures in various fire hazard severity zones (see Structures subsection). As is shown in Table 5-154.

Table 5-153 Population and Improved Values Exposed to Very High and High Wildfire FHSZ by Jurisdictions

JURISDICTION	VERY HIGH & HIGH POPULATION	VERY HIGH & HIGH IMPROVED VALUES
Arroyo Grande	2,510	$426,346,456
Atascadero	5,183	$852,483,001
Grover Beach	-	$0
Morro Bay	1,973	$266,440,146
Paso Robles	4,464	$913,567,686
Pismo Beach	5,125	$1,235,014,679
San Luis Obispo City	8,413	$1,780,708,431
Unincorporated	48,140	$8,644,764,669
Total	**75,808**	**$14,119,325,068**

Source: San Luis Obispo Assessor Data November 15, 2024, CAL FIRE - FHSZ Phase 3 March 10, 2025, WSP GIS Analysis

Table 5-157, 75,808 people is estimated to live in High or Very High wildfire threat zones.

The actual exposed population changes based on time of day and time of year. For example, the population at California Polytechnic State University, San Luis Obispo (Cal Poly) increases during the academic year, and during daytime hours. Significant exposure of people can also occur in wildland recreational areas such as state and national parks and forests where persons might be recreating or even working. This is not reflected in place-of-residence data.

People are clearly susceptible to injury and death from wildfire hazards. Wildland fires can directly cause injury and loss of life to inhabitants of the fire area and firefighters. The health effects of particle pollution exposure can range from relatively minor (e.g., eye and respiratory tract irritation) to more serious health effects (e.g., exacerbation of asthma and heart failure, and premature death). Wildfires in or near the WUI frequently require emergency evacuation and sheltering, often for many days. Large destructive fires that destroy homes and businesses can dramatically reshape communities by causing property loss, social and economic disruption, and environmental damage.

Social Vulnerability

The potential for extended power outages as a result of a wildfire event requires special preparation by healthcare facilities and medically vulnerable individuals who are dependent on power for medical assessments and treatments. While the County and PG&E maintain lists of people who are medically vulnerable, individuals are only added by signing up on the lists are therefore the lists only include a portion of the people who may need assistance.

The loss of the internet and cellular services further impacts communities as that may be the only means people have of being alerted to an emergency and an evacuation. The ability to check on family and make emergency purchases could all be limited by the loss of these services. First responders have redundant communication systems, however the loss of these services encumber their ability.

As shown in Figure 5-94 the highest wildfire hazard severity zones are found east of Atascadero, northeast Avila Beach, and north of Grover Beach which happen to be also highest in terms of overall social vulnerability ranking based on the SVI data presented and discussed in subsection 4.4.1. Other areas of particular concern include Atascadero, Los Osos, and San Simeon, which rank medium-high on the vulnerability scale but are exposed to great wildfire hazard based on potential severity.

Social vulnerability factors such long response times for emergency resources, economic instability, and lack of mobility can amplify the risks associated to wildfire events. Much of the

County is characterized by agricultural lands and rural communities, where fire response times may be slower due to remote locations.

Structures

The historical and potential impacts of wildfire on property include crop loss, injury and death of livestock and pets, and damage to infrastructure, homes and other buildings located throughout the wildfire risk area, with greatest potential impact on property, buildings and infrastructure located within high and very high hazard zones including the WUI, and buildings and infrastructure located within forested lands, to include national forests and parks.

The Community Wildfire Threat used in this analysis was derived from the Fire Hazard Severity Zones (FHSZ) spatial dataset, which was explicitly developed for adopting new ignition-resistant building code standards and adopted by the California Building Commission in 2007. It is constructed to describe the nature and probability of fire exposure to structures, including those lands that are highly urbanized, but in close proximity to open wildlands. It is broken into State Responsibility Areas (SRA) and Local Responsibility Areas (LRA). Details of the FHSZ mapping project are available on the FRAP website (http://frap.fire.ca.gov/projects/hazard/fhz.html).

GIS was used to create a centroid, or point, representing the center of each parcel polygon, which was overlaid on the FHSZ wildfire layer. For the purposes of this analysis, the wildfire hazard zone that intersected the centroid was assigned as the hazard zone for the entire parcel. For purposes of this analysis, it was assumed that every parcel with an improved value greater than zero was developed in some way, thus only improved parcels and their values were analyzed. The Fire Hazard Severity Zones for the SRA and Very High zones in the LRA were analyzed. The county's parcel layer was used as the basis for the inventory of developed parcels. The results are summarized in the map and tables that follow.

An analysis of the value of those parcels – the improvement value plus estimated value of building contents – quantifies the potential losses from wildfires by severity zones. An estimated of over $35 billion worth of developed parcels are exposed in the Moderate, High and Very High Severity zones throughout San Luis Obispo County. Residential properties constitute more than half of both the number of parcels and the projected losses. The communities with the greatest exposure are the unincorporated areas, San Luis Obispo City, and Pismo Beach. The total values shown in these tables include both structure value and contents and can be used as an estimate of potential losses since wildfires typically result in a total loss. More detailed information on the types and value of properties exposed to wildfire hazard zones can be found in the jurisdictional annexes.

Table 5-154 Improved Parcels Exposed to Fire Hazard Severity Zones by Jurisdiction Summary

JURISDICTION	STRUCTURE COUNT VERY HIGH	STRUCTURE COUNT HIGH	STRUCTURE COUNT MODERATE	TOTAL STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	POPULATION
Arroyo Grande	0	1,080	537	**1,617**	$660,410,538	$366,758,604	$1,027,169,142	3,768
Atascadero	1,119	1,147	5,768	**8,034**	$2,429,926,549	$1,341,798,586	$3,771,725,135	18,423
Grover Beach	0	0	13	**13**	$3,375,182	$3,576,389	$6,951,571	7
Morro Bay	468	505	1,381	**2,354**	$648,174,242	$346,693,317	$994,867,559	4,859
Paso Robles	0	1,946	1,191	**3,137**	$1,495,724,710	$1,012,046,837	$2,507,771,547	7,407
Pismo Beach	1,641	1,292	373	**3,306**	$1,411,684,955	$836,950,355	$2,248,635,310	5,696
San Luis Obispo City	2,443	1,502	3,760	**7,705**	$3,374,771,994	$2,203,855,918	$5,578,627,912	15,870
Unincorporated	7,425	14,176	8,855	**30,456**	$12,367,263,814	$6,572,419,074	$18,939,682,888	68,192
Total	**13,096**	**21,648**	**21,878**	**56,622**	**$22,391,331,984**	**$12,684,099,078**	**$35,075,431,062**	**124,222**

Source: San Luis Obispo Assessor Data November 15, 2024, CAL FIRE - FHSZ Phase 3 March 10, 2025, WSP GIS Analysis

Table 5-155 Improved Parcel Exposed to Fire Hazard Severity Zones by Property Type

PROPERTY TYPE	STRUCTURE COUNT VERY HIGH	STRUCTURE COUNT HIGH	STRUCTURE COUNT MODERATE	TOTAL STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	POPULATION
Agricultural	143	146	118	**407**	$440,804,371	$440,804,371	$881,608,742	-
Commercial	440	687	683	**1,810**	$1,868,662,845	$1,868,662,845	$3,737,325,690	-
Exempt	62	72	93	**227**	$131,072,949	$131,072,949	$262,145,898	-
Industrial	29	132	114	**275**	$358,623,336	$537,935,004	$896,558,340	-
Mining	2	3	1	**6**	$26,032,402	$39,048,603	$65,081,005	-
Mixed Use	239	278	630	**1,147**	$356,556,078	$356,556,078	$713,112,156	-

PROPERTY TYPE	STRUCTURE COUNT VERY HIGH	STRUCTURE COUNT HIGH	STRUCTURE COUNT MODERATE	TOTAL STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	POPULATION
Mobile/Manufactured Homes	662	1,474	614	**2,750**	$504,293,927	$252,146,964	$756,440,891	6,810
Multi-Family Residential	249	443	598	**1,290**	$775,647,273	$387,823,637	$1,163,470,910	3,096
Residential	10,909	17,612	18,564	**47,085**	$17,340,097,255	$8,670,048,628	$26,010,145,883	114,316
Vacant Improved	361	801	463	**1,625**	$589,541,548	$0	$589,541,548	-
Total	**13,096**	**21,648**	**21,878**	**56,622**	**$22,391,331,984**	**$12,684,099,078**	**$35,075,431,062**	**124,222**

Source: San Luis Obispo Assessor Data November 15, 2024, CAL FIRE - FHSZ Phase 3 March 10, 2025, WSP GIS Analysis

Table 5-156 Improved Parcels Exposed to Fire Severity Zones by Community Service District

COMMUNITY SERVICE DISTRICT	STRUCTURE COUNT VERY HIGH	STRUCTURE COUNT HIGH	STRUCTURE COUNT MODERATE	TOTAL STRUCTURE COUNT	IMPROVED VALUE	ESTIMATED CONTENT VALUE	TOTAL VALUE	POPULATION
Avila Beach	-	227	-	**227**	$143,356,014	$98,263,618	$241,619,632	395
Cambria	912	1,744	1,269	**3,925**	$1,362,104,381	$738,914,436	$2,101,018,817	9,072
Ground Squirrel Hollow	-	383	-	**383**	$117,642,092	$58,735,545	$176,377,637	941
Heritage Ranch	288	1,653	-	**1,941**	$431,028,120	$219,840,064	$650,868,184	4,290
Los Osos	1,326	273	328	**1,927**	$603,385,521	$310,758,014	$914,143,535	4,616
Nipomo	-	398	982	**1,380**	$480,860,716	$252,753,512	$733,614,228	3,325
Oceano	-	-	179	**179**	$54,272,925	$28,435,249	$82,708,174	410
San Miguel	-	304	228	**532**	$143,365,488	$93,492,236	$236,857,724	1,176
San Simeon	-	-	186	**186**	$70,628,899	$52,631,870	$123,260,769	398
Templeton	-	314	548	**862**	$414,049,772	$269,730,440	$683,780,212	1,788
Total	**2,526**	**5,296**	**3,720**	**11,542**	**$3,820,693,928**	**$2,123,554,983**	**$5,944,248,911**	**26,412**

Source: San Luis Obispo Assessor Data November 15, 2024, CAL FIRE - FHSZ Phase 3 March 10, 2025, WSP GIS Analysis

Table 5-157 Population and Improved Values Exposed to Very High and High Wildfire FHSZ by Jurisdictions

JURISDICTION	VERY HIGH & HIGH POPULATION	VERY HIGH & HIGH IMPROVED VALUES
Arroyo Grande	2,510	$426,346,456
Atascadero	5,183	$852,483,001
Grover Beach	-	$0
Morro Bay	1,973	$266,440,146
Paso Robles	4,464	$913,567,686
Pismo Beach	5,125	$1,235,014,679
San Luis Obispo City	8,413	$1,780,708,431
Unincorporated	48,140	$8,644,764,669
Total	**75,808**	**$14,119,325,068**

Source: San Luis Obispo Assessor Data November 15, 2024, CAL FIRE - FHSZ Phase 3 March 10, 2025, WSP GIS Analysis

Table 5-158 Population and Improved Values Exposed to Very High and High Wildfire FHSZ by Community Service District

COMMUNITY SERVICE DISTRICT	VERY HIGH & HIGH POPULATION	VERY HIGH & HIGH IMPROVED VALUES
Avila Beach	395	$143,356,014
Cambria	6,007	$862,784,500
Ground Squirrel Hollow	941	$117,642,092
Heritage Ranch	4,290	$431,028,120
Los Osos	3,858	$503,763,707
Nipomo	978	$139,013,881
Oceano	-	$0
San Miguel	679	$93,359,128
San Simeon	-	$0
Templeton	543	$185,215,633
Total	**17,693**	**$2,476,163,075**

Source: San Luis Obispo Assessor Data November 15, 2024, CAL FIRE - FHSZ Phase 3 March 10, 2025, WSP GIS Analysis

Critical Facilities and Lifelines

Critical facilities are essential community assets needed to function during and after a disaster. Wildfires can severely impact these facilities through structural damage or destruction, endangerment of occupants, and disruption of vital operations and services. Maintaining the functionality of critical facilities during wildfire events is crucial for effective emergency response and community resilience. Wood timber bridges are particularly vulnerable to fire. GIS analysis shows three bridges have been rated as being in scour-critical (erosion of the riverbed or streambed around its foundations) conditions in very high wildfire hazard and twelve bridges have been rated as being scour-critical conditions in high wildfire hazard zones, which makes them even more vulnerable to failure or destruction during a post-fire flood or debris flow event. The table below summarizes how many bridges are at risk of which type of

wildfire hazard zone and includes the total of scour-critical and non-scour status bridges. Further details on the bridges at risk are found in Appendix E.

Table 5-159 Bridges Exposed to Fire Hazard Severity Zones by Risk and Type

FIRE HAZARD SEVERITY ZONES	BRIDGE TYPE	COUNT
Very High	Non-Scour Fair Condition Bridge	40
Very High	Non-Scour Good Condition Bridge	40
Very High	Non-Scour Poor Condition Bridge	2
Very High	Scour Fair Condition Bridge	3
Very High	**Total**	**85**
High	Non-Scour Fair Condition Bridge	63
High	Non-Scour Good Condition Bridge	53
High	Non-Scour Poor Condition Bridge	10
High	Scour Fair Condition Bridge	12
High	**Total**	**138**
Moderate	Non-Scour Fair Condition Bridge	55
Moderate	Non-Scour Good Condition Bridge	49
Moderate	Non-Scour Poor Condition Bridge	10
Moderate	Scour Fair Condition Bridge	3
Moderate	**Total**	**117**
	Grand Total	**340**

Source: San Luis Obispo County, National Bridge Inventory (2024), CAL FIRE - FHSZ Phase 3 March 10, 2025, WSP Analysis

Table 5-160 through Table 5-165 summarize the number and types of critical facilities found to be at risk of wildfires. These results were found by performing overlay analysis of the critical facilities and the wildfire hazard zone layers in GIS. Most of these facilities at very high and high risk are found in unincorporated portions of the county. Overall, a total of 671 critical facilities are found within wildfire hazard zones across the county, and most of these in high or very high hazard zones. The majority of these facilities are communications towers. Details on the specific properties at risk are found in Appendix E.

Table 5-160 Critical Facility Assets Exposed to Very High Hazard Severity Zones by Jurisdiction and FEMA Lifelines

JURISDICTION	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Atascadero	-	-	-	-	1	-	4	-	**5**
Morro Bay	-	-	-	-	1	-	1	2	**4**
Pismo Beach	-	-	1	-	2	5	9	1	**18**
San Luis Obispo City	4	-	1	-	5	8	15	-	**33**
Unincorporated	74	5	-	1	8	48	58	14	**208**

JURISDICTION	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Total	**78**	**5**	**2**	**1**	**17**	**61**	**87**	**17**	**268**

Source: San Luis Obispo County, CAL FIRE - FHSZ Phase 3 March 10, 2025, CalARP, HIFLD, NBI, NID, WSP Analysis

Table 5-161 Critical Facility Assets Exposed to High Hazard Severity Zones by Jurisdictions and FEMA Lifelines

JURISDICTION	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Atascadero	-	-	-	-	1	2	5	-	**8**
Paso Robles	-	-	-	5	1	5	8	1	**20**
Pismo Beach	2	-	-	-	-	1	5	-	**8**
San Luis Obispo City	1	-	1	-	4	6	4	-	**16**
Unincorporated	116	21	1	7	14	49	123	20	**351**
Total	**119**	**21**	**2**	**12**	**20**	**63**	**145**	**21**	**403**

Source: San Luis Obispo County, CAL FIRE - FHSZ Phase 3 March 10, 2025, CalARP, HIFLD, NBI, NID, WSP Analysis

Table 5-162 Critical Facility Assets Exposed to Very High Hazard Severity Zones by Community Service District and FEMA Lifelines

COMMUNITY SERVICE DISTRICT	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Cambria	6	-	-	2	-	24	2	-	**34**
Heritage Ranch	-	-	-	-	-	-	-	1	**1**
Los Osos	-	-	-	-	1	2	-	-	**3**
Total	**6**	**0**	**0**	**2**	**1**	**26**	**2**	**1**	**38**

Source: San Luis Obispo County, CAL FIRE - FHSZ Phase 3 March 10, 2025, CalARP, HIFLD, NBI, NID, WSP Analysis

Table 5-163 Critical Facility Assets Exposed to High Hazard Severity Zones by Community Service District and FEMA Lifelines

COMMUNITY SERVICE DISTRICT	COMMUNICATIONS	ENERGY	FOOD, HYDRATION, SHELTER	HAZARDOUS MATERIAL	HEALTH AND MEDICAL	SAFETY AND SECURITY	TRANSPORTATION	WATER SYSTEMS	TOTAL COUNT
Avila Beach	3	-	-	-	-	1	-	-	**4**
Cambria	5	-	1	-	1	2	2	-	**11**
Ground Squirrel Hollow	1	-	-	-	-	-	-	-	**1**
Heritage Ranch	1	-	-	-	1	1	-	1	**4**
Los Osos	2	-	-	-	-	-	-	-	**2**
Nipomo	-	-	-	-	-	-	-	1	**1**
San Miguel	4	2	-	-	-	3	7	-	**16**
Templeton	-	-	-	-	-	3	5	-	**8**
Total	**16**	**2**	**1**	**0**	**2**	**10**	**14**	**2**	**47**

Source: San Luis Obispo County, CAL FIRE - FHSZ Phase 3 March 10, 2025, CalARP, HIFLD, NBI, NID, WSP Analysis

Table 5-164 Critical Facility Assets Exposed to Fire Hazard Severity Zones by Jurisdiction

JURISDICTION	VERY HIGH		HIGH	MODERATE	TOTAL COUNT
Arroyo Grande	-	-	1	1	
Atascadero	5	8	37	50	
Grover Beach	-	-	1	1	
Morro Bay	4	-	6	10	
Paso Robles	-	20	6	26	
Pismo Beach	18	8	-	26	
San Luis Obispo City	33	16	20	69	
Unincorporated	208	351	219	778	
Total	268	403	290	961	

Source: San Luis Obispo County, CAL FIRE - FHSZ Phase 3 March 10, 2025, CalARP, HIFLD, NBI, NID, WSP Analysis

Table 5-165 Critical Facility Assets Exposed to Fire Hazard Severity Zones by CSD

COMMUNITY SERVICE DISTRICT		VERY HIGH	HIGH	MODERATE	TOTAL COUNT
Avila Beach	-	4	-	**4**	
Cambria	34	11	11	**56**	
Ground Squirrel Hollow	-	1	-	**1**	
Heritage Ranch	1	4	-	**5**	
Los Osos	3	2	4	**9**	
Nipomo	-	1	7	**8**	
Oceano	-	-	4	**4**	
San Miguel	-	16	3	**19**	
San Simeon	-	-	2	**2**	
Templeton	-	8	9	**17**	
Total	**38**	**47**	**40**	**125**	

Source: San Luis Obispo County, CAL FIRE - FHSZ Phase 3 March 10, 2025, CalARP, HIFLD, NBI, NID, WSP Analysis

Economy and Community Values

Wildfires pose substantial economic risks to affected regions, with consequences ranging from immediate financial burdens to long-term impacts. Economic Assets include: business, industry, historic sites, jobs, Hearst Castle, tourism, wine, and agriculture.

One of the most direct consequences is the destruction of property and critical infrastructure, necessitating extensive rebuilding efforts that strain local economies. Additionally, heightened wildfire activity may lead to increased insurance costs, affecting both residential and commercial property owners who face rising premiums. The economic impacts of wildfire include loss of property, direct agricultural sector job loss, secondary economic losses to businesses in or near wildland resources like parks and national forests, and loss of public access to recreational resources. Fire suppression may also require increased cost to local and state government for water acquisition and delivery, especially during periods of drought when water resources are scarce.

Effects on agriculture can be significant. In addition to the obvious impacts on crops and animals, wildland fire can have damaging effects on soil and water that will impact agriculture for an extended period of time. Wildfires pose a significant threat to the wine industry, causing direct damage to vineyards and infrastructure, and indirectly impacting wine quality through "smoke taint," which results in undesirable flavors in the wine.

Historic, Cultural, and Natural Resources

San Luis Obispo County also has substantial natural resources potentially at risk from wildfires. As noted earlier, fire is an important natural component of the ecosystem, and wildlands need to burn periodically to naturally maintain viable environments. However, wildfires can have negative impacts on natural resources such as forests, and wildlife habitats. In addition to damaging critical watersheds, post-fire runoff can pollute waterways further impacting water supplies.

Natural Assets that could be affected include the Oceano Dunes, Los Padres National Forest, Montaña de Oro State Park, BLM-Carrizo Plains National Monument, wildlife refuges and recreational beaches.

Natural resources are important to include in benefit-cost analyses for future projects and may be used to leverage additional funding for mitigation projects that also contribute to community goals for protecting natural resources. Recognizing and valuing natural assets creates opportunities to achieve multiple objectives. For example, protecting watersheds supports water quality and supply, sustains timber production, and promotes carbon sequestration, contributing to both environmental and economic resilience.

GIS analysis, shown in the tables below, indicates that 70 historic properties are potentially at risk to wildfires; 32 are in very high hazards, 24 are in high hazards and 14 are in moderate hazard potential areas.

Table 5-166 Historical Sites Exposed to Very High Fire Hazard Severity Zones by Jurisdictions

JURISDICTION	COUNT
Unincorporated	32
Total	**32**

Source: San Luis Obispo County, CAL FIRE - FHSZ Phase 3 March 10, 2025, WSP Analysis

Table 5-167 Historical Sites Exposed to High Fire Hazard Severity Zones by Jurisdictions

JURISDICTION	COUNT
San Luis Obispo City	2
Unincorporated	22
Total	**24**

Source: San Luis Obispo County, CAL FIRE - FHSZ Phase 3 March 10, 2025, WSP Analysis

Table 5-168 Historical Sites Exposed to Moderate Fire Hazard Severity Zones by Jurisdictions

JURISDICTION	COUNT
Morro Bay	1
Unincorporated	13
Total	**14**

Source: San Luis Obispo County, CAL FIRE - FHSZ Phase 3 March 10, 2025, WSP Analysis

Development Trends

Over time, development can increase vulnerability to wildfire. Development into forested and shrubland or grassland areas expands the wildland-urban interface and increasing the value of assets in fire hazard zones. To some extent, development can also make wildfire management and suppression more complex in WUI areas (Subsection *Extent*), potentially increasing exposure of assets to wildfire hazards.

Out of 2,440 structure count issued in San Luis Obispo County between 2019 and 2024, 13% (316) were for construction in the Very High severity zones, and another 38% (921) were within the High severity zone. Additional growth and development in areas of fire risk will continue to increase the exposure of the planning area to damaging wildfires. All new homes that are built in Moderate, High and Very High Fire Severity Zones are required to build to the strictest WUI fire regulations.

Risk Summary

The overall significance of wildfire in San Luis Obispo County is **High**. These events can cause extensive property damage, threaten lives, and disrupt critical infrastructure, making wildfire mitigation and preparedness essential for community resilience. Note that the jurisdictional ratings were determined by each jurisdiction.

- Scale of wildfire threat zones used by the California Fire and Resource Assessment Program (FRAP) of CAL FIRE is rated as Low, Moderate, High, Very High, Extreme.
- The county experiences several relatively smaller wildfires per year, with a major damaging fire every 7-8 years.
- Powerlines and vehicle or equipment use account for 74% of ignitions where the cause of the fire can be determined.
- *Effects on people:* Past wildfires in the county have not resulted in a large number of fatalities; however, wildfires can cause severe health impacts, displacement, property loss, and long-term economic hardship for affected residents.
- *Effects on property:* Wildfires can destroy homes, businesses, and critical infrastructure. Over 35 billion dollars' worth of property is at Very High, High, or moderate exposure to wildfire threat.
- *Effects on Economy and Community Values:* Wildfires impacts can include loss of property, direct agricultural sector job loss, secondary economic losses to businesses, and loss of public access to recreational resources.
- *Effects on Critical Facilities and Lifelines:* Wildfires can disrupt access to, or even destroy Critical Facilities and Lifelines. Based on GIS analysis of the Critical Facilities and Lifelines, there are a total of 671 of them found within moderate, high, or very high wildfire hazard zones, with most of those facilities in the unincorporated portions of the county. A total of 340 bridges were found to be in wildfire hazard zones.
- *Related Hazards:* Drought, Adverse Weather, Agricultural Pest Infestation and Plant Disease and Tree Mortality, Landslide and Debris Flow

Table 5-169 Hazard Risk Summary - Wildfire

JURISDICTION	GEOGRAPHIC EXTENT	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY	OVERALL SIGNIFICANCE
San Luis Obispo County	Extensive	Highly Likely	Critical	High
City of Arroyo Grande	Significant	Occasional	Limited	Medium
City of Atascadero	Extensive	Likely	Critical	High
City of Grover Beach	Limited	Occasional	Limited	Low
City of Morro Bay	Extensive	Highly Likely	Catastrophic	High
City of Paso Robles	Extensive	Highly Likely	Critical	High
City of Pismo Beach	Significant	Occasional	Critical	Medium
City of San Luis Obispo	Significant	Occasional	Limited	Medium
Avila Beach CSD	Significant	Likely	Limited	High
Cambria CSD	Extensive	Likely	Critical	High
Ground Squirrel Hollow CSD	Extensive	Occasional	Critical	High
Heritage Ranch CSD	Extensive	Likely	Catastrophic	High

JURISDICTION	GEOGRAPHIC EXTENT	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY	OVERALL SIGNIFICANCE
Los Osos CSD	Significant	Likely	Limited	High
Nipomo CSD	Significant	Occasional	Limited	Medium
Oceano CSD	Extensive	Likely	Critical	High
San Miguel CSD	Extensive	Highly Likely	Catastrophic	High
San Simeon CSD	Significant	Likely	Catastrophic	High
Templeton CSD	Significant	Likely	Limited	Medium
Cayucos Sanitary District	Significant	Occasional	Limited	Medium
Port San Luis Harbor District	Significant	Occasional	Critical	Medium
San Luis Obispo FCWCD	Extensive	Likely	Critical	High
South San Luis Obispo Sanitary District	Significant	Occasional	Limited	Low

5.3.16 Hazardous Materials Incidents

5.3.16.1 Hazard/Problem Definition

Generally, a hazardous material is a substance or combination of substances which, because of quantity, concentration, or physical, chemical, or infectious characteristics, may either cause or significantly contribute to, an increase in mortality or an increase in serious, irreversible, or incapacitating reversible, illness. Hazardous materials may also pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported, disposed of, or otherwise managed. Hazardous material incidents can occur while a hazardous substance is stored at a fixed facility, or while the substance is being transported along a road corridor or railroad line or via an enclosed pipeline or other linear infrastructure.

The U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA) all have responsibilities relating to the transportation, storage, and use of hazardous materials and waste The California Environmental Protection Agency (CalEPA) and Department of Toxic Substances Control (DTSC) are authorized by the U.S. EPA to enforce and implement federal hazardous materials laws and regulations within the state. At the local level, San Luis Obispo County's Environmental Health Department is the approved Certified Unified Program Agency (CUPA) responsible for administration of permitting, inspections, and enforcement for hazardous waste and hazardous materials programs. The CUPA administers the Hazardous Material Business Plan (HMBPs), California Accidental Release Prevention (Cal-ARP) program, and the Aboveground Storage Act, as well as permitting and inspection activities for hazardous waste generators, and onsite hazardous waste treatment facilities, and underground storage tanks.

According to the 2024 Emergency Response Guidebook, Hazardous materials can be divided into the following classes:

- Explosives
- Gases: flammable, non-flammable, not toxic gasses toxic gases
- Flammable liquids: flammable (flashpoint below 141 degrees Fahrenheit), combustible (flashpoint from 141 – 200 degrees)
- Flammable solids: spontaneously combustible, dangerous when wet
- Oxidizing substances and organic peroxides

- Toxic substances and infections substances
- Radioactive materials
- Corrosive substances
- Miscellaneous hazardous materials/dangerous goods and articles

It is also common to see hazardous materials releases as escalating incidents resulting from other hazards such as floods, wildfires, and earthquakes. The release of hazardous materials can greatly complicate or even eclipse the response to the natural hazards event that caused the spill.

5.3.16.2 Geographic Area

Hazmat incidents can occur at a fixed facility or during transportation. Table 5-170 breaks down the 2,224 hazardous materials incidents reported to the California Office of Emergency Services (Cal OES) Warning Center from 1994 through July 2024 based on location. These incidents include both transportation and fixed-facility incidents. This list in no way captures all hazardous material spills within the county, only those that were significant enough to be reported to Cal OES. The data indicates that hazardous materials incidents can occur across the county with a greater frequency in the more developed areas, notably the municipalities.

Table 5-170 Hazardous Materials Incidents in San Luis Obispo County by Jurisdiction, 1994-2024

JURISDICTION	INCIDENTS	JURISDICTION	INCIDENTS
San Luis Obispo City	542	Los Osos	33
Morro Bay	311	Shandon	21
Unincorporated County	223	Pozo	13
Arroyo Grande	185	San Miguel	12
Paso Robles	179	Creston	5
Avila Beach	115	Shell Beach	5
Atascadero	104	Cholame	3
Cambria	78	Cuyuma	2
Nipomo	72	New Cuyuma	2
Pismo Beach	74	Santa Maria	3
Santa Margarita	43	Baywood Park	1
San Simeon	44	Bradley	1
Templeton	32	California Valley	1
Cayucos	33	Camp Roberts	1
Grover Beach	35	Lake Nacimiento	1
Oceano	30	Lockwood	1
Guadalupe	18	Unknown	1

Source: Cal OES Spill Release Reporting https://www.caloes.ca.gov/office-of-the-director/operations/response-operations/fire-rescue/hazardous-materials/spill-release-reporting/), analysis by WSP.

Fixed Facilities

Hazardous materials facilities are identified and mapped by the counties they are located in, along with the types of materials stored there; facilities generally are located in and around developed areas. The San Luis Obispo County Office of Emergency Services administers the

Emergency Planning and Community Right-to-Know program for the planning area. Under Chapter 6.95, Article 2 of the California Health and Safety Code and the Federal Resource Conservation and Recovery Act (RCRA), any business storing quantities of hazardous materials greater than 55 gallons of liquid, 500 pounds of solid or 200 cubic feet of some compressed gasses must file a HMBP annually that establishes incident prevention measures, hazardous material handling protocols and emergency response and evacuation procedures.

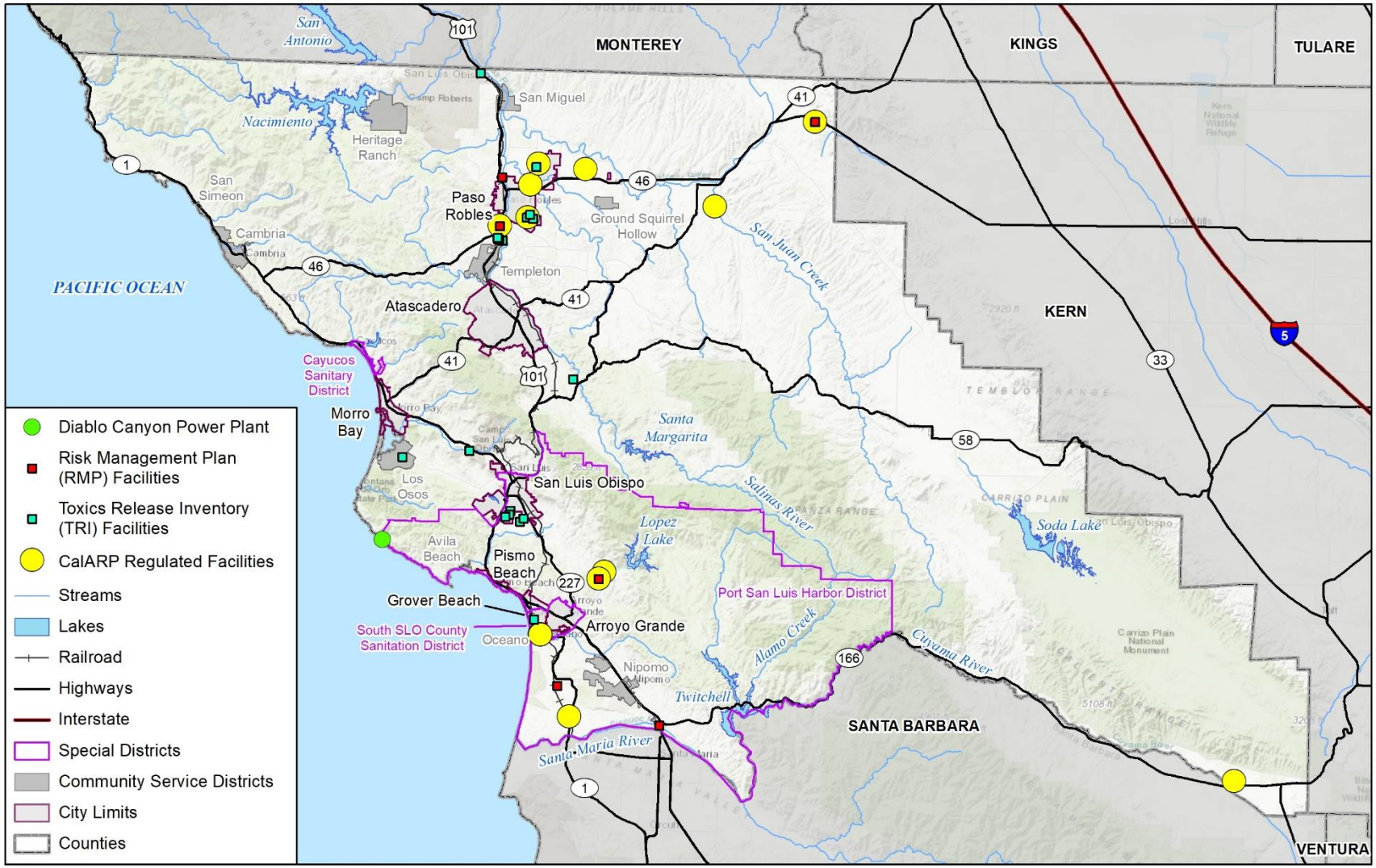
The EPA requires facilities containing certain extremely hazardous substances, above certain quantities generate Risk Management Plans (RMPs) and resubmit these plans every five years. According to the RTK NET, in April 2019 there were nine RMP facilities located in the county. These nine sites stored approximately 364,066 pounds of toxic chemicals, primarily ammonia (304,000 pounds), chlorine (56,400 pounds), and anhydrous ammonia (28,166 pounds). As of October 2024, there were 13 CalARP facilities located in the county. These 13 facilities stored Anhydrous Ammonia, Aqueous Ammonia, Sulfur Dioxide, and Chlorine.

The California Accidental Release Prevention Program (CalARP) is a statewide initiative to reduce the likelihood and severity of consequences of extremely hazardous materials releases that can cause serious harm to the public and the environment, and to minimize the damage if released do occur. CalARP requires certain facilities (referred to as "stationary sources") which handle specified chemicals (termed "regulated substances") to take specified actions to proactively prevent and prepare for chemical accidents. Because the CalARP program is implemented at the local government level by the CUPAs, they can work directly with regulated facilities. Figure 5-98 shows 13 CalARP-regulated facilities located in San Luis Obispo County.

Additionally, there are several offshore oil and gas drilling platforms to the southwest of Arroyo Grande that have the potential to cause significant oil spills.

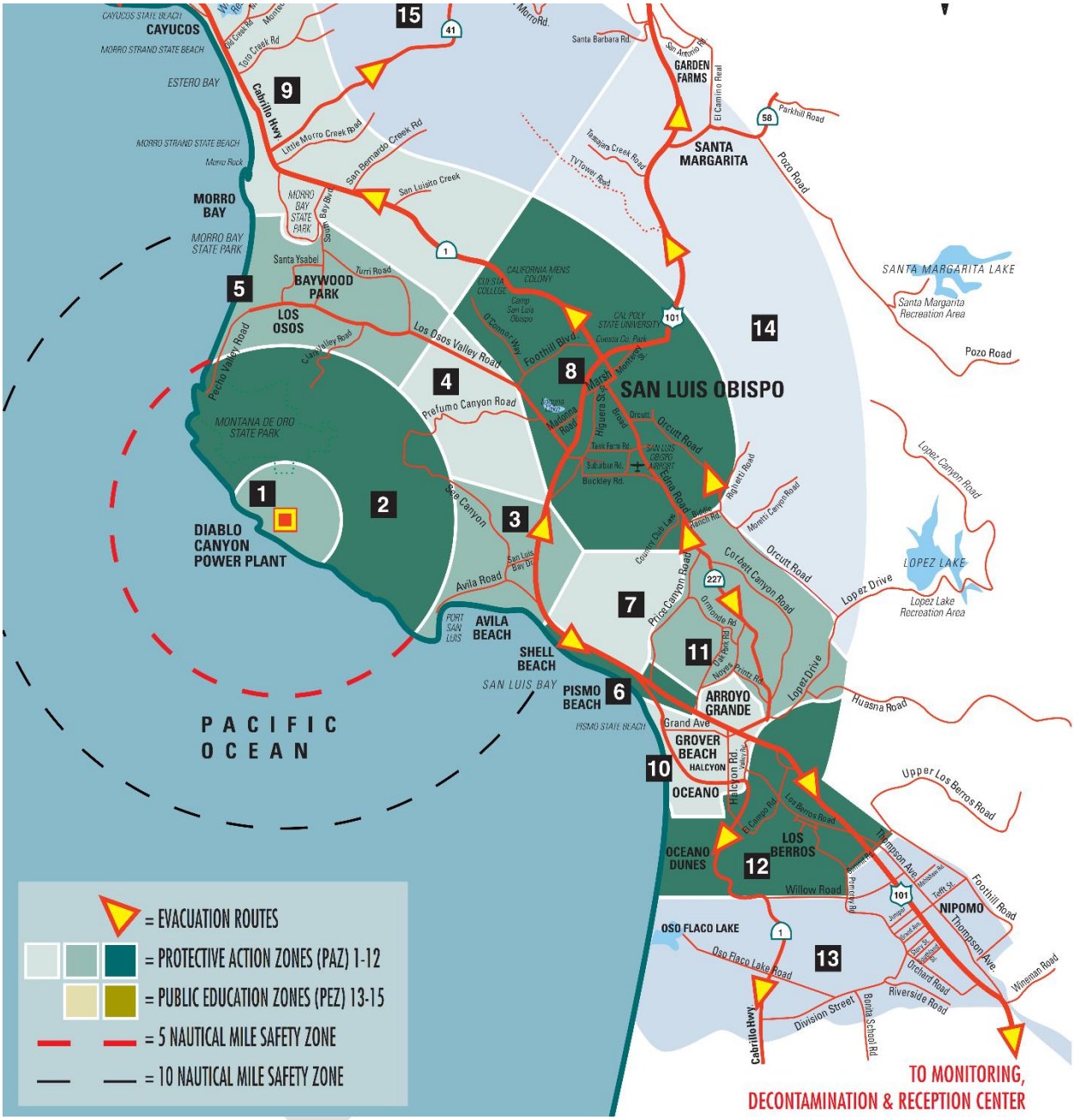
Finally, California's only operating nuclear power plant, the Diablo Canyon Nuclear Power Plant, is located in San Luis Obispo County west of Avila Beach. Jurisdictions located in the Emergency Planning Zones (1-12) for the plant include Avila Beach, the City of San Luis Obispo, Los Osos, Arroyo Grande, Grover Beach, Oceano, Pismo Beach, Shell Beach, Morro Bay, and Cayucos; these zones are shown in Figure 5-98 and Figure 5-99 below. Further details on the Emergency Planning Zones, as well as other information on hazards and vulnerabilities pertaining to the Diablo Canyon Power Plant, can be found in the San Luis Obispo County/Cities Nuclear Power Plant Emergency Response Plan. The plant's operator, Pacific Gas & Electric, has announced its intention to extend the operation of both of the Diablo Canyon reactors until 2030. It was previously 2025; however, the site will remain a hazardous materials site for decades. Figure 5-99 shows the emergency planning zones for the Diablo Canyon Nuclear Power Plant.

Figure 5-98 Significant Hazardous Materials Facilities in San Luis Obispo County



Map compiled 1/2025;
Intended for planning purposes only.
Data Source: San Luis Obispo County, CalARP, EPA, HIFLD

Figure 5-99 Diablo Canyon Nuclear Power Plant Emergency Planning Zones



Source: San Luis Obispo County, 2024

Transportation

In transit, hazardous materials generally follow major transportation routes, including road, rail and pipelines, creating a risk area immediately adjacent to these routes. The county's transportation network, primarily U.S. Route 101, and State Highways 1, 46, and 166, all have the potential for hazardous material incidents. Railroad lines and airports may also transport hazardous materials.

Hazardous materials releases can also result from natural disasters, such as floods or earthquakes that may cause containment systems to fail or affect transportation infrastructure.

In summary, hazardous material incidents have the potential to occur in business and industrial areas (where fixed facilities are located) and along transportation corridors. Often these facilities are concentrated in the planning area due to their manufacturing operations. Hazardous material incidents can also occur in agricultural areas; these types of facilities typically use pesticides, fertilizers, and other agricultural chemicals that are harmful to people and the environment. For example, agricultural pesticides and fertilizers are often transported daily around the planning area. Illegal drug operations and dumping sites have also been known to pose a hazardous materials threat.

Lastly, information provided by the National Pipeline Mapping System (NPMS) indicate several pipelines conveying gas or hazardous liquids crossing the planning area. Pipelines ruptures can result in major spills, or even explosions like the ones in San Bruno in 2010, and Fresno in 2015. The HMPC noted that high-pressure gas and petroleum pipelines to Kern County cross the San Andreas fault.

5.3.16.3 Extent (Magnitude/Severity)

Hazardous materials come in the form of explosives, flammable and combustible substances, poisons and radioactive materials. Hazards can occur during production, manufacturing, storage, transportation, use, or disposal. Impacts from hazardous materials releases can include:

- Fatalities
- Injury
- Evacuations
- Property damage
- Animal fatalities (livestock, fish & wildlife)
- Air pollution
- Surface or ground water pollution/contamination
- Interruption of commerce and transportation

Numerous factors influence the impacts of a hazardous materials release, including the type and quantity of material, location of release, method of release, weather conditions, and time of day. This makes it difficult to predict precise impacts. The impact to life and property from any given release depends primarily on:

- The type and quantity of material released.
- The human act(s) or unintended event(s) necessary to cause the hazard to occur.
- The length of time the hazard is present in the area.
- The tendency of a hazard, or that of its effects, to either expand, contract, or remain confined in time, magnitude, and space.
- Characteristics of the location and its physical environment that can either magnify or reduce the effects of a hazard.

CAL FIRE notes several additional factors that can contribute to the impact of hazardous materials releases from a fixed facility or transportation incident:

- Solid, liquid, and/or gaseous hazardous materials can be released from fixed or mobile containers either accidentally or on purpose.

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- The resulting release can last for hours or for days.
- The substances released may be corrosive or otherwise damaging over time, and they may cause an explosion and/or fire.
- Contamination may be carried out of the area by people, vehicles, water, and/or wind.
- Weather conditions will directly affect how the hazard develops.
- The micrometeorological effects of buildings and terrain can alter travel and duration of agents.
- Shielding in the form of sheltering in place can protect people and property from harmful effects.
- Noncompliance with fire and building codes as well as failure to maintain existing fire protection and containment features can substantially increase the damage from a hazardous materials release.

The release or spill of hazardous materials can also require different emergency responses depending on the amount, type, and location of the spill incident.

As noted above, the county contains a number of facilities that store and use significant quantities of hazardous materials. Additionally, a variety of hazardous materials are transported through the county by highway, rail, and pipelines, all of which are potentially vulnerable to accidental spills. Consequences can vary depending on whether the spill affects a populated area versus an unpopulated but environmentally sensitive area.

Potential losses can vary greatly for hazardous material incidents. For even a small incident, there are cleanup and disposal costs. In a larger scale incident, cleanup can be extensive and protracted. There can be deaths or injuries requiring doctor's visits and hospitalization, disabling chronic injuries, soil and water contamination can occur, necessitating costly remediation. Evacuations can disrupt home and business activities. Large-scale incidents can easily reach $1 million or more in direct damages, with clean-ups that can last for years.

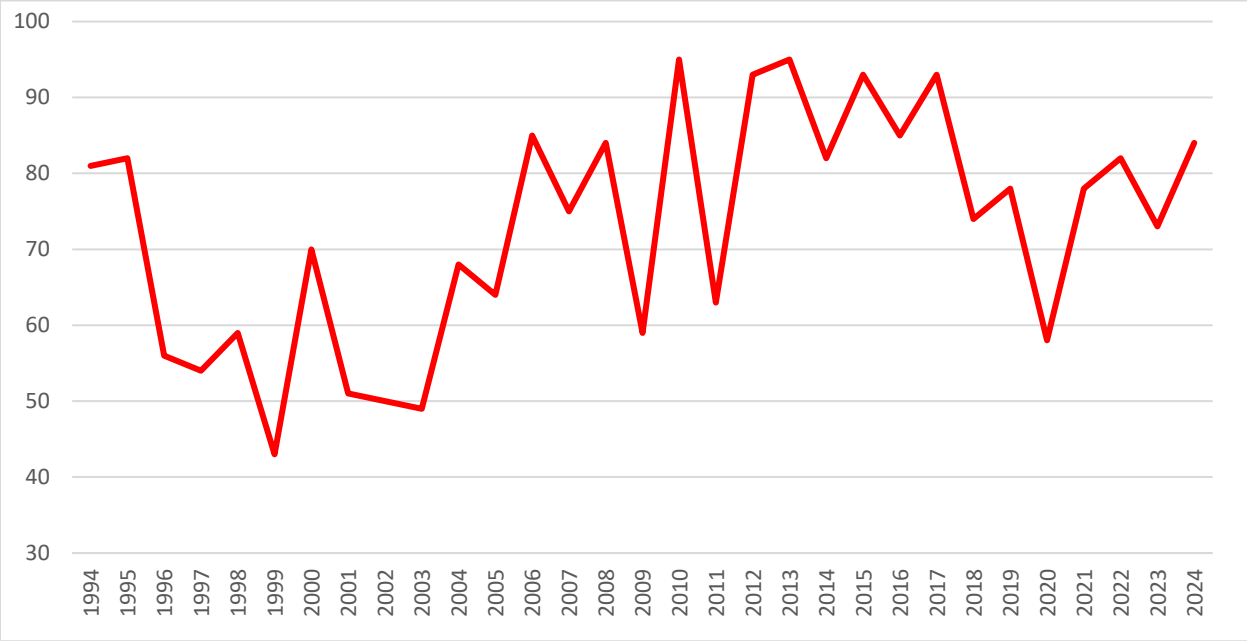
5.3.16.4 Previous Occurrences

San Luis Obispo County experiences multiple hazardous materials incidents every month. The vast majority of these incidents are minor with very localized impacts. However, the county also has a history of more serious incidents. On August 10, 1986, a train derailment including three tank cars containing 31,000 gallons of liquid isobutane led to a precautionary evacuation of 3,000 people in Grover Beach and Oceano; fortunately, there were no leaks or explosions, and no injuries from the incident. In the 1990s a massive oil spill caused by decades of seepage from corroded oil pipelines was discovered underneath the town of Avila Beach, the cleanup of which generated more than 6,750 truckloads of contaminated material. On October 3, 2001, an anhydrous ammonia leak developed in a refrigeration system that was being dismantled at a fish handling facility just above the harbor; the incident resulted in the temporary evacuation of an estimated 3,000 people for approximately nine hours and generated significant nationwide media attention.

The former EPA's Right-to-Know Network (RTK NET) records 726 hazardous materials incidents in San Luis Obispo County reported to the EPA from 1987 through 2018, an average of 22.7 per year. However, only the most serious spills are reported to the EPA. The Cal OES Warning Center reports 2,256 hazardous materials incidents in San Luis Obispo County from 1994 through December 20, 2024; this works out to an average of 75.2 incidents per year. Even this total likely excludes a large number of unreported minor spills.

Figure 5-100 below shows the number of incidents in San Luis Obispo County reported to Cal OES over the last 30 years. It shows that the number of recorded hazardous materials incidents in the county has increased from an average of less than 60 per year in the 1990s to the low 80s in recent years.

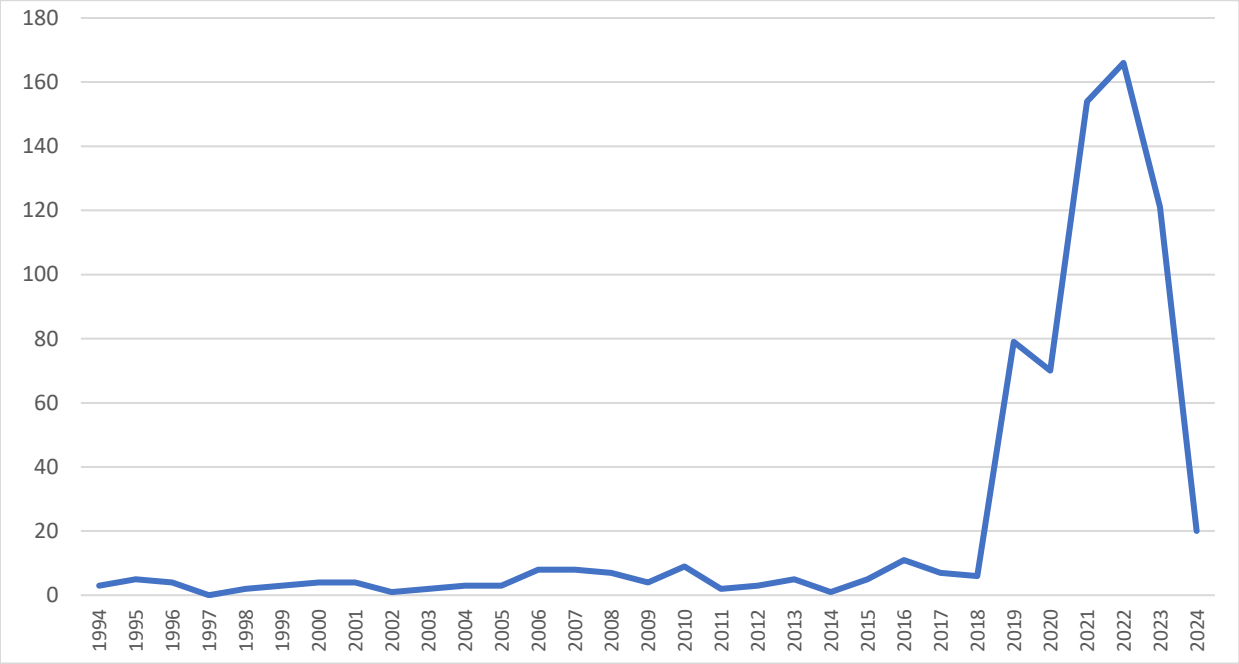
Figure 5-100 Hazardous Materials Incidents in San Luis Obispo County, 1994-2024



Source: Cal OES Spill Release Reporting (https://www.caloes.ca.gov/cal-oes-divisions/fire-rescue/hazardous-materials/spill-release-reporting), analysis by WSP

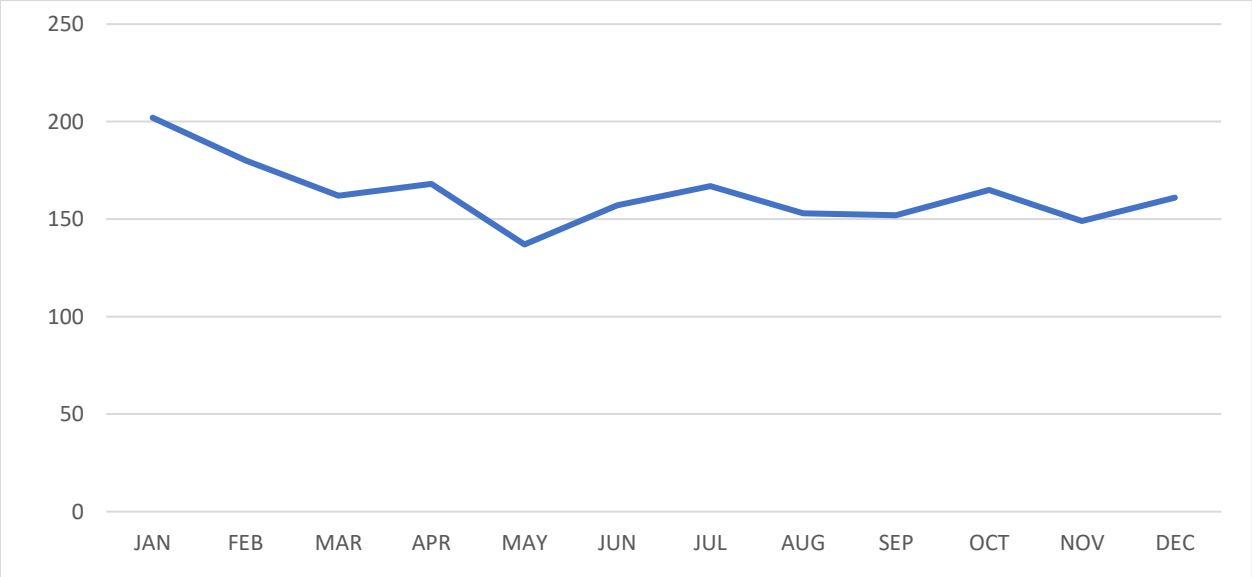
The vast majority of hazardous materials incidents have only minimal life safety impacts. Of the 2,256 incidents Cal OES reports in San Luis Obispo County from 1994 through December 20, 2024, 720 (31%) have resulted in any injuries, fatalities, or evacuations. This translates to an average of 24 damaging hazardous materials incidents per year where life safety is impacted. Figure 5-101 shows that the number of these damaging incidents with injuries/fatalities has increased from 2-3 per year in the late 90s to 3-5 per year more recently (over 160 when counting evacuation). In all, Cal OES recorded 12 fatalities, 16 injuries, and 582 people evacuated that were associated with those incidents between 2018-2024. This is an average of 2 fatalities, 2.6 injuries, and 97 individuals requiring evacuation per year.

Figure 5-101 Hazardous Materials Incidents in San Luis Obispo County Resulting in Injuries, Fatalities, or Evacuations, 1994-2024



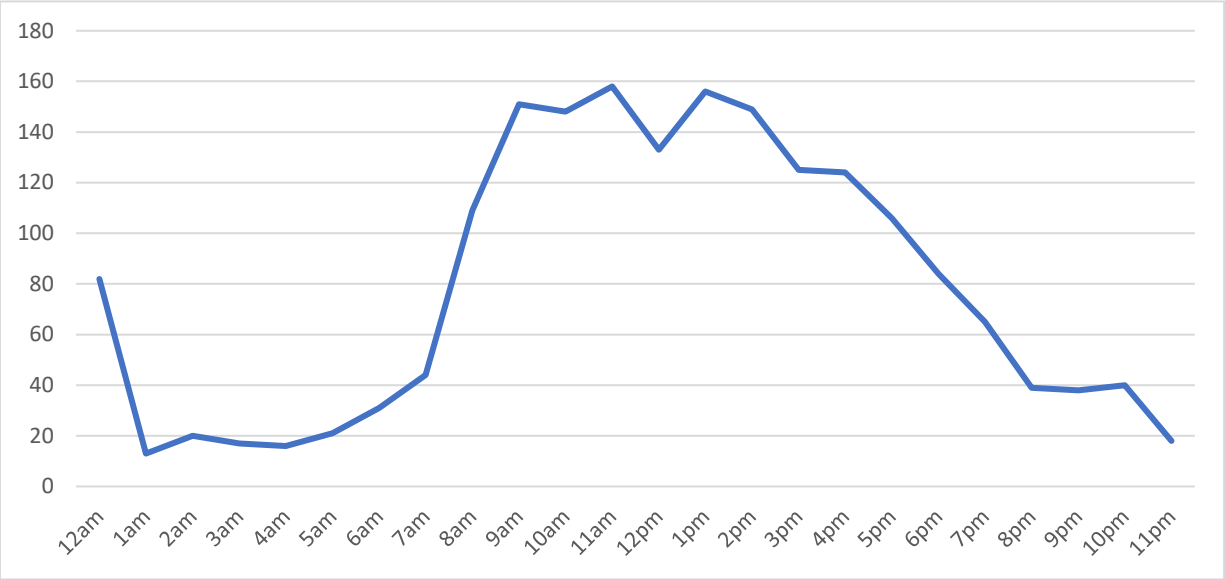
Analysis of the Cal OES data shows a great deal of variation from month-to-month and year-to-year. As shown in Figure 5-102 Hazardous materials incidents are slightly more likely in the winter (6.6 incidents per month on average) and slightly less common in the summer (5.6 incidents per month on average) but occur regularly in all months. Hazardous materials incidents are more common during the daytime hours, as shown in Figure 5-103.

Figure 5-102 Hazardous Materials Incidents by Month



Source: Cal OES Spill Release Reporting (https://www.caloes.ca.gov/cal-oes-divisions/fire-rescue/hazardous-materials/spill-release-reporting), analysis by WSP, 2018-2024

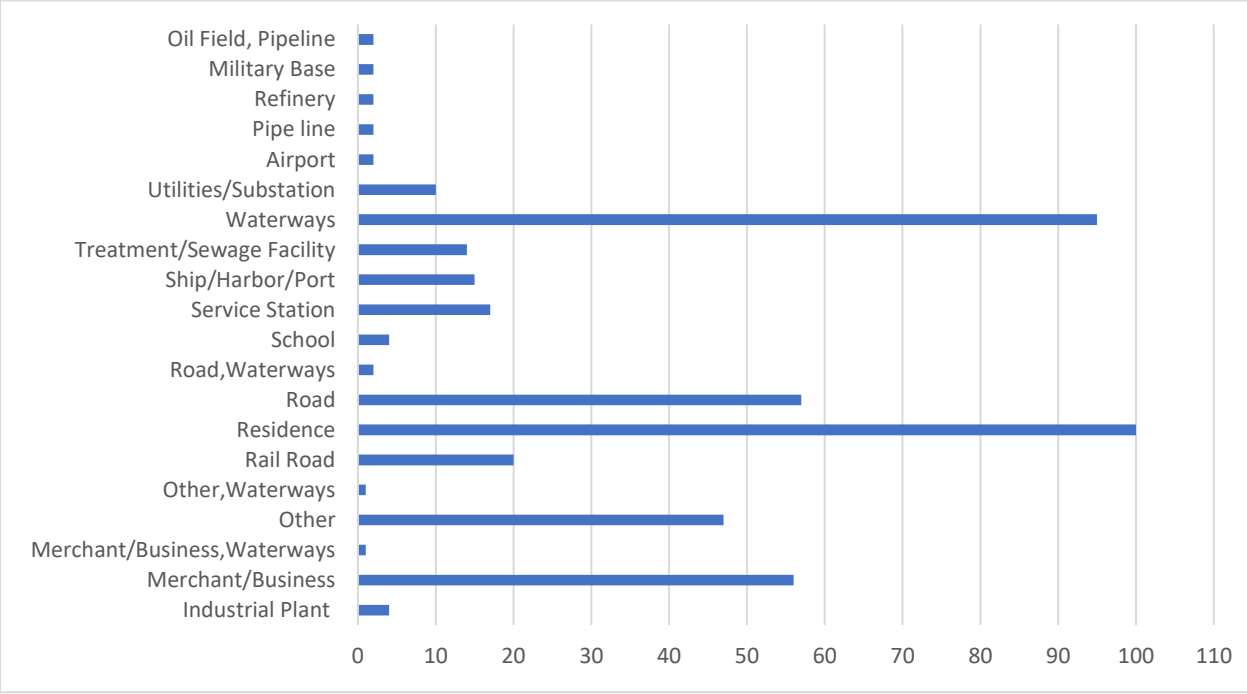
Figure 5-103 Hazardous Materials Incidents by Time of Day



Source: Cal OES Spill Release Reporting (https://www.caloes.ca.gov/cal-oes-divisions/fire-rescue/hazardous-materials/spill-release-reporting), analysis by WSP.

Figure 5-104 breaks down the incidents reported to Cal OES by location of incident from 2019-2024. While fixed site incidents make up the largest category, combining all the transportation-related categories (road, waterway, and rail) reveals that transportation incidents are far more common than fixed site incidents, at 252 incidents (55%) compared to 173 (38%) for fixed site (business, residence, service station).

Figure 5-104 Hazardous Materials Incidents by Location



Source: Cal OES Spill Release Reporting (https://www.caloes.ca.gov/cal-oes-divisions/fire-rescue/hazardous-materials/spill-release-reporting), analysis by WSP.

Upon reviewing the data provided from CalOES, the most common substances involved in Hazardous Material releases in San Luis Obispo County are various petroleum products and fuels including natural gas vapor. This is closely followed by sewage, wastewater, and ammonia.

5.3.16.5 Probability of Future Occurrences

Between 2019-2024 the county experienced between 58-84 hazardous materials incidents per year, with an average of 1.4 fatalities, 2.4 injuries, and 1.2 incidents requiring evacuations per year. Hazardous material incidents have been averaging 75 per year over the last six years. They can occur at any time and with little predictability given the presence of multiple major transportation routes in the planning area, as well as multiple facilities that store and use hazardous materials. With the increase in shipping of hazardous materials in populated areas, and the number of past occurrences, it is highly likely that hazardous material incidents will continue to happen in San Luis Obispo County.

5.3.16.6 Climate Change Considerations

There are no known effects of climate change on human-caused hazards such as hazardous material incidents.

5.3.16.7 Vulnerability

Structures

The impact of a fixed hazardous facility, such as a chemical processing facility is typically localized to the property where the incident occurs. The impact of a small spill (i.e., liquid spill) may also be limited to the extent of the spill and remediated if needed. However, major spills can have significant cleanup costs and may cause long term environmental and health impacts, including soil contamination, water pollution, and air quality issues. These effects can extend beyond the immediate property and require extensive remediation efforts.

People

Hazardous materials incidents can cause injuries, hospitalizations, and even fatalities to people nearby. People living near hazardous facilities and along transportation routes may be at a higher risk of exposure, particularly those living or working downstream and downwind from such facilities. For example, a toxic spill or a release of an airborne chemical near a populated area can lead to significant evacuations and have a high potential for loss of life.

In addition to the immediate health impacts of releases, a handful of studies have found long term health impacts such as increased incidence of certain cancers and birth defects among people living near certain chemical facilities. However there has not been sufficient research done on the subject to allow detailed analysis.

Social Vulnerability

While hazardous material incidents could take place anywhere across the county and may be unpredictable, those living near HazMat facilities or along transportation routes that additionally happen to be socially vulnerable would be of highest concern. Based on a combination of the SVI data presented and discussed in subsection 4.4.1 and the presence of major transportation routes and EPA or CalARP regulated facilities, the most vulnerable populations include Paso Robles, Atascadero, San Luis Obispo, Arroyo Grande, Grover Beach, Oceano and Nipomo. In addition, agricultural workers are the most vulnerable to pesticide exposure.

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Critical Facilities and Lifelines

Impacts of hazardous material incidents on critical facilities are most often limited to the area or facility where they occurred, such as at a transit station, airport, fire station, hospital, or railroad. However, they can cause long-term traffic delays and road closures resulting in major delays in the movement of goods and services. These impacts can spread beyond the planning area to affect neighboring counties, or vice-versa. While cleanup costs from major spills can be significant, they do not typically cause significant long-term impacts to critical facilities.

Economy and Community Values

The primary economic impact of hazardous material incidents results from lost business, delayed deliveries, property damage, and potential contamination. Large and publicized hazardous material-related events can deter tourists and recreationists and could potentially discourage residents and businesses. Economic effects from major transportation corridor closures can be significant.

Historic, Cultural, and Natural Resources

Hazardous material incidents may affect a small area at a regulated facility or cover a large area outside such a facility. Widespread effects occur when hazards contaminate the groundwater and eventually the municipal water supply, or they migrate to a major waterway or aquifer. Impacts on wildlife and natural resources can also be significant depending on the location of the incident.

Development Trends

The number of hazardous materials that are stored, used, and transported across the county is expected to increase over the next five years driven by regional growth trends. As discussed previously, the number of hazardous materials incidents in San Luis Obispo County has been increasing roughly 5% a year for the last twenty years and is likely to continue to increase. Future development is also expected to increase the number of people potentially exposed to the impacts of hazardous materials incidents.

Risk Summary

The overall significance of hazardous materials incidents in San Luis Obispo County is Low. While these incidents occur frequently with little-to-no warning, both at fixed sites and along transportation routes throughout the county, most are relatively considered minor incidents. The possibility of a major spill impacting a major populated area does exist, historically, however, the impacts of these incidents on the county have been fairly limited.

- The County experiences between 80-90 hazardous materials incidents per year,
- Cal OES recorded 12 fatalities, 16 injuries, and 582 people evacuated that associated with those hazardous materials incidents between 2018-2024. This is an average of 2 fatalities, 2.6 injuries, and 97 individuals requiring evacuation per year.
- transportation incidents are far more common than fixed site incidents, at 252 incidents (55%) compared to 173 (38%) for fixed site (business, residence, service station).
- Hazardous materials releases can complicate response to and recovery from natural disasters such as floods and earthquakes.
- *Effects on people:* Hazardous Materials incidents can cause injuries and fatalities, as well as long term health problems like increased cancer risks.
- *Effects on property:* Impacted properties can require cleanup, but the effects are usually localized to the site of the release.

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- *Effects on Economy and Community Values:* Extended road closures can result in economic losses and impact tourism.
- *Effects on Critical Facilities and Lifelines:* Impacted facilities and infrastructure can require cleanup, but the effects are usually localized to the site of the release.
- *Related Hazards:* Earthquake, Flood, Tsunami.

Table 5-171 Hazard Risk Summary - Hazardous Materials

JURISDICTION	GEOGRAPHIC EXTENT	PROBABILITY OF FUTURE OCCURRENCE	MAGNITUDE/ SEVERITY	OVERALL SIGNIFICANCE
San Luis Obispo County	Limited	Highly Likely	Negligible	Low
City of Arroyo Grande	Limited	Highly Likely	Negligible	Medium
City of Atascadero	Significant	Likely	Limited	Medium
City of Grover Beach	Limited	Highly Likely	Negligible	Low
City of Morro Bay	Limited	Highly Likely	Negligible	Medium
City of Paso Robles	Limited	Highly Likely	Negligible	Low
City of Pismo Beach	Limited	Highly Likely	Limited	Medium
City of San Luis Obispo	Limited	Highly Likely	Negligible	Medium
Avila Beach CSD	Limited	Highly Likely	Negligible	Medium
Cambria CSD	Limited	Highly Likely	Negligible	Low
Ground Squirrel Hollow CSD	Limited	Highly Likely	Negligible	N/A
Heritage Ranch CSD	Limited	Highly Likely	Negligible	N/A
Los Osos CSD	Limited	Highly Likely	Negligible	N/A
Nipomo CSD	Limited	Highly Likely	Negligible	Medium
Oceano CSD	Limited	Highly Likely	Negligible	N/A
San Miguel CSD	Limited	Highly Likely	Negligible	Medium
San Simeon CSD	Limited	Highly Likely	Negligible	Medium
Templeton CSD	Significant	Occasional	Negligible	Medium
Cayucos Sanitary District	Limited	Highly Likely	Negligible	Low
Port San Luis Harbor District	Extensive	Unlikely	Catastrophic	High
San Luis Obispo FCWCD	Limited	Highly Likely	Negligible	Medium
South San Luis Obispo Sanitary District	Limited	Highly Likely	Negligible	Low

5.4 Temporary Bibliography Section (to be added to the all-HMP bibliography)

From Adverse Weather

- Arcuni 2019
- NOAA 2015
- NOAA 2018

Added sourced news from Coastal Storm and Sea Level Risk

- California Ocean Protection Council. (2024). *State of California Sea Level Rise Guidance: 2024 Science and Policy Update*. Retrieved from https://opc.ca.gov/wp-content/uploads/2024/05/California-Sea-Level-Rise-Guidance-2024-508.pdf
- Moffatt & Nichol. 2020. *City of Pismo Beach Sea Level Rise Adaptation Plan*. Prepared for the City of Pismo Beach, CA. Accessed February 12, 2025. https://www.pismobeach.org/DocumentCenter/View/55172/Sea-Level-Rise-Adaptation-Plan.
- Fugro West, Inc. 2002. *1992 Bluff Erosion Study Update: Private Lots, North Cypress Street to Bluff Drive, Pismo Beach, California*. Prepared for the City of Pismo Beach. Accessed February 12, 2025. https://pismobeach.org/DocumentCenter/View/109/1992-Bluff-Erosion-Study-Update?bidId=
- USGS 2024. *Coastal Change Hazards: Sea-Level Rise and Storm Impacts*. USGS Publications Warehouse. Retrieved from https://www.usgs.gov/centers/pcmsc/science/coastal-change-hazards-sea-level-rise-and-storm-impacts.
- USGS. 2024. Historical coastal cliff retreat along the California coast. USGS Publications Warehouse. Retrieved from https://pubs.usgs.gov/publication/ofr20071133#:~:text=Due%20to%20the%20geomorphology%20of,population%20pressures%20in%20this%20area.
- NASA. *How Do Tide Gauges Measure Sea Level Change*? NASA Sea Level Change Portal, 2024. Accessed February 12, 2025. https://sealevel.nasa.gov/faq/20/how-do-tide-gauges-measure-sea-level-change/.
- NASA, "How Do Satellites Measure Sea-Level Change?" *NASA Sea Level Change Portal*, 2024, accessed February 12, 2025, https://sealevel.nasa.gov/faq/19/how-do-satellites-measure-sea-level-change/.
- NASA. 2024. "Which Are More Accurate in Measuring Sea-Level Rise: Tide Gauges or Satellites?" *NASA Sea Level Change Portal*. Accessed February 12, 2025. https://sealevel.nasa.gov/faq/21/which-are-more-accurate-in-measuring-sea-level-rise-tide-gauges-or-satellites/.
- NOAA 2024. *Climate change: Global sea level.* NOAA Climate.gov. Retrieved from https://climate.gov/news-features/understanding-climate/climate-change-global-sea-level
- NOAA 2024. *Defining nationally consistent coastal flood severity thresholds.* NOAA National Centers for Coastal Ocean Science. Retrieved from https://coastalscience.noaa.gov/project/defining-nationally-consistent-coastal-flood-severity-thresholds/
- NWS 2024. *Warning definitions: Coastal flood watch, warning, and advisory.* NOAA National Weather Service. Retrieved from https://www.weather.gov/lwx/warningsdefined

Added sources from Dam section:

- California Division of Safety of Dams. 2021. *Definitions for Downstream Hazard and Condition Assessment*. California Department of Water Resources. Accessed February 12, 2025. https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/Division-of-Safety-of-Dams/Files/Publications/Division-of-Safety-of-Dams-Definitions-for-Downstream-Hazard-and-Condition-Assessment.pdf.
- FEMA (Federal Emergency Management Agency). 2020. *Dam Safety Awareness Fact Sheet*. Washington, DC: U.S. Department of Homeland Security. Accessed February 12, 2025. https://www.fema.gov/sites/default/files/2020-08/fact-sheet_dam-awareness.pdf.

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- Federal Emergency Management Agency (FEMA). *Dam Safety: Inundation Mapping of Flood Risks*. August 2020. https://www.fema.gov/sites/default/files/2020-08/fema_dam-safety_inundation-mapping-flood-risks.pdf.

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6 Capability Assessment

Thus far, the planning process has identified the hazards posing a threat to San Luis Obispo County and described, in general, the vulnerability of the County to these risks. The next step is to assess what loss prevention mechanisms are already in place. This part of the planning process is the mitigation capability assessment. Combining the risk assessment with the mitigation capability assessment results in the County's "net vulnerability" to disasters and more accurately focuses the goals, objectives, and proposed actions of this plan.

As such, this section presents San Luis Obispo County's mitigation capabilities: programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. It also identifies select state and federal departments/agencies that can supplement the County's mitigation capabilities. This assessment is divided into four sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities and hazard specific capabilities. Information about capabilities specific to the other participating jurisdictions can be found in the jurisdictional annexes.

The HMPC used a two-step approach to conduct this assessment for the County. First, an inventory of common mitigation activities was made through the use of a matrix. The purpose of this effort was to identify policies and programs that were either in place, needed improvement, or could be undertaken, if deemed appropriate. Second, the HMPC reviewed existing policies, regulations, plans, and programs to determine if they contributed to reducing hazard-related losses or if they inadvertently contributed to increasing such losses. During the 2025 update, this section was reviewed by County staff and the WSP consultant team to update information where applicable.

This update process afforded the County and its participating jurisdictions the opportunity to review their previous capabilities and note the ways in which these capabilities have improved or expanded since the adoption of the previous plan. Additionally, in summarizing their current capabilities and identifying gaps, plan participants also considered their ability to expand or improve upon existing policies and programs as potential new mitigation strategies. Section 7 Mitigation Strategy includes mitigation actions aimed at improving community capability to reduce hazard risk and vulnerability.

6.1 San Luis Obispo County's Regulatory Mitigation Capabilities

Table 6-1 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in San Luis Obispo County.

Excerpts from applicable policies, regulations, plans, and program descriptions follow to provide more detail on existing mitigation capabilities. For each of the profiled hazards, several ordinances, regulations, plans and programs were identified in various communities within County. These are listed here to serve as a reference for related planning efforts.

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Table 6-1 San Luis Obispo's Regulatory Mitigation Capabilities

REGULATORY TOOL (ORDINANCES, CODES, PLANS)		YES/NO	COMMENTS
General Plan		Y	Agricultural Element, Conservation and Open Space Element, Economic Element, Housing Element, Noise Element, Offshore Energy Element, Parks and Recreation Element, Safety Element; Land Use Element: Framework for Planning – Coastal Zone, and Framework for Planning - Inland A General Plan Safety Element update in 2025 is anticipated to incorporate a dead end road exception process and update implementation measures for development in VHFHSZ and SRA (SB2911 and SB 1241). Housing Element Implementation Framework (directed by the Board of Supervisors in March 2024) considers focusing new development in strategic areas outside of hazards.
Zoning ordinance		Y	Inland Land Use Ordinance and Coastal Zone Land Use Ordinance (Titles 22 and 23) will be updated in 2025 to comply with State housing laws.
Subdivision ordinance		Y	Title 21 Real Property Division Ordinance will be updated to incorporate Senate Bill 9 Urban Lot Split, which limits development to be out of hazardous areas
Growth management ordinance		Y	Title 26
Floodplain ordinance		Y	County Land Use Ordinance Section 22.14.060; One foot above base flood elevation freeboard requirement for all structures. FEMA Flood Hazard standards update completed in 2024
Other special purpose ordinance (stormwater, steep slope, wildfire)		Y	Stormwater Management Chapter 22.10.155; California Fire Code 16.10; Post-Disaster Regulations 19.85; Combining Designation Standards Chapter 23.07; Geologic Study Area (GSA) 23.07.080; Title 22 Grading Ordinance
Building code		Y	Title 19, Chapter 19.01.40 of SLO County Code adopts the 2022 Title 24 California Building Standards Code. The next update to the Title 24 California Building Standards Code is anticipated in January 2026 and will likely be adopted by SLO County.
Fire department ISO rating		Y	6
Erosion or sediment control program		Y	Erosion and Sedimentation Control Plan Required 22.52.120; 23.05.036
Stormwater management program		Y	22.10.155; Post-Construction and During Construction Stormwater Management requirements
Site plan review requirements		Y	Title 22 Article 3
Capital improvements plan		Y	FY 2019-20 through FY 2023-24

REGULATORY TOOL (ORDINANCES, CODES, PLANS)		YES/NO	COMMENTS
Economic development plan		Y	Economic Element (2012) of General Plan
Local emergency operations plan		Y	County EOP (2023)
Other special plans		Y	CWPP (2019) Dam and Levee Failure Plan (2016); Tsunami Emergency Response Plan (2016); Earthquake Emergency Response Plan (2015); Hazardous Materials Emergency Response Plan (2013); Disaster Recovery Plan (2018); Diablo Canyon emergency response and evacuation plans; Tsunami evacuation plans; Wildland Fire Pre-attack Plans; Wildland Fire evacuation plans for West Atascadero, Parkhill, Avila, Cambria, Upper Los Berros, Suey Creek.
Flood insurance study or other engineering study for streams		Y	2012
Elevation certificates (for floodplain development)		Y	Required by 22.14.060(D)(4). On file with the Public Works Department.
Other		Y	Water Efficient Landscaping 19.90; Transfer of Development Credit Program; Fire Safety Plans 22.50; CUPA Program (Hazardous Materials and Waste) Unreinforced Masonry Building Removal program; Community Health Improvement Plan (2018-2023)

6.1.1 Discussion on Existing Building Codes, Land Use and Development Regulations

As indicated in the table above, San Luis Obispo County has several plans and programs that guide the County's development in hazard-prone areas. Starting with the San Luis Obispo County General Plan, which is the most comprehensive of the County's plans when it comes to mitigation, some of these are described in more detail below.

SLO County has adopted the most recent (2022) Title 24 California Building Standards Code. SLO County has traditionally adopted updates to this standard as they become available. The next update to the California Building Standards Code is expected in early 2026. Formal adoption of building codes is documented in Title 19, Chapter 19.01.40 of SLO County code. County building code (Title 19) is updated annually by the Building Division and by the County Office of the Fire Marshal for clean ups and consistency with state law. Additional aspects of building codes in SLO County are provided throughout Section 6, in jurisdiction-specific annexes, and elsewhere in this HMP update as specified.

Land use statutes are documented in Title 22 and 23 of SLO County code, titled Land Use Ordinance and Coastal Zone Land Use, respectively. Land use in the coastal zone and inland is further addressed in the Land Use Element of the SLO County General Plan.

Development is addressed in the Housing Element of the SLO County General Plan. More specific, current guidance for housing development is provided in the 2020-2028 Housing Element Implementation Framework. This latter document provides current guiding principles to guide the development of housing, endorses 11 programs relevant to housing and development, and a provides timeline for implementation. Additional aspects of development

are addressed throughout Section 6, in jurisdiction-specific annexes, and elsewhere in this HMP update as specified, including Chapters 4 and 5.

Regarding floodplain management see section 6.4.8.

6.1.2 San Luis Obispo County General Plan

The San Luis Obispo County General Plan consists of multiple element documents (12), as well as two Frameworks for Planning (Inland and Coastal) and four Area Plans. This discussion is derived primarily from four Element documents of the San Luis Obispo County General Plan, from which the text that follows is largely extracted.

The County's General Plan is a comprehensive, long-term framework for the protection of the county's agricultural, natural, and cultural resources and to direct future development in the county. Designed to meet state general plan requirements, it outlines policies, standards, and programs and sets out plan proposals to guide day-to-day decisions concerning San Luis Obispo County's future. It is a legal document that serves as the County's "blue print" or "constitution" for land use and development.

The General Plan Policy Document is organized into twelve elements, which generally correspond with the content requirements specified in State Planning Law. The following four elements have goals, policies and implementation measures related to hazards and hazard mitigation and are detailed further below:

- Safety Element
- Agricultural Element
- Conservation and Open Space Element
- Land Use Element

Each of these elements include goal statements relating to different aspects of the issues addressed in the element. Under each goal statement, the plan sets out policies that amplify the goal statement, policies, and implementation strategies. Implementation strategies are listed and described briefly with the action proposed by the program, the County agencies or departments with primary responsibility for carrying out the program, the time frame for accomplishing the program and potential funding sources.

The following is an element-by-element summary of the General Plan goals and policies that are most relevant to the Hazard Mitigation Plan Update. The summary tracks the organization of each element, with topically-focused goals followed by related policies.

6.1.2.1 Safety Element

The Safety Element of the General Plan establishes policies and programs to protect the community from risks associated with fires, flood, geologic hazards, earthquakes, and other natural disasters. In order to reduce loss of life, serious injury, and damage to property, the Safety Element requires safety to be considered in the planning and development process.

The Safety Element is being updated (2025) for consistency with several state bills that include measures to reevaluate development patterns after a large hazard event.

After the 2023 and 2024 severe storm events which caused widespread damage and flooding there has been an increased focus on hazard mitigation projects related to upsizing culverts, improving low water crossings, hardening existing levees, and sediment removal and vegetation management in creeks and other storm water channels.

The information from the Hazard Identification and Risk Assessment of the HMP was used to inform the ongoing update of the Safety Element, and the goals and policies in both

documents were aligned to be coordinated and mutually reinforcing during the 2025 HMP update.

Planning for growth and development requires the consideration of a wide range of public safety issues. Many of the safety risks associated with development, including risks to buildings and infrastructure, can be avoided through siting decisions made at the planning stages of development, while others may be lessened through the use of mitigation measures in the planning and land use review process. The Safety Element outlines San Luis Obispo County's strategy for ensuring the maintenance of a safe physical environment. Applicable goals and policies from the draft update of the Safety Element (as of November 2019) are presented below. As the HMP was finalized prior to the Safety Element update, the following are subject to change when the Safety Element update is finalized in 2025.

Emergency Preparedness

The Emergency Preparedness chapter of the Safety Element is specific to preparing for emergencies as well as recovery needs post-disaster. The chapter also recognizes, "an important part of preparedness is the careful assessment of risks before an emergency occurs (San Luis Obispo County, 1999). The following policies are set forth in the chapter to help the County achieve its goal of emergency preparedness and are applicable to hazard mitigation.

Table 6-2 Emergency Preparedness Goal and Policies

GOAL 1:	SUPPORT PROGRAMS THAT PROVIDE EMERGENCY AND OTHER SERVICES TO THE PUBLIC WHEN A DISASTER OCCURS. THE FOCUS OF RESPONSE ACTIVITIES IS SAVING LIVES AND PREVENTING INJURY AND REDUCING IMMEDIATE PROPERTY DAMAGE.
Policy 1.1:	**Coordination.** Improve coordination among City, County and State programs, and among others working to reduce the risks of disasters. This should also include improved coordination with the news media. This will result in more effective preparedness, response and recovery from disasters.
Policy 1.2:	**Information Systems and Research.** Expand and keep the database of safety related information. Knowledge about disasters and the area we live in is growing. New information must be made available to the public and decision makers. Regularly update the GIS data as new information becomes available.
Policy 1.3:	**Risk Assessment.** Continue investigations that reduce or eliminate long term risks. Risk assessment activities, effectively carried out, can improve the efficiency and reduce the cost of response and recovery from disasters.

Geologic and Seismic Hazards

The Geologic and Seismic Hazards chapter of the Safety Element is specific to the various types of geologic and seismic hazards in San Luis Obispo County. Geologic hazards include slope instability and landslides. Seismic hazards profiled include fault rupture, ground shaking, and liquefaction and seismic settlement hazards. This section also covers coastal bluff erosion hazards. The purpose of this chapter is to help in assessing the vulnerability of development to these types of geologic hazards. The following policies set forth in the chapter are applicable to hazard mitigation and help the County achieve its goal of minimizing the potential for loss of life and property as a result of geologic and seismic hazards.

Table 6-3 Geologic and Seismic Hazard Goal and Policies

GOAL 4:	MINIMIZE THE LEVEL OF INJURY, LOSS OF LIFE AND DAMAGE TO EXISTING AND FUTURE CRITICAL FACILITIES, PROPERTY AND INFRASTRUCTURE DUE TO GEOLOGIC AND SEISMIC HAZARDS.
Policy 4-1:	**Resilient Design.** Develop a comprehensive approach to reducing the level of damage and losses due to hazards through utilizing resilient community and critical infrastructure design, management, code enforcement, GIS mapping, improved policies, procedures, training evacuation planning, and planning processes.
Policy 4-2:	**Fault Information.** Information on faults and geologic hazards in the County should continue to be updated. The County will enforce the General Plan and applicable building codes that require developments, structures, and public facilities to address geologic and seismic hazards through the preparation and approval of geotechnical and geologic reports. Appointment of a County Geologist will improve implementation of the goals, policies, programs and standards of this Element by assuring more objective review and consistent enforcement of hazard mitigation measures county-wide than is possible under the present system of project review.
Policy 4-3:	**Fault Rupture Hazards.** Locate new development away from active and potentially active faults to reduce damage from fault rupture. Fault studies may need to include mapping and exploration beyond project limits to provide a relatively accurate assessment of a fault's activity. The County will enforce applicable regulations of the Alquist-Priolo Earthquake Fault Zoning Act pertaining to fault zones to avoid development on active faults.
Policy 4-4:	**Reduce Seismic Hazards.** The County will enforce applicable building codes relating to the seismic design of structures to reduce the potential for loss of life and reduce the amount of property damage.
Policy 4-5:	**Liquefaction and Seismic Settlement.** The County will require design professionals to evaluate the potential for liquefaction or seismic settlement to impact structures in accordance with the currently adopted Uniform Building Code.
Policy 4-6:	**Slope Instability.** The County acknowledges that areas of known landslide activity are generally not suitable for residential development. The County will avoid development in areas of known slope instability or high landslide risk when possible and continue to encourage that developments on sloping ground use design and construction techniques appropriate for those areas.
Policy 4-7:	**Readiness and Response.** Fire and law enforcement agencies will maintain and improve their ability to respond to seismic emergencies throughout the County.
Policy 4-8:	**Coastal Bluff.** Development shall not be permitted near the top of eroding coastal bluffs.
Policy 4-9:	**Unreinforced Masonry Buildings.** Reduce the danger to people and property from unreinforced masonry buildings.

Fire Safety

The Fire Safety chapter of the Safety Element is specific to fire hazards, including urban fires and wildfire hazards. The Fire Safety chapter acknowledges that fire plays a significant role in

the County's ecosystem and that development patterns can influence a fire agency's response and ability to defend "values at risk". The following policies set forth in the chapter are applicable to hazard mitigation and help the County achieve its goal of reducing the threat of fire hazards.

Table 6-4 Fire Safety Goals and Policies

GOAL 5:	MITIGATE WILDFIRE HAZARD IMPACTS TO EXISTING AND FUTURE DEVELOPMENT.
Policy 5-1:	**Pre-Fire Management.** New development should be carefully located, with special attention given to fuel management in higher fire risk areas. Large, undeveloped areas should be preserved so they can be fuel-managed. New development in fire hazard areas should be configured to minimize the potential for added danger.
Policy 5-2:	**Loss Prevention.** Improve structures and other values at risk to reduce the impact of fire. Regulations should be developed to improve the defensible area surrounding habitation.
Policy 5-3	**Limit Development.** Limit new development in areas identified as State Responsibility Areas (SRAs) or Very High Fire Hazard Severity Zones in Local Responsibility Areas or other areas determined to have a high wildfire risk.
Policy 5-4	**Streamline Reviews.** Expedite reviews for reconstruction of fire-damaged structures, while adopting current codes and standards in State Responsibility Areas (SRAs) or Very High Fire Hazard Severity Zones.
Policy 5-5	**Wildfire Protection Planning.** Encourage the development of community wildfire protection plans to supplement existing codes and regulations.
Policy 5-6	**Expert Review.** Include professional fire planning experts and Fire Department in the planning review process for projects located in High and Very High Fire Hazard Areas to consistently evaluate fire safety, potential impacts related to fire safety, and to identify effective measures to minimize potential impacts related to wildland fire.
Policy 5-7	**Post-Fire Streamlining.** Encourage rapid post-fire assessment and rehabilitation of burned lands to limit soil erosion, protect water quality, minimize flooding, restore damaged landscapes and assist landowners in re-establishing fire-safe homesites.
Policy 5-8	**Landowner Education.** Facilitate education of landowners about the risks of living in the wildland urban interface including regulations, prevention measures and pre-application activities.

Water Hazards

The Water Hazards chapter of the Safety Element is specific to flood, dam failure, tsunami, and coastal erosion hazards. The following policies and implementation measures set forth in the chapter are applicable to hazard mitigation and help the County achieve its goal of reducing damage caused by water related hazards.

Table 6-5 Water Hazards Goal and Policies

GOAL 7	MITIGATE FLOOD HAZARD IMPACTS TO EXISTING AND FUTURE DEVELOPMENT.
Policy 7.1	**Resilient Development and Design.** New development or redevelopment shall be sited and designed to avoid or minimize coastal flooding; and shall take into account significant storm events, tidal inundation, and predicted sea level rise over the anticipated life of the development.
Policy 7.2	**Flood Hazards.** Strictly enforce flood hazard regulations both current and revised. FEMA regulations and other requirements for the placement of structures in flood plains shall be followed. Maintain standards for development in flood-prone and poorly drained areas.
Policy 7.3:	**Reduce Flood Damage.** Reduce flood damage in areas known to be prone to flooding, such as Los Osos, Avila Valley, Santa Margarita, Cambria, Oceano and others.
Policy 7.4:	**Floodplain Management.** Promote and implement sound floodplain management through continued compliance with the National Flood Insurance Program and consistent implementation of the County Land Use Ordinance Section 22.14.060.

Other Safety Issues

This chapter of the Safety Element speaks to aircraft hazards, radiation hazards, hazardous materials, electromagnetic fields, radon and hazardous trees. The following policies captured are applicable to hazard mitigation and are related to manmade hazards that are profiled in this plan as well as hazardous trees.

Table 6-6 Human Caused Hazards Goal and Policies

GOAL 10:	REDUCE THE POTENTIAL FOR HARM TO INDIVIDUALS AND DAMAGE TO THE ENVIRONMENT FROM RADIATION HAZARDS, HAZARDOUS MATERIALS, AND HAZARDOUS TREES.
Policy 10.1:	**Radiation Hazards.** Maintain a high level of emergency preparedness and information to the public.
Policy 10.2:	**Hazardous Materials.** Reduce the potential for exposure to humans and the environment by hazardous substances.
Policy 10.3:	**Hazardous Trees.** Reduce the danger to people and property from trees that are weakened and susceptible to falling or limb loss during storms.

6.1.2.2 Agricultural Element

This element of the SLO County General Plan focuses on the agricultural economy and resources of San Luis Obispo County, "while recognizing that other valuable open space resources such as wetlands, riparian vegetation or scenic resources can exist on those agricultural lands" (San Luis Obispo County, 2010). The policies within the Agricultural Element apply primarily to land designated Agriculture on the County's land use designation maps. The applicable policy measures from the Agricultural Element are presented below.

Table 6-7 Agricultural Element Policies

POLICIES AND IMPLEMENTATION MEASURES REGARDING THE USE OF AGRICULTURAL LAND	
Policy AGP9:	**Soil Conservation.** a. Encourage landowners to participate in programs that reduce soil erosion and increase soil productivity. Promote coordination between the Natural Resources Conservation Service, Resource Conservation Districts, Consolidated Farm Services Agency, Morro Bay State and National Estuary, and other agencies and organizations. b. Emphasize the long-range benefits of proper drainage control and tillage, cropping, soil amendment, and grazing techniques to minimize soil erosion. c. Assure that roads and drainage systems on county-controlled properties and facilities do not negatively impact agricultural lands and that the roads and systems are properly maintained. Loss of topsoil is a threat to the continued productivity of agricultural lands. The purpose of this policy is to minimize the loss of topsoil by encouraging broad-based cooperation between property owners, ag operators, agencies and organizations that will lead to effective soil conservation practices on farmlands and on county-controlled properties.
Policy AGP10:	**Water Conservation.** a. Encourage water conservation through feasible and appropriate "best management practices." Emphasize efficient water application techniques; the use of properly designed irrigation systems; and the control of runoff from croplands, rangelands, and agricultural roads. b. Encourage the U.C. Cooperative Extension to continue its public information and research program describing water conservation techniques that may be appropriate for agricultural practices in this county. Encourage landowners to participate in programs that conserve water. Land area, the water falling on it, and groundwater stored beneath its surface are inseparable in determining agricultural values and productivity in the County. Other than the land itself, water is the most precious resource for agriculture. Conserving water can benefit agriculture by reducing groundwater pumping. Uncontrolled runoff can contribute to soil loss, reduced water quality in streams, increased impact on riparian habitat, decreased opportunity for groundwater recharge and degradation of the general productivity of the watershed.
Policy AGP11:	**Agricultural Water Supplies.** a. Maintain water resources for production agriculture, both in quality and quantity, so as to prevent the loss of agriculture due to competition for water with urban and suburban development. b. Do not approve proposed general plan amendments or rezonings that result in increased residential density or urban expansion if the subsequent development would adversely affect: (1) water supplies and quality, or (2) groundwater recharge capability needed for agricultural use. c. Do not approve facilities to move groundwater from areas of overdraft to any other area, as determined by the Resource Management System in the Land Use Element.
Policy AGP12:	**Pest, Vertebrate, and Weed Management.** a. Assure that pests such as squirrels and noxious weeds are managed on county owned properties so as to avoid impacts on agriculture. b. Encourage the use of integrated pest management techniques to manage pests, vertebrates, and weeds on both public and private lands.

POLICIES AND IMPLEMENTATION MEASURES REGARDING THE USE OF AGRICULTURAL LAND	
	c. Support and promote programs that help landowners learn pest control methods, utilizing the expertise of the U.C. Cooperative Extension and the County Agriculture Department.
Policies Regarding the Protection of Agricultural Lands	
Policy AGP15:	**Transfer of Development Credits (TDC)** a. Continue to utilize a voluntary TDC program to help protect agricultural resources by guiding development to more suitable areas.
Policy AGP26:	**Streams and Riparian Corridors.** a. Encourage private landowners to protect and preserve stream corridors in their natural state and to restore stream corridors that have been degraded. Provide information and incentives to eliminate overgrazing in stream corridors. Encourage off-stream livestock watering sources. b. For new development requiring a discretionary permit and for land divisions, protect streams and riparian habitat affected by the proposal through the following measures: i. Consistent with the requirements of the Regional Water Quality Control Board's Basin Plan, establish a grading and building setback of 30 feet from the top of the steam bank. Locate buildings and structures outside the setback. Do not remove riparian vegetation within 30 feet of the top of the stream bank. Provide for adjustments when the applicant demonstrates that such setbacks would have a significant negative impact on the agricultural viability of the site, or where alternatives are infeasible or more environmentally damaging, and the adjustments are acceptable to the Regional Board. ii. Require appropriate erosion control measures during and following construction. iii. Consistent with state and federal requirements, allow steam alterations for water supply and flood control projects, road maintenance, maintenance of existing channels, or improvement of fish and wildlife habitat if there are no practical alternatives. iv. Consistent with state and federal requirements, assure that stream diversion structures protect habitats. v. When significant impacts to stream or riparian resources are identified, the landowner shall implement county-approved mitigation measures consistent with the existing requirements of CEQA.

6.1.2.3 Conservation and Open Space Element

Applicable goals and policies from the Conservation and Open Space Element of the General Plan are presented below. Implementation measures related to each policy can be found in the General Plan.

Air Quality

This chapter of the Conservation and Open Space Element focuses on local and regional air quality and sets forth goals and policies for the County to reduce its contribution to global climate change.

Table 6-8 Air Quality and Climate Change Adaption Goal and Policies

GOAL AQ 5:	THE COUNTY WILL ADAPT TO ADVERSE CLIMATE CHANGE.
Policy AQ 5.1:	Adapt to Climate Change.

GOAL AQ 5:	THE COUNTY WILL ADAPT TO ADVERSE CLIMATE CHANGE.
	Identify needs and strategies to monitor, prepare for, and adapt to a changing climate.
Policy AQ 5.2:	Public Awareness. Increase public awareness about climate change and lifestyle changes that will reduce greenhouse gas emissions.

Biological Resources

This chapter of the Conservation and Open Space Element identifies biological resources of importance for the County and puts forth a framework to achieve a "future that is healthy and vibrant ecologically, socially and economically.

Table 6-9 Biological Resources Goals and Policies

GOAL BR 2:	THREATENED, RARE, ENDANGERED, AND SENSITIVE SPECIES WILL BE PROTECTED
Policy BR 2.7:	**Fire Suppression and Sensitive Plants.** Balance the need for fire suppression and/or vegetation (fuel) management with the need to protect sensitive biological resources. Where possible, design land divisions and development so that fuel-breaks, vegetation, or fuel modification areas that are needed to reduce fire hazards do not disrupt special-status plant communities or critical habitat for special status animal species. Fuel-breaks and vegetation or fuel modification areas shall be located on the development side of required setbacks from sensitive features and shall be in addition to the required setbacks.
Policy BR 2.11:	**Control Spread of Non-native Invasive Animal Species.** The County will work with landowners, the California Department of Fish and Game, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the National Invasive Species Council, and other agencies and organizations to control and prevent the spread of non-native, invasive animal species.
Goal BR 3:	Maintain the acreage of native woodlands, forests and trees as 2008 levels.
Policy BR 3.1:	**Native Tree Protection.** Protect native and biologically valuable trees, oak woodlands, trees with historical significance, and forest habitats to the maximum extent feasible.
Policy BR 3.2:	**Protection of Native Trees in New Development.** Require proposed discretionary development and land divisions to avoid damage to native trees (e.g., Monterey Pines, oaks) through setbacks, clustering, or other appropriate measures. When avoidance is not feasible, it requires mitigation measures.
Policy BR 3.4:	**Vegetation and Wildlife Disease Management Programs.** Continue to support agency programs to limit the impacts of Sudden Oak Death syndrome and any other potential or existing diseases harmful to native vegetation and wildlife in the county, while addressing any potential adverse effects on sensitive resources.
Goal BR 4:	The natural structure and function of streams and riparian habitats will be protected and restored
Policy BR 4.2	**Minimize Impacts from Development.** Minimize impacts of public and private development on streams and associated riparian vegetation due to construction, grading, resource extraction, and development near streams/

GOAL BR 2:	THREATENED, RARE, ENDANGERED, AND SENSITIVE SPECIES WILL BE PROTECTED
Policy BR 4.3	**Alluvial Well Extractions.** Require discretionary projects that depend on alluvial well extractions and stream diversion to monitor the long-term effects on surface streamflow and riparian vegetation. Identify and implement contingencies for maintaining streamflow (e.g., minimum bypass flows, alternate water sources, decreased pumping rates, groundwater discharge).
Policy BR 4.5	**Encourage Stream Preservation on Private Lands.** Encourage private landowners to protect and preserve stream corridors in their natural state and to restore stream corridors that have been degraded.
Policy BR 4.6	Encourage Stream Preservation on Public Lands. Protect stream and riparian corridors in their natural state on public lands.
Policy BR 4.10	**Vector Control.** Control vectors to prevent disease problems in keeping with good conservation principles. Vector control practices should minimize disturbance of the environment.
Goal BR 7:	Significant Marine Resources will be protected.
Policy BR 7.1:	**Coastal Protection.** The County should continue to advocate sound energy and coastal protection policies and oppose proposals along the San Luis Obispo County coastline that are inconsistent with the County's Local Coastal Program and other County plans and policies.
Policy BR 7.3:	**Best Management Practices.** Support landowners that participate in education and assistance programs and other voluntary and cooperatives programs, such as conservation programs offered by the Natural Resources.
Policy BR 7.7:	**Watershed Protection.** As a complement to regulatory and enforcement programs, promote a voluntary, cooperative, educational, and incentive-based approach to protect Morro Bay and its watershed. Where appropriate, continue to obtain open space easements for sensitive wetlands and bayfront areas, and encourage other agencies and conservation organizations to obtain open space and conservation easements and fee title to these areas

Energy

This chapter of the Conservation and Open Space Element sets goals, policies and implementation measures related to the energy sector in the County and ensures future energy development is done responsibly and sustainably. The following goals and policies are applicable to hazard mitigation.

Table 6-10 Energy Goals and Policies

Goal E 4:	Green building practices will be integrated into all development.
Policy E 4.4:	**Solar Exposure.** Orient new buildings to maximize solar resources, shading, ventilation, and lighting.
Goal E 7:	Design, Siting, and Operation of non-renewable energy facilities will be environmentally appropriate.
Policy E 7.1:	**Non-Renewable Energy Facility Siting.**

Goal E 4:	Green building practices will be integrated into all development.
	Energy, fossil fuel and related facilities will be sited, constructed and operated in a manner to protect the public from potential hazards and significant environmental impacts.
Policy E 7.3:	**Safety Coordination.** The County will coordinate with state and federal agencies to promote an information exchange about safety standards and regulations with regard to electricity and fossil fuel facilities.
Policy E 7.4:	**National Repository for Nuclear Waste.** Carefully monitor the federal government's progress in establishing a national repository for high-level nuclear waste and the state's efforts for low-level nuclear waste disposal. The County should advocate the safest methods of transportation and storage.

Open Space Resources

This chapter of the Conservation and Open Space Element sets goals, policies and implementation measures to ensure the protection, restoration, and preservation of significant open features throughout San Luis Obispo County.

Table 6-11 Open Space Resources Goal and Policy

GOAL OS 1:	IMPORTANT OPEN SPACE AREAS WILL BE IDENTIFIED, PROTECTED, SUSTAINED AND WHERE NECESSARY, RESTORED AND RECLAIMED.
Policy OS 1.1:	**Future Open Space Protection.** Continuing to identify and protection open space resources with the following characteristics: • Recreation areas, • Ecosystems and environmentally sensitive resources such as natural area preserves, streams, and riparian vegetation, unique, sensitive habitat, natural communities' significant marine resources, • Archaeological, cultural, and historical resources, • Scenic areas, • Hazard areas, • Rural character

Soil Resources

This chapter of the Conservation and Open Space Element sets goals, policies and implementation measures to ensure the protection, restoration, and preservation of significant open features throughout San Luis Obispo County.

Table 6-12 Soil Resources Goals and Policies

GOAL SL 1:	SOILS WILL BE PROTECTED FROM WIND AND WATER EROSION, PARTICULARLY THAT CAUSED BY POOR SOIL MANAGEMENT PRACTICES.
Policy SL 1.2:	**Promote Soil Conservation Practices in All Land Uses.** Require erosion and sediment control practices during development or other soil-disturbing activities on steep slopes and ridgelines. These practices should disperse stormwater so that it infiltrates the soil rather than running off and protect downslope areas from erosion.
Policy SL 1.3:	**Minimize Erosion Associated with New Development.** Avoid development, including roads and driveways, on the steeper portions of a site except when necessary to avoid flood hazards, protect prime soils, and protect

GOAL SL 1:	SOILS WILL BE PROTECTED FROM WIND AND WATER EROSION, PARTICULARLY THAT CAUSED BY POOR SOIL MANAGEMENT PRACTICES.
	sensitive biological and other resources. Avoid grading and site disturbance activities on slopes over 30%. Minimize site disturbance and protect existing vegetation as much as possible.
Goal SL 2:	Watershed and ecological function will be maintained through soil conservation.
Policy SL 2.1:	**Protect Watersheds and Aquifer Recharge Areas.** Give high priority to protecting watersheds, aquifer-recharge areas, and natural drainage systems when reviewing applications for discretionary development.

Water Resources

This chapter of the Conservation and Open Space Element sets goals, policies and implementation measures that connect water supply and land use planning in the County that will ensure a sustainable water supply.

Table 6-13 Water Resources Goals and Policies

GOAL WR 1:	THE COUNTY WILL HAVE A RELIABLE AND SECURE REGIONAL WATER SUPPLY (IRWM).
Policy WR 1.1:	**Protect water supplies.** Continue to coordinate with water suppliers and managers to identify water management strategies to protect existing and secure new water supplies.
Policy WR 1.2:	**Conserving Water Resources** Water conservation is acknowledged to be the primary method to serve the county's increasing population. Water conservation programs should be implemented countywide before more expensive and environmentally costly forms of new water are secured.
Policy WR 1.3:	**New Water Supply.** Development of new water supplies should focus on efficient use of our existing resources. Use of reclaimed water, interagency cooperative projects, desalination of contaminated groundwater supplies, and groundwater recharge projects should be considered prior to using imported sources of water or seawater desalination, or dams and on-stream reservoirs.
Policy WR 1.4:	**Use Reclaimed Water.** The County will be a leader in the use of reclaimed water. Support expanding the use of reclaimed water to make up at least 5% of total water use by 2015 and 10% of total water use by 2020.
Policy WR 1.5:	**Interagency Projects.** Help implement interagency projects, including emergency interties between systems, jointly developed facilities, water exchanges, and other methods of enhancing reliability through cooperative efforts.
Policy WR 1.7:	**Agricultural Operations.** Groundwater management strategies will give priority to agricultural operations. Protect agricultural water supplies from competition by incompatible development through land use controls.
Policy WR 1.11:	**Reduce RMS alert levels.** The County will work with local agencies to reduce Resource Management System alert levels for water supply and water systems from recommended or certified Levels of Severity II or III to Level of Severity I or better by 2020.
Policy WR 1.12:	**Impacts of new development.**

GOAL WR 1:	THE COUNTY WILL HAVE A RELIABLE AND SECURE REGIONAL WATER SUPPLY (IRWM).
	Accurately assess and mitigate the impacts of new development on water supply. At a minimum, comply with the provisions of Senate Bills 610 and 221.
Goal WR 2:	The County will collaboratively manage groundwater resources to ensure sustainable supplies for all beneficial uses.
Policy WR 2.1:	**Groundwater quality assessments.** Prepare groundwater quality assessments, including recommended monitoring, and management measures.
Policy WR 2.2:	**Groundwater basin reporting programs.** Support monitoring and reporting programs for groundwater basins in the region.
Policy WR 2.3:	**Well permits.** Require all well permits to be consistent with the adopted groundwater management plans.
Policy WR 2.4:	**Groundwater recharge.** Where conditions are appropriate, promote groundwater recharge with high-quality water.
Policy WR 2.5:	**Groundwater banking programs.** Encourage groundwater-banking programs.
Goals WR 3:	Excellent water quality will be maintained for the health of people and natural communities.
Policy WR 3.6:	**Prevent pollution of water sources.** The County will collaborate with private and nonprofit land managers, Resource Conservation Districts, recreation providers, Community Services Districts, and other stakeholders to prevent pollution or contamination of potable water sources, such as Lake Nacimiento and Lopez Lake. The County will also coordinate with the Nacitone Watershed Plan.
Goal WR 4:	Per capita potable water use in the county will decline by 20 percent by 2020.
Policy WR 4.8:	**Efficient irrigation.** Support efforts of the resource conservation districts, California Polytechnic State University (CalPoly), the University of California Cooperative Extension, and others to research, develop, and implement more efficient irrigation techniques.
Goal WR 5:	The best possible tools and methods available will be used to manage water resources.
Policy WR 5.1:	**Watershed approach.** The County will consider watersheds and groundwater basins in its approach to managing water resources in order to include ecological values and economic factors in water resources development.
Policy WR 5.2:	**Climate Change.** The County will consider ongoing research on long-term changes in climate and precipitation patterns in the county and region and incorporate relevant data in its approach to managing water resources.
Goal WR 6:	Damage to life, structures, and natural resources from floods will be avoided.
Policy WR 6.1:	**Integrated management.** Pursue an integrated management approach for waterway projects that includes flood management, sea level rise, water quality protection, groundwater recharge, and ecosystem enhancement objectives.
Policy WR 6.2:	**Region-wide permitting.** The County should coordinate with applicable state, regional, and local permitting agencies to develop and implement a region-wide permitting program that will provide consistent watershed or regional implementation measures.

GOAL WR 1:	THE COUNTY WILL HAVE A RELIABLE AND SECURE REGIONAL WATER SUPPLY (IRWM).
Policy WR 6.3:	**Drainage problems.** Consider drainage problems in the context of an entire watershed. Drainage and flood management plans should address property owner and developer responsibilities. These plans should use an integrated watershed approach that incorporates flood management, water quality, water supply, groundwater, and ecosystem protection and enhancement objectives on a watershed/basin scale.
Policy WR 6.7:	**Areas prone to flooding.** Develop a public information and education program in areas of the county prone to flooding and drainage problems to discourage new development in those areas and to inform residents and property owners about how to deal with drainage and flood control problems, use best management practices, and get assistance.

6.1.2.4 Land Use Element

The Land Use Element of the SLO County General Plan is one of the required general plan elements by the state. The principle consideration in this element is the physical setting of the county. This element describes the official County policy on the location of land uses and ensures orderly growth and development. This element is written in coordination with the circulation element in order to correlate future land use with transportation infrastructure. The policies within the Land Use Element work directly with the County's Land Use Ordinance to provide comprehensive development standards and review procedures.

The Land Use Element is divided into four major chapters: Framework for Planning, the area plans, the community/village plans, and the official maps. For planning purposes and due to the size and diversity of topography and climate throughout, the county has been divided into the Inland Area and the Coastal Zone. Both of which have separate *Framework for Planning* documents, area plans, and community plans tailored to those areas of the county. Each Framework of Planning document assists the County Planners when reviewing development or land division proposals by explaining the criteria in applying land use categories, combining designations and the Resource Management System to ensure future growth and development takes places in areas and in a manner that will not harm current or future residents.

Combining Designations

Combining designations are special map categories that identify areas of potential hazards or public value that should be taken into consideration when proposing new development and when reviewing applications for development. Each Framework for Planning document explains the purpose of the combining designations with a list of items specific to the Inland Area and Coastal Zone, both explain the following as one of the purposes of the designation, "To reduce risks to life and property through proper location and design of structures within areas subject to man-made or natural hazards, such as: airports; flooding; or geologic hazards, including active faulting, land sliding, or liquefaction."

There are ten (10) combining designations in the Inland Area and fourteen (14) in the Coastal Zone. Each designation has specific purposes and development standards to help mitigate the risk of the hazard for proposed development. The following combining designations are specific to hazards profiled in this plan were taken from the Framework for Planning documents:

Geologic Study Area (GSA): Applied to: areas identified in the Alquist-Priolo Geologic Hazard Zones Act as "Special Studies Zone" (Public Resources Code Section 2622); to areas within

urban and village reserve lines subject to "moderately high to high" landslide risk or liquefaction potential (as identified in the geologic and seismic hazard section of the Safety Element of the county general plan); and to lands outside urban reserve lines subject to high landslide risk potential (also according to the geologic and seismic hazard section of the Safety Element).

Flood Hazard (FH): Applied to flood-prone areas identified through review of available data from various federal, state, or local agencies. Also includes flood elevations of existing lakes and reservoirs.

Sensitive Resource Area (SRA): Applied to areas having high environmental quality and special ecological or educational significance. (Note, the following is only applicable in the Coastal Zone): The SRA includes four types of Environmentally Sensitive Habitats: Wetlands, Coastal Streams and Riparian Vegetation, Terrestrial Habitats and Marine Habitats.

The following combining designations are only applicable to the Inland Area:

TDCS Transfer of Development Credits Sending Site: Applied to areas where a landowner has met the criteria and standards of the Land Use Ordinance for TDC Sending Sites and has entered into an easement that qualifies under either the Open Space Easement Act or the Conservation Easement Act granted to a qualified public or private non-profit organization created for the purposes of protecting and managing resources, that restricts the development potential of the property. May also apply to community-based TDC programs, (as set forth in Chapter 6 of Framework for Planning) identified through an area or community/village plan update or by request of the area property owners. [Added 1996, Ord. 2776]

TDCR Transfer of Development Credits Receiving Site: Applied to areas where a landowner has met the criteria and standards of the Land Use Ordinance for TDC Receiving Sites and where a tentative map requiring the use of TDCs has been approved and recorded. May also apply to community-based TDC programs, (as set forth in Chapter 6 of Framework for Planning) identified through an area or community/village plan update or by request of the area property owners. [Added 1996, Ord. 2776]

6.2 San Luis Obispo County's Administrative and Technical Mitigation Capabilities

The following County Departments and other administrative entities have capabilities that are or could be used in planning for hazard mitigation projects. Other departments not listed here that have hazard specific capabilities are listed under subsection 6.4 Hazard Specific Mitigation Capabilities of this section. Table 6-14 below identifies the County personnel responsible for activities related to mitigation and loss prevention in San Luis Obispo County.

6.2.1 Department of Planning and Building

The San Luis Obispo County Department of Planning and Building is the County's land-based department. This department is responsible for a wide variety of programs and activities related to planning, zoning, permits, water conservation, stormwater, energy and housing for the unincorporated portion of the County of San Luis Obispo. Staff often take natural hazards into consideration when reviewing development applications and updating the County land use plans, as the Department is responsible for applying the County's Land Use Code, General Plan, and Building Code to each land use and construction permit application. The Department's mission is to promote "the wise use of land and helping to build great communities".

6.2.2 Office of Emergency Services

The County Office of Emergency Services (OES) coordinates planning and preparedness, response and recovery efforts for disasters occurring within the unincorporated area of San Luis Obispo County. OES has the mission of serving the public before, during and after disasters. The Office communicates and coordinates with all levels of government and many other entities in order to minimize the impact of disasters and enable affected communities to return to pre-disaster conditions as soon as possible. OES is responsible for public outreach related to hazards, including educating the public on preparedness and mitigation actions, this information can be found on the County's website ReadySlo.org. The Office is also responsible for the public alert and notification systems to notify the public during an emergency.

Various emergency plans have been developed and implemented by OES, some of which are described in further detail in subsection 6.4 Hazard Specific Mitigation Capabilities. These emergency plans include: The County Emergency Operations Plan (EOP), Earthquake Emergency Response Plan, Dam and Levee Failure Plan, Hazardous Materials Response Plan, Recovery Plan and Tsunami Response Plan.

6.2.3 Environmental Health Services Division

Environmental Health is a division of the County Public Health Department with the mission of providing a safe and healthful environment for all unincorporated areas of San Luis Obispo County. The Division maintains geospatial data and utilizes GIS including web map viewers to share information related to the assessment of proposed water well sites, beach water quality, and mosquito surveillance trapping sites which include the identification and counts of mosquito species. The Environmental Health Services maintains an inventory of small water systems and well permits, which supports tracking and vulnerability screens.

The Environmental Health Division also provides the following services related to hazards and hazard mitigation:

- **Disaster Preparedness and Emergency Response Program** – The Division is responsible for providing information related to water quality, food safety, sewage disposal, indoor air pollution, fire recovery and cleanup and other guidance that can be leveraged to protect public health during a disaster or emergency.
- **Land Use Program –** A required review by the Division with referral from the Planning and Building Department. The purpose of the program is to prevent health hazards and mitigate, where possible environmental degradation as a result of improperly planned development projects. The primary focus is water quality and availability.
- **CUPA Program (Hazardous Materials and Waste) –** The Environmental Health Division is the County's Certified Unified Program Agency (CUPA) which applies the state regulatory standards and programs related to hazardous materials. Refer to subsection 6.4 and the Hazardous Materials Capabilities subsection for more information related to the specific programs with the County's CUPA Program.

6.2.4 Public Works Department

The San Luis Obispo County Public Works Department is comprised of twelve divisions. The Department has the overall responsibility for the maintenance of all county roadways and bridges, engineering review of proposed land developments, the administration and operation of various water and wastewater facilities, long term master water planning, and the facility planning, design, and construction management of all County building projects. The Public

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Works Department is also charged with the development and implementation of the County's five-year Capital Improvement Plan.

Table 6-14 San Luis Obispo County's Administrative and Technical Mitigation Capabilities

PERSONNEL RESOURCES	YES/NO	DEPARTMENT/POSITION
Planner/engineer with knowledge of land development/land management practices	Y	Planning and Building Department/Planning and Engineering Staff
Engineer/professional trained in construction practices related to buildings and/or infrastructure	Y	Planning and Building Department/Building Staff
Planner/engineer/scientist with an understanding of natural hazards	Y	Public Works, Planning and Building Department, Ag Department/Planning, Engineering, and Environmental Specialist Staff
Personnel skilled in GIS	Y	Information Technology Department/GIS Analysts
Full time building official	Y	Planning & Building Department/Chief Building Officer
Floodplain manager	Y	Public Works/Water Resources Engineer
Emergency manager	Y	Office of Emergency Services/Emergency Services Coordinator
Grant writer	Y	Office of Emergency Services/ Emergency Services Coordinator; Planning and Building Department/Planning Staff; Public Works/Engineering Staff; Public Health/Program Managers; Environmental Health Services/Program Managers
Other personnel	Y	County Health Officer, Public Health Dept.
GIS Data Resources (Hazard areas, critical facilities, land use, building footprints, etc.)	Y	Information Technology Department/GIS Analysts; Ag Commissioner, Assessor's Office; Environmental Health, Planning and Building, Public Works
Warning Systems/Services (Reverse 9-1-1, cable override, outdoor warning signals)	Y	Reverse 9-1-1; Early Warning System Sirens; Emergency Alert System; Wireless Emergency Alerts, NOAA Weather Radio; Social Media; Route Alerting
Other	Y	Subdivision Review Board; Evacuation Assistance List and Registration; Fire Safe Council; County Drought Task Force; Resource Management Administration; CUPA Program

6.2.5 Local Boards, Commissions, Committees

There are a number of local boards, commissions, and committees in San Luis Obispo County. Those that have responsibilities related to hazard mitigation are described briefly below.

- **Board of Supervisors** – The Board of Supervisors (BOS) is the legislate body of the County responsible for setting policies and priorities that serve the County's needs. The BOS is made up of five members who are each elected by five districts of approximately equal population to overlapping four-years terms. The BOS holds bi-weekly televised broadcasts of Board meetings to reach and inform as many citizens as possible.
- **Planning Commission** - This commission is charged with the review and approval or denial of discretionary land use permits. The Commission is also advisory to the Board of Supervisors on proposed amendments to the General Plan and the Zoning Ordinance.
- **Agricultural Liaison Advisory Board (ALAB)** – This advisory board to the Board of Supervisors is the forum for the discussion of local agricultural and land use matters as directed by the Board of Supervisors. The ALAB board is comprised of the following members: one representative from each Supervisorial district; SLO County Farm Bureau representative; Agricultural Finance representative; Environmental representative; Coastal San Luis Resource Conservation District (RCD) representative; Upper Salinas-Las Tablas RCD; SLO County Cattleman's Association Representative; Wine Grape industry representative; Vegetable industry representative; Nursery industry representative; Organic Grower/Direct Marketing industry representative; Strawberry industry representative. As well as non-voting members include the UC Cooperative Extension Director and Agricultural Commissioner/Sealer.
- **Parks and Recreation Commission (PRC)** – An advisory group providing a link between Parks and Recreation Department, member of the County Board of Supervisors and the public. All five members are individually appointed by the Board member representing their district. The PRC advises Staff and the Board of Supervisors on park development issues, budget considerations, and community relations.
- **Water Resources Advisory Committee (WRAC)** – The WRAC advises the County Board of Supervisors on all policy decisions relating to the water resources of the San Luis Obispo County Flood Control and Water Conservation District. The Committee recommends specific water resource and water conservation programs, methods of financing water resource programs, and other programs concerning the objectives and purposes of the San Luis Obispo County Flood Control and Water Conservation District Act. The WRAC also serves as the County's Drought Task Force (see section 6.4.6).
- **Water Districts.** A well-developed system of water districts and water conservation districts operates in California. A handful of districts are especially notable for their activity in San Luis Obispo County.

  The San Luis Obispo Flood Control and Water Conservation District (SLOFC&WCD) was formed in 1945 and is an effective resource to help individuals and communities in San Luis Obispo County identify and address flooding problems. The District uses its general funding to identify flooding problems, recommend solutions, and help local areas implement recommended solutions. The District has historically not funded mitigation projects.

  The Estrella-El Pomar-Creston Water District (EPCWD; www.epcwd.org) was formed to represent opted-in members in matters regarding the Paso Robles ground water subbasin. Membership includes a number of winegrape growers and other agricultural entities and concerned citizens in the Paso Robles Groundwater Basin.

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The Shandon-San Juan Water District (www.ssjwd.org), located in San Luis Obispo County, consists of approximately 135,000 acres. It was formed effective May 22, 2017.

The Cuyama Basin Water District (cuyamabwd.org) is a California water district that encompasses an area of approximately 83,000 acres within Santa Barbara, San Luis Obispo, and Ventura counties, and is located in the Cuyama Valley which lies in the Coastal Range between the Southern San Joaquin Valley and the Central California Coast. The Cuyama Basin Water District formed in 2017 with a primary purpose of operating on behalf of agricultural interests for compliance with the 2014 legislation known as the Sustainable Groundwater Management Act (SGMA). The District is one of six member agencies that formed a Groundwater Sustainability Agency (GSA) under the SGMA legislation. This GSA is presently (2025) developing a Groundwater Sustainability Plan (GSP) to set a path for achieving the sustainable groundwater management of the Cuyama Valley Groundwater Basin.

6.2.6 State and Federal Programs

A number of state and federal programs exist to provide technical and financial assistance to local communities for hazard mitigation. Some of the primary agencies/departments that are closely involved with local governments in the administration of these programs include:

- California Governor's Office of Emergency Services
  - State of California Multi-Hazard Mitigation Plan
- California Governor's Office of Planning and Research
- California Polytechnic State University (Cal Poly)
- California Department of Water Resources
- California Department of Forestry and Fire Protection
- California Environmental Protection Agency
- California Department of Fish and Game
- California Department of Transportation (Caltrans) (District 5)
- California Highway Patrol
- California State Parks and Recreation Department
- California State Lands Commission
- Federal Emergency Management Agency (Region IX)
- U.S. Army Corps of Engineers (Sacramento District/Los Angeles District)
- Bureau of Reclamation (South-Central California Region)
- USDA Forest Service (Los Padres National Forest)
- California State Farm Service Agency (Templeton)
- National Parks Service
- USDA Natural Resources Conservation Service (Templeton Field Office)
- U.S. Environmental Protection Agency (Region IX)
- American Red Cross (Central California Region)

Other resources that are present that could assist in disaster recovery include:

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- California Military Department – California National Guard Camp San Luis Obispo and Camp Roberts

6.3 San Luis Obispo County's Fiscal Mitigation Capabilities

Table 6-15 identifies financial tools or resources that the County could potentially use to help fund mitigation activities.

Table 6-15 San Luis Obispo County's Fiscal Mitigation Capabilities

FINANCIAL RESOURCES	ACCESSIBLE/ELIGIBLE TO USE (YES/NO)	COMMENTS
Community Development Block Grants	Potentially	The County is recipient agency under a variety of CBDG programs. Grants received under programs are restricted to specific uses. The County could potentially apply for any hazard mitigation CDBG program.
Capital improvements project funding	Potentially	The County maintains reserves for capital projects. Use of reserves is subject to Board approval but could potentially be used for hazard mitigation.
Authority to levy taxes for specific purposes	Unlikely	Tax measures must be placed on ballot by BOS majority and if proceeds are dedicated to specific purposes they are subject to supermajority (2/3) voter approval
Fees for water, sewer, gas, or electric services	Potentially	BOS can approve fees when a nexus exists to the payor receiving direct benefit
Impact fees for new development	Potentially	BOS can approve fees when a nexus exists to the payor receiving direct benefit
Incur debt through general obligation bonds	Unlikely	Measures for tax-supported debt issuances must be placed on ballot by BOS majority and if proceeds are dedicated to specific purposes are subject to supermajority (2/3) voter approval
Incur debt through special tax bonds	Unlikely	Measures for tax-supported debt issuances must be placed on ballot by BOS majority and if proceeds are dedicated to specific purposes are subject to supermajority (2/3) voter approval
Incur debt through private activities	No	
Withhold spending in hazard prone areas	No	

The County was able to obtain a FEMA HMGP grant to assist with the 2025 5-year update of the HMP.

6.4 Hazard Specific Mitigation Capabilities

The following San Luis Obispo County capabilities are organized by the hazards they help to mitigate.

6.4.1 Adverse Weather Capabilities

There are three adverse weather centers in the county, all located in incorporated cities (SLO, Paso Robles, & Arroyo Grande) and aimed at aiding the unhoused population. There are currently no adverse weather centers in unincorporated communities.

In San Luis Obispo County, the County Agriculture Department works with growers following inclement weather however at this time does not alert growers of impending severe weather such as freeze, high winds and heavy rains.

6.4.2 Agricultural Pest Infestation and Plant Disease Capabilities

SLO County has a well-developed Pest Management program that is committed to protecting agriculture, the local environment, and the economic health of the community from the spread of detrimental pests. See Section 5.3.5 for information on pests relevant to this HMP update. The County pursues this program through early detection then managing or eradicating infestations through partnerships, education, and the promotion of integrated pest management strategies. Key aspects of this program include assisting other agencies in pest monitoring, prevention, and control; providing alternative approaches to pest control problems; coordinating research and educational resources; distributing and collecting biological agents such as beneficial insects; and reducing use of pesticides.

As part of the Pest Management program, the county prioritizes weed pest control, with a focus on early detection and eradication of small "pioneer" infestations of weed pests. Among other actions, the county provides expertise on invasive weed control management to local agriculturalists and land managers. More information on the SLO County Pest Management Program is available on the SLO Pest prevention web page: https://www.slocounty.ca.gov/departments/agriculture-weights-and-measures/pest-prevention.

Within the SLO County Pest Management program, the county maintains a Pest Prevention program, mandated by California Food and Agricultural Code, that is focused on pest exclusion, detection, and eradication. Through this program, the county also takes a supporting role in prevention and response of animal diseases foreign to California. The county provides several services relevant to pest prevention, including insect trapping, nursery licensing, pest-exclusion inspections, phytosanitary export certification, seed certification, and a program to control glassy-winged sharpshooter/Pierce Disease. Additional information on the Pest Prevention program and its related services is available on the San Luis Obispo Pest Prevention webpage: https://www.slocounty.ca.gov/departments/agriculture-weights-and-measures/pest-prevention.

Other agencies enhance the already-robust public outreach of the SLO County Agriculture Department. For example, the San Luis Obispo County Agricultural Commissioner's office and the University of California Cooperative Extension Farm Advisors keep agriculturalists, including production nursery operators, updated on efforts to prevent, detect and manage or eradicate agricultural pests. Also, the San Luis Obispo County Fire Safe Council has issued articles and brochures on Sudden Oak Death and Pine Pitch Canker, both diseases that increase the potential for catastrophic fires.

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6.4.3 Biological Agents (Naturally Occurring) Capabilities

6.4.3.1 Public Health Department

The County Health Officer (CHO) is authorized under the California Health and Safety Code to take measures as may be necessary to prevent the spread of communicable disease. Generally, actions may include: 1) Obtaining information pertaining to the incident, 2) Assessing the health risk to the community, 3) Notifying appropriate agencies, and 4) Coordinating disease prevention and control with community, local, regional, state and federal agencies. Should it be necessary, the CHO may also initiate isolation and/or quarantine measures within the county.

Enhanced disease surveillance, including accurate, reliable and timely disease reporting and investigation are crucial to early detection of a naturally occurring infectious disease. The Public Health epidemiologist routinely investigates and records the causes and distribution of disease and disability within the County. Use of the existing centralized reporting system will help ensure coordinated and timely epidemiological investigation of disease occurrence.

6.4.4 Coastal Storm Capabilities

Development along the San Luis Obispo County coast is regulated by the standards and policies established in the Coastal Zone Land Use Ordinance (Title 23). All proposed development applications on the coast is reviewed in coordination by the Coastal Commission and the County Planning and Building Department. Development is not permitted near the top of eroding coastal bluffs. San Luis Obispo County will require coastal bluff erosion studies to determine the rate of erosion and the resulting safe distance from the top of the bluff for development.

6.4.5 Dam Failure Capabilities

6.4.5.1 Dam and Levee Failure Evacuation Plan (2016)

The Dam and Levee Failure Evacuation Plan is an annex to the County's Emergency Operations Plan and contains information specific to the actions that will need to be taken in the event of a dam or levee failure. The Plan sets forth guidelines and checklists for initial and general emergency management response, and EAS warning message specific to each dam and levee identified in the plan. The Evacuation Plan also include a hazard assessment in which it describes the area dams and levees and the overall potential effects of each one failing.

6.4.6 Drought and Subsidence Capabilities

6.4.6.1 San Luis Obispo County Flood Control and Water Conservation District

The San Luis Obispo County Flood Control and Water Conservation District is administered by the County Board of Supervisors and Department of Public Works to address various water related issues in the County including flood control (described in more detail below under Flood Capabilities and in Annex T) and water resources management. The District is responsible for collecting and monitoring data from stream and rain gauges, groundwater wells, and reservoirs to support the County's water resource planning efforts. The District manages both regional planning efforts for groundwater, watershed and water infrastructure resiliency, and for specific operations such as the Nacimiento Water Project, State Water Project, Lopez (Zone 3) System, and Los Osos Wastewater Recycling Facility. During the 2015 and 2022 droughts the District provided community resources describing water restrictions and tips for conserving water.

Drought Task Force

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The WRAC advises the County Board of Supervisors on water resources policy decisions related to the District including determining needs and financial capabilities. The WRAC also recommends specific water resource and water conservation programs and methods of financing those programs to the County Board of Supervisors. San Luis Obispo County, following the alternative process (California Water Code (CWC) Section 10609.70 (a)(2)), is using the WRAC to advise on and monitor drought, including the County Drought Resilience Plan (DRP) development. 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 WRAC is supported by an Internal Working Group (IWG) that includes the County Departments of Groundwater Sustainability, Emergency Services, Planning and Building, Public Works, County Counsel, and the California Department of Forestry.

Drought and Water Conservation Initiatives

The "Every Drop Counts" drought media campaign was developed in 2019-2023 and has served as a rallying point for the Water Conservation Program in the Public Works Department.

The County has implemented multiple projects funded through Proposition1 (Water Quality, Supply and Infrastructure Improvement Act of 2014) and Proposition 68 (Parks, Environment, and Water Bond Act of 2018). Examples include:

- IRWM Funding: Through the IRWM program, the County has collaborated with regional partners to implement projects that enhance water supply reliability, improve groundwater recharge, and support disadvantaged communities. Projects funded through the IRWM have included:
  - Well monitoring and data collection in the Paso Robles Subbasin,
  - Small water system interconnection feasibility studies, and
  - Recycled water pipeline extensions and infrastructure improvements.
- Emergency Drought Response Grants: During the 2016-20165 drought and 2020-2022 drought, the County coordinated with the Department of Water Resources (DWR) and State water Resources Control Board (SWRCB) to access emergency drought relief funds. These grants supported:
  - Bottled water and hauled water programs for residents reliant on dry wells,
  - Emergency well deepening or replacement for vulnerable households, and
  - Installation of water storage tanks and small-scale treatment systems.
- Proposition 68 Technical Assistance Funding: The County has served as a fiscal agent and regional coordinator for grants aimed at enhancing the drought resilience of small water systems and disadvantaged communities. This has included funding for needs assessments, vulnerability mapping, and pilot programs for alternative water solutions.

6.4.6.2 Regional Water Management Group (RWMG)

The San Luis Obispo County methods of financing water resource programs (RWMG) is a collaboration of twenty-nine local agencies and nonprofit organizations responsible for developing and implementing the Integrated Regional Water Management (IRWM) plan. IRWM planning efforts are intended to address all aspects of water resources in the San Luis Obispo County region. The RWMG is comprised of various stakeholder groups that include incorporated cities, community service districts, special districts, nonprofit organizations, water purveyors, resource conservation districts, and other water resources stakeholders. The County

Flood Control and Water Conservation District serves as the lead agency. The RWMG is currently in the process of updating the 2014 IRWM Plan, which will also include future updates to the County's Stormwater Resource Plan (2018). The IRWM Plan, originally developed in 2005, was updated in 2014 to include more information related to water supply and drought events. The IRWM Plan identifies priority issues in the region and sets forth projects and programs to achieve the plans goals and objectives. The Plan is approved by the California Department of Water Resources and each participating member of the RWMG is responsible for adopting the Plan in order to be eligible to receive future State grant funding.

6.4.6.3 Countywide Water Conservation Program

In response to a multi-year statewide drought and declining water levels in the Nipomo Mesa Water Conservation Area (part of the Santa Maria Groundwater Basin), Los Osos Groundwater Basin and the Paso Robles Groundwater Basin, the County Board of Supervisors adopted Resolution 2015-288 on October 27, 2015 to establish the Countywide Water Conservation Program (CWWCP). The program was created to assist with water conservation within these basins. A key strategy of this program is to ensure all new construction and new or expanded agriculture will offset its predicted water use on other properties with in the same basin. Each groundwater basin and conversation area have specific policies and programs to assist residents in meeting the offset requirements. Some of the programs include the cash for grass program, plumbing retrofit program, and a new construction program. The passing of Resolution 2015-288 also led to the adoption of several specific amendments related to water natural new development and water waste prevention within the following documents and ordinances:

- The Agricultural Element;
- The Conservation and Open Space Element;
- Title 8 (Health and Sanitation Code);
- Title 19 (Building and Construction Code);
- Title 22 (Land Use Ordinance); and
- Ordinance 3274 (County Fee Schedule)

6.4.6.4 Groundwater Sustainability Plans and Ground Water Sustainability Agencies

The 2014 Sustainable Groundwater Management Act (SGMA) is a comprehensive State law that sets the framework for a statewide, long-term sustainable groundwater management by local entities. Under SGMA, the California Department of Water Resources (DWR) designated priority for groundwater basins throughout the State as either high, medium, low, or very low. There are eight local priority groundwater basins and subbasins (collectively, "basins") identified in San Luis Obispo County: Paso Robles, Atascadero, Arroyo Grande, Santa Maria, Los Osos, Warden Creek, San Luis Obispo Valley, and Cuyama Valley. SGMA requires high and medium priority basins to form Groundwater Sustainability Agencies (GSAs) consisting of one or more local public agencies overlying the basin. These GSAs collect and share groundwater level data in adjudicated and critically overdrafted basins.

Since the 2020 HMP update, two groundwater sustainability plans (GSP) were published for portions of SLO County. These plans are the product of efforts to comply with SGMA and provide a comprehensive evaluation and plan for adapting to worsening drought conditions in SLO County and throughout the state of California. Two GSPs exist for portions of SLO County. The Paso Robles Subbasin Groundwater Sustainability Plan was approved in 2020 and the San Luis Obispo Valley Basin Groundwater Sustainability Plan was approved in 2021.

SGMA does not apply to the portions of the Los Osos and Santa Maria basins that are under adjudication, and as a result these basins (including fringe areas outside of the adjudicated

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areas) are designated very low priority. The Warden Creek, Arroyo Grande, and Atascadero basins are designated very low priority following the recent boundary modification and prioritization processes. As a result, these five basins are no longer subject to the requirements of SGMA.

6.4.7 Earthquake Capabilities

6.4.7.1 The Great California ShakeOut

The Great California ShakeOut is an annual statewide earthquake drill to prepare citizens on what actions to take in the event of an earthquake. On October 18th, 2018 at 10:18 a.m. individuals throughout San Luis Obispo practiced *Drop, Cover and Hold on* and stayed in that position for 60 seconds, as if a large earthquake had just occurred. The goal of the drill is to prepare California for major earthquakes and inform citizens on what to do before, during and after an earthquake. The California ShakeOut is held the third Thursday of October and every year local governments and individual citizens have the opportunity to participate. The 2019 Great California ShakeOut will take place on October 17th; approximately 3,044 participants in San Luis Obispo County are registered to participate in 2019.

6.4.7.2 Earthquake Emergency Response Plan (2015)

San Luis Obispo County Earthquake Emergency Response Plan is a component of the County's Emergency Operations Plan and establishes the procedures, policies and organizational response to an earthquake event that affects the county. Similar to other emergency response plans in the county the most applicable section to hazard mitigation is the hazard assessment section. This section identifies past earthquake events that have affected the county and describes each active or potentially active faults that are capable of producing damaging earthquakes. Within this section the Plan also identifies the potential effects of a damaging earthquake including secondary hazard events such as hazardous materials incidents, nuclear power plant failure and dam failure.

6.4.7.3 Uniform Code for Building Conservation – Title 19

In 1987 The California legislature passed Senate Bill 547, which required all cities and counties located in Seismic Zone 4, which the County of San Luis Obispo is part of, to conduct an inventory of potentially hazardous structures, including unreinforced masonry buildings. To comply with the requirements of SB 547, the County of San Luis Obispo adopted the Uniform Code for Building Conservation as part of Title 19 (Building and Construction Ordinance) of the County Code. Surveys that were conducted to identify potentially unsafe unreinforced masonry buildings identified about 80 structures that required modifications to meet specified earthquake resistance structural standards. Identified structures that require seismic retrofit are generally located in various areas, mostly urban areas. The County's ordinance implementing SB 547 requires the owners of identified unreinforced buildings to demolish the structures or complete modifications, depending upon the building's use and number of occupants.

6.4.8 Flood Capabilities

6.4.8.1 National Flood Insurance Program (NFIP)

The goals of the NFIP are to reduce future flood damage through floodplain management, and to provide people with flood insurance. Community participation in the NFIP is voluntary. The County has participated in the NFIP since 1975. The County and municipalities continue to maintain full compliance with the NFIP.

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The Public Works Public Works, Deputy Director Transportation Group is designated as the Floodplain Administrator (FPA). Local floodplain management regulations are actively implemented and enforced by the FPA to regulate and permit development within SFHAs. This includes reviewing construction and land use permits to confirm compliance with elevation, structural, and zoning requirements aimed at reducing flood risk to properties and residents. New construction in flood hazard areas are required to be raised one foot above base flood elevation.

The County consistently adopts the latest effective Flood Insurance Rate Map (FIRM) provided by FEMA, updating local floodplain management practices to align with newly identified flood risks. The updated FEMA FIRM maps were adopted on June 6, 2024. This helps to ensure the community is aware of the most recent flood hazard data for planning and development purposes.

Following flood or other damage events, the County enforces substantial improvement/substantial damage provisions by evaluating damaged properties to determine if they meet thresholds requiring them to comply with updated floodplain management standards. If substantial damage is determined, properties must undergo upgrades to meet current floodplain standards before they can be repaired or rebuilt. This process helps to reduce future risk by ensuring that post-event repairs and reconstructions contribute to long-term flood resilience.

The ways in which each municipality are described in further detail in each jurisdiction's annex. Continued compliance is also described in Section 7 Mitigation Strategy. Specifics on flood insurance policies and repetitive loss properties are described in 5.3.8.

The County is taking action to:

- Participate and comply with the NFIP. Strictly enforce flood hazard regulations both current and revised. FEMA regulations and other requirements for the placement of structures in floodplains shall be followed.
- Maintain standards for development in flood-prone and poorly drained areas.
- Establish mitigation for new development impacts on flooding.
- Identify areas known to be prone to flooding, such as Los Osos, Avila Valley, Santa Margarita, Cambria, Oceano and Templeton by developing community drainage studies. Seek stakeholder involvement in developing funding mechanisms and in acquiring grants to implement listed flood control improvements.
- Fire, Public Works, and law enforcement agencies will maintain and improve their ability to respond to water hazard emergencies throughout the County.
- Outline the needs for mapping of high-risk areas of the County.
- Develop Flood Control Zones and assessment districts to finance capital projects and provide for on-going maintenance of facilities and waterways.

Community Rating System (CRS): An additional indicator of floodplain management capability is the active participation of local jurisdictions in the CRS. The CRS is an incentive-based program that encourages counties and municipalities to undertake defined flood mitigation activities that go beyond the minimum requirements of the NFIP, adding extra local measures to provide protection from flooding. All of the 18 creditable CRS mitigation activities are assigned a range of point values. As points are accumulated and reach identified thresholds, communities can apply for an improved CRS class. Class ratings, which run from 10 to 1, are tied to flood insurance premium reductions. As class ratings improve (decrease), the percent reduction in flood insurance premiums for NFIP policy holders in that community

increases. The cities of Morro Bay and San Luis Obispo participate in the CRS, though the five other incorporated cities and County do not.

6.4.8.2 San Luis Obispo County Land Use Ordinance and Coastal Zone Land Use Ordinance

The Land Use Ordinance for the Inland Area and Coastal Zone are contained in Title 22 and Title 23 of the SLO County Code, respectively. These statutes provide standards for the preparation and submittal of drainage plans for new development. These regulations specify when drainage plans are required, the contents of an adequate drainage plan, drainage standards, and the plan review and approval process. The Land Use Ordinance for both areas of the county contains the County's Floodplain Ordinance, which specifies development standards for areas that have a Flood Hazard (FH) combining land use designation. The development standards contained in the Floodplain Ordinance pertain to land use permit processing and construction standards for new development located in areas that have the potential to be inundated by a 100-year flood.

6.4.8.3 Flood Control and Water Conservation District

The San Luis Obispo County Flood Control and Water Conservation District (District) was established in 1945 with the purpose "to provide for control, disposition and distribution of the flood and storm waters of the district and of streams flowing into the district..." In 1968, Resolution No. 68-223 was adopted and defined the policy role of the District relating to the costs of planning, design, construction, operations and maintenance of drainage and flood control facilities. In accordance with Resolution 68-223, the District cannot be responsible for direct funding of community specific mitigation improvements. The District uses its general funding to identify flooding problems, recommend solutions, and help local areas implement recommended solutions. The District has developed a model on how to approach these important water resource issues, including steps on how to integrate solutions for multiple benefits and community acceptance.

In 2016, the District Board of Supervisors adopted Resolution No. 2016-281 to update the 1968 policy, including provisions related to financing for implementation projects with respect to changes in California law such as Proposition 218. The policy update also includes identifying the broad range of services provided or anticipated to be provided by the District to help achieve sustainable water resources in all areas of the County.

The District, through the County Public Works Department, develops flood control projects that could protect life and property from flood hazards through community involvement and establishing funding mechanisms. The District has the authority to maintain and construct flood control improvements on major drainage facilities located throughout the County when specific flood control zones are established.

The District has a regional role in the County and can work with individual cities or communities when requested. More information on the District can be found in Annex T.

6.4.9 Hazardous Materials Capabilities

6.4.9.1 Hazardous Materials Emergency Response Plan (2013)

The San Luis Obispo County Hazardous Materials Emergency Response Plan provides information related to the response and responsibilities of county departments in the event of a hazardous materials incident. The Plan is written with the intent that it will be read and learned prior to hazardous materials emergency.

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6.4.9.2 CUPA Program

The Environmental Health Division under the County of San Luis Obispo Public Health Department is the County's Certified Unified Program Agency (CUPA) which applies the state regulatory standards and programs related to hazardous materials. The following are there are seven (7) hazardous materials programs under the County's CUPA Program:

- Aboveground Petroleum Storage Tank Program
- California Accidental Release Prevention Program
- Hazardous Materials Business Plan Program
- Hazardous Waste Generator Program
- Household Hazardous Waste Disposal
- Tiered Permitting Hazardous Materials/Waste Program Permit
- Underground Storage Tank Program

6.4.9.3 Public Outreach and Education

The County Office of Emergency Services (OES) in collaboration with Pacific Gas & Electric (PG&E) produce an annual Emergency Planning Calendar that is mailed to businesses and residences within the Diablo Canyon Emergency Planning Zone as well as available to view online. The calendar provides the following information:

- How to prepare for a potential emergency at the Diablo Canyon Power Plant,
- what to do during an emergency, public alert and notification system,
- What to do if you hear the warning sirens, evacuation information,
- School relocation information,
- Sheltering place information,
- Possible effects to agricultural products in the region,
- A map and explanation of the emergency planning zones,
- An explanation of government response and contacts information.

The calendar also provides information for those you do not have transportation to evacuate as well as an "Evacuation Assistance Card" to be filled out and returned to OES by individuals who are unable to evacuate themselves due to a disability or medical need.

6.4.10 Landslide Risk Reduction Capabilities

The California Building Code, which has been adopted by all seven cities and the County of San Luis Obispo, requires that site specific investigations be performed for development located in hillside areas. Investigations and practices typically required for hillside development include the following:

- Conduct thorough geologic/geotechnical studies by qualified geotechnical engineers and engineering geologists.
- Require both engineering geologists and geotechnical engineers during construction to confirm preliminary findings reported during initial studies.
- Require certification of the proposed building site stability in relation to the adverse effects of rain and earthquakes prior to the issuance of building permits.

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- Mandate coordination between the civil engineer and the project engineering geologist and geotechnical engineer during construction grading.
- Require mitigation of on-site hazards caused by grading that may affect adjoining properties, including erosion and slope instability.

The County acknowledges that areas of known landslide activity are generally not suitable for residential development. The County will avoid development in areas of known slope instability or high landslide risk when possible and continue to encourage that development on sloping ground use design and construction techniques appropriate for those areas. More stringent slope stability criteria, or dynamic stability analysis, may apply to improvement design under the jurisdiction of some agencies.

6.4.11 Tsunami Capabilities

County programs related to tsunamis include: working with Federal and State agencies to better understand and prepare for the hazard of tsunamis and to improve the ability to respond to tsunami warnings provided by NOAA's West Coast and Alaska Tsunami Warning Center.

March from 25 to March 29, 2019 was Tsunami Week in San Luis Obispo County. This was an opportunity for the County to share information with the people and organizations on how to prepare for and understand the warning signs of a tsunami event. During this week, the National Weather Service conducted a test of the Emergency Alert System (EAS) and NOAA Weather Radio All Hazards.

The County installed Tsunami evacuation signage in 2022 as a result of the implementation of an action in the 2014 version of this HMP.

6.4.11.1 Tsunami Emergency Response Plan (2016)

This Plan is an annex to the County's Emergency Operations Plan and contains information specific to the actions that will need to be taken in the event of being notified of a possible tsunami or in the event of an actual tsunami along the County's coastline. Section two of the Response Plan is the Hazard Assessment which includes analysis on the hazard potential, inundation mapping, and potential warning challenges in the event of a tsunami.

6.4.12 Wildfire Capabilities

6.4.12.1 CAL FIRE/San Luis Obispo County Fire Unit Strategic Fire Plan (2018)

The County's Fire Unit Strategic Fire Plan assess the fire situation within the SLO County Fire Unit and explains the preparedness and firefighting capabilities within each division of the Fire Unit. The development of the Plan included local stakeholders to help identify priorities and strategic areas for pre-planning and fuel treatment. The Unit Fire Plan is updated annually and is developed to work cohesively with the CAL FIRE/San Luis Obispo County Fire Departments Service Level Analysis and the California Fire Plan. The Plan identifies six (6) Planning Areas to facilitate localized pre-fire planning efforts and explain priority WUI areas within the Planning Areas that would benefit from fuel reduction or pre-fire planning efforts.

The Plan further identifies pre-fire management strategies and tactics for each Planning Area. Pre-fire management strategies are, "all activities undertaken by county land managers, property owners, agencies and fire departments to reduce the risk of wildfire and resulting suppression costs…" (CAL FIRE, 2018). These management strategies focus on the four functions within the County Fire Unit which include fire prevention (fire codes, design, construction and engineering practices for planning a fire safe community), engineering and structure ignitability, fire information and education and vegetation management. The pre-fire

management tactics the Plan identifies are tactics employed by CAL FIRE/SLO through multiple scalable programs to be implemented countywide or at the community level. These tactics include opportunities for fire prevention and engineering tactics which can be integrated into existing planning mechanisms such as the County General Plan, County Municipal Code and Building Plans Reviews and Inspection Program.

Appendix A of the Plan lists all CAL FIRE/SLO County Fire Unite Pre-Fire Projects including the Planning Area, status, estimated completion date, project type and net acres. The comprehensive information provided in the CAL Fire/San Luis Obispo County Fire Unit Plan helps to inform other pre-fire planning efforts including county and municipality CWPPs, Fire Danger Operating Plan, County Fire Service Level Analysis, Central Coast Operating Plan, and Wildland Pre-Attack Plans.

6.4.12.2 Community Wildfire Protection Plan (CWPP) (2019)

The overall goal of the San Luis Obispo County's Community Wildfire Protection Plan is to "provide a county level strategic planning level framework for hazardous fuel assessment and reduction within San Luis Obispo County so that structures and assets are provided additional protection, reducing the potential of ignition" (San Luis Obispo, 2019). The plan addresses fire protection efforts to minimize the risk to watersheds, communities, assets, firefighters and the public throughout the County. The CWPP was developed to work together with the California Fire Plan and in collaboration and coordination with the San Luis Obispo County fire agencies, County Fire Council and various stakeholders. The plan identifies strategic measures to reduce vulnerabilities, public education and outreach strategies, and identifies fuel reduction goals and techniques while recognizing the variation in fuels, weather, topography, community and agency priorities throughout the County. The CWPP discusses Cooperative Assistance between the County fire agencies and list existing the automatic and mutual aid agreements between fire agencies. The CWPP is a living document that is managed and updated routinely by the fire agencies and Fire Council. The County's CWPP serves as the foundation document for all local community wildfire protection plans and their wildfire mitigation projects set forth in those plans.

6.4.12.3 Firewise Communities

The Firewise USA® program provides a framework for communities to learn how to adapt to living with wildfire, including providing a framework for neighbors in a community to work together and be empowered to reduce risks to wildfire at the local level. The following communities in the County of San Luis Obispo that are certified Firewise communities.

- Ranchita Estates, Arroyo Grande
- Cambria
- Lake Nacimiento, Paso Robles
- Heritage Ranch HOA, Paso Robles

In addition to the communities listed above, Cabrillo Estates a community in Los Osos met with Cal Fire/SLO County Fire Department and SLO County Fire Council to discuss becoming a Firewise Community.

6.4.12.4 Fire Prevention Ordinances

Several local ordinances direct fire prevention activities within San Luis Obispo County.

These include Chapter 19.20, Construction Standards of Title 19, of the County Code; as well as Section 22/23.05.050 of the Land Use Ordinance and Coastal Zone Land Use Ordinance. These sections of Titles 22 and 23 contain standards pertaining to the preparation and review of fire safety plans, fire safety standards, site access, and driveway requirements. In addition, the

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California Fire Code has been adopted by San Luis Obispo County with amendments as part of County Ordinance Title 16.

6.4.12.5 California Fire Code

This code may be adopted by local jurisdictions, with amendments, and provides minimum standards for many aspects of fire prevention and suppression activities. These standards include provisions for access, water supply, fire protection systems, and the use of fire-resistant building materials.

6.4.12.6 California Health and Safety Code and the California Building Code

The Health and Safety Code provides regulation pertaining to the abatement of fire related hazards. It also requires that local jurisdictions enforce the California Building Code, which provides standards for fire resistive building and roofing materials, and other fire-related construction methods.

Title 19 of the California Code of Regulations: These regulations pertain to fire prevention and engineering measures for State Fire Marshal regulated occupancy.

6.4.12.7 Public Resources Code and Title 14 of the California Code of Regulations: The Public Resources Codes

(PRC) 4290 and 4291 are State laws that have a significant impact on the prevention of large losses of life and property in the wildland/urban intermix areas from a destructive wildfire. The intent of these codes is to require new development in wildfire prone areas to be built with adequate road access, water for firefighting, addressing, fire resistive construction, and vegetation clearance. The code also requires the owners to maintain an adequate defensible space around their buildings from an approaching fire. These laws are an important component in the land use approval process in the County as well as in enforcement by the fire department.

6.4.12.8 Assembly Bill 337 (Bates Bill)

In response to the Oakland Hills fire of 1991, this bill was passed in 1992 and requires brush clearance and fire-resistant roof material (Class A or B) to be used on all new construction that is located in areas designated as being a “Very High Fire Hazard Severity Zone”. This applies mostly to the unincorporated areas; Atascadero is the only city in the County that has an area designated as a Very High Fire Hazard Severity Zone.

6.4.12.9 San Luis Obispo County Community Fire Safe Council

In addition to the measures outlined above to prevent and best respond to fires, the County has undertaken a variety of mitigation activities including an aggressive inspection program, a Countywide Community Fire Safe Council, a vegetation management program, completing the removal of fuel through a chipping program, creation of community separators and pre-planning major wildfire scenarios in the high and very high fire danger areas (includes evacuation plans and pre-plans).

Fires impact an array of agencies, organizations and citizens known as stakeholders. These stakeholders are represented on the San Luis Obispo County Community Fire Safe Council. The purpose of the Council is to bring these representatives to the table to discuss solutions for the prevention and reduction of losses from fire. The primary objective and purpose of the San Luis Obispo County Community Fire Safe Council is to provide education, exchange information and foster fire prevention and fire safety within the County of San Luis Obispo. The San Luis Obispo County Community Fire Safe Council plays a vital role in the development and implementation and reviews all elements of the Fire Management Plan. This practice ensures buy-in from the stakeholders.

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6.4.12.10 Mutual Aid Agreements

The California Department of Forestry and Fire Protection (CAL FIRE), U.S. Forest Service (USFS), and the Bureau of Land Management (BLM) have entered into mutual aid agreements for the purpose of wildfire protection in San Luis Obispo County. Mutual aid agreements are reciprocal arrangements in which fire protection agencies share personnel and equipment during emergency situations. Cities and fire protection districts are also participants in various mutual aid and auto aid agreements, including the State Master Mutual Aid Agreement.

6.4.12.11Existing Fire Protection Services

Services to San Luis Obispo County are provided by the California Department of Forestry and Fire Protection (CAL FIRE) under contract to provide full service fire protection. CAL FIRE is responsible for the administration of the fire stations that serve the unincorporated areas of the County not within fire protection or other special districts and provides equipment and training for volunteer stations located throughout the county.

6.4.12.12 Risk Reduction Measures

A number of steps have been taken by San Luis Obispo County to reduce the potential for wildfires. Although these measures cannot eliminate the risk of wildfire related damages, they will help to substantially reduce the associated risk. Wildfire hazard reduction measures generally include implementation by the County of the following precautions:

- Use fire resistant building materials and construction methods: Standards have been adopted to reduce the use of combustible building materials in high fire hazard areas. Standards for fire resistive building materials and construction methods are provided by the California Building Code (Chapter 7A), The California Fire Code (Chapter 47) and the Public Resources Code.
- Provide defensible space around structures: This broad measure as implemented in the County includes a number of specific actions that are taken to minimize wildfire risks. Providing a defensible space area around a structure serves a dual function of limiting fuel for the fire to approach the structure, as well as providing a position from which fire fighters can combat the blaze. Wildfire risk reduction and management practices enforced in the County include the removal or thinning of highly combustible vegetation, the use and maintenance of fire-resistant plantings, providing clearings around structures and other combustible materials, and the implementation of a variety of other fuel reduction and fire prevention/ suppression measures.
- Provide adequate water supply: Water that is used for fire suppression purposes, and the pressure under which it is delivered, is referred to as “fire flow.” The fire flow that would be required for a specific development is dependent upon a variety of factors, including the type of construction, the use or occupancy of the structure, and the location of surrounding structures. For residential development, the County determines adequate fire flow ranges to be a minimum of 1,000 gallons per minute at 20 psi, for a minimum of two hours.
- Provide adequate access: Adequate access to structures includes providing roadways that are passable by large fire-fighting equipment. This requires roadways to have adequate widths, as well as gradients, bridges, and turn-around areas that accommodate fire trucks.

6.4.13 Climate Change Capabilities

The 2010 Climate Adaptation Plan continues to provide guidance for the county’s actions to cope with the effects of climate change. This document provides a comprehensive evaluation and plan for adapting to and mitigating the challenge related to climate change that face SLO County. To supplement that document and provide alignment with more recent state

legislation this MJHMP also considers climate change mitigation as it relates to natural hazards. Climate change considerations consistent with SB 379, including adaptation strategies and adaptation projects from the County and municipality's CAAPs, have been incorporated into the MJHMP update and cross linked with related Safety Element considerations (see summary in Appendix F).

The County has acknowledged that climate change is occurring and has continued to plan for it. The County's mitigation strategy in Section 7 has two climate change related mitigation actions that are continuing from the previous mitigation action plan:

- SLO-22 (formally C.7.2 in 2019 and previously 10.D) Support Efforts to reduce greenhouse gas emissions.
- SLO-23 Consider potential climate change impacts when planning new facilities and critical infrastructure.
- SLO-24 (formally C.7.4 in 2019 and previously formally 10.B) Continue to promote energy efficiency and renewable energy within the County to reduce peak load demand.

The HMPC gave the following updates for these actions related to energy efficiency, renewables and energy storage and other efforts:

Energy Efficiency

- Delivered WBS 350177 to replace 16 natural-gas powered water heaters with electric Heat Pump Water Heaters at 14 different facilities. The project is estimated to reduce the County's entire municipal portfolio of natural gas use by nearly nine percent per year, or about 34,000 therms per year, while electricity use is only expected to rise by less than a third of one percent per year. The project will offset an estimated 1685 metric tons of greenhouse gas emissions.
- Implemented two phases of the Sustainable Turnkey Solutions project with PG&E, which is estimated to reduce County energy consumption by over ten percent.
- Implemented exterior lighting energy efficiency project at El Chorro Park.
- Implemented personal computer power monitoring software on Public Works' computers.
- Implementing two lighting energy efficiency projects at 1087 Santa Rosa in SLO and at the Los Osos Sheriff Substation. (current status: ordering equipment for installation)
- Developing mechanical energy efficiency projects at three Park sites
- Auditing fourteen sites for energy efficiency opportunities to consider for next fiscal year.

Renewable & Energy Storage

- Implemented ground-mounted solar photovoltaic system at Creston Fire Station.
- Approved two Energy Service Agreements for solar photovoltaic carport canopies at Dept. of Social Services and dairy Creek Golf Course parking lots. (current status: preconstruction)
- Audited ten sites for renewable energy and energy storage opportunities.
- Developing solar photovoltaic systems and battery storage projects at six County sites (County Operations Center, Los Osos Wastewater Treatment Plant, Lopez Water Treatment Plant (Tesla Battery Energy Storage Systems installed and in operation 2023, Nacimiento booster stations)

Other

- Implemented software that allows tracking energy use at County facilities.

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- Trained five departments to date (Auditor-Controller-Treasurer-Tax Collector-Public Administrator, Parks and Recreation, Public Works, Drug and Alcohol Services, Planning & Building)
- Installing electrical submeters in downtown San Luis Obispo campus to track energy use by building (status: preconstruction)
- Formed County-wide stakeholder group to direct energy initiatives

Many of these County-facility projects were initiated and initially managed by the Department of Planning & Building's Energy Section but are now overseen and directed by the Department of Public Works Facilities Division. Other departments in the County have also taken steps to educate the public on the potential effects of climate change. The County Public Health Department conducts public outreach through pamphlets and brochures on how climate change may lead to increased vulnerabilities related to community health.

6.5 Opportunities for Enhancement

The 2025 update provided the County an opportunity to review and update the capabilities currently in place to mitigate hazards. This also provided an opportunity to identify where capabilities could be improved or enhanced. Specific opportunities could include:

Join the CRS: The County may consider joining the Community Rating System to improve flood insurance affordability, public flood hazard notification, and enhanced floodplain management. The County is already going above and beyond some of the minimum NFIP standards by requiring a one foot above base flood elevation freeboard requirement for all new structures permitted in flood hazard areas. The County can get credit for this and potentially lower the cost of flood insurance for residents in the unincorporated areas. A mitigation action specific to exploring the cost/benefit of the CRS has been added to this plan's mitigation strategy.

Become a Tsunami Ready Community: The County has been in process of becoming a Tsunami Ready Community including installing awareness signs in populated coastal areas. This has been a work in progress, and requires overcoming issues with installing signage within Caltrans encroachments.

Training: Provide training opportunities to help inform County staff on how best to integrate hazard information and mitigation projects into their departments.

Encourage Additional Firewise Communities: San Luis Obispo County Fire/Cal Fire could continue to help the number of Firewise communities grow and build resilience to wildfires.

Alignment of General Plan Safety Element and related polices with SB 2911 and SB 1241 and updated Cal FIRE (Fire Hazard Severity Zone) map updates: Recent state legislation is requiring additional fire safe building practices, and changes/updates in the Cal Fire FHSZ maps may impose additional requirements in areas potentially prone to wildfire. Effective January 2019 SB 2911 requires parcels in Very High Severity Zones to have fire safe design. The County should review updated maps, becoming effective in mid-2025, and update policies to align with the new legislation.

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7 Mitigation Strategy

DMA REQUIREMENT §201.6(C)(3):

[The plan shall include] a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section describes the mitigation strategy process and mitigation action plan for the San Luis Obispo County Multi-Jurisdictional Hazard Mitigation Plan. It describes how the County and participating jurisdictions met the requirements for the following from the 10-step planning process:

- Planning Step 6: Set Goals
- Planning Step 7: Review Possible Activities
- Planning Step 8: Draft an Action Plan

The mitigation strategy reflects the results of the collaborative work of the HMPC. Subsection 7.2 Mitigation Action Plan is based on the updated planning process, risk assessment, capability assessment, goal setting, and the identification of mitigation actions. Taking all of these into consideration, the HMPC developed the following overall mitigation strategy:

- **Communicate** the hazard information collected and analyzed through this planning process as well as HMPC success stories so that the community better understands what can happen where and what they themselves can do to be better prepared.
- **Implement** the action plan recommendations of this plan.
- **Use** existing rules, regulations, policies, and procedures already in existence. Given the flood hazard in the planning area, an emphasis should be placed on continued compliance with the National Flood Insurance Program and participation by all communities in the Community Rating System.
- **Monitor** multi-objective management opportunities so that funding opportunities may be shared and packaged, and broader constituent support may be garnered.

7.1 Goals and Objectives

DMA REQUIREMENT §201.6(C)(3)(I):

[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards

Throughout a series of meetings during the 2025 update process the HMPC reviewed the results of the hazard identification, vulnerability assessment, and capability assessment update. This analysis of the risk assessment identified areas where improvements could be made and provided the framework for the HMPC to update planning goals and objectives and the ultimate mitigation strategy for the San Luis Obispo County planning area. As part of the planning process, goals and objectives from the previous plan were revised, updated, and combined and new goal statements were added. This included a review of the California State Hazard Mitigation Plan goals for potential alignment. The HMPC agreed to move some hazard specific goals to objectives, and to condense the wording. The end result was a new set of goals and objectives that were reorganized to reflect the updated risk assessment and new priorities for this plan update.

Goals were defined for the purpose of this mitigation plan as broad-based public policy statements that:

- Represent basic desires of the community;

- Encompass all aspects of community, public and private;
- Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;
- Are future-oriented, in that they are achievable in the future; and
- Are time-independent, in that they are not scheduled events.

Goals are stated without regard to implementation. Implementation cost, schedule, and means are not considered. Goals are defined before considering how to accomplish them so that they are not dependent on the means of achievement. Goal statements form the basis for objectives and actions that will be used as means to achieve the goals. Objectives define strategies to attain the goals and are more specific and measurable.

The updated goals and objectives of this plan are:

3. Strengthen risk reduction and resilience by minimizing risks to life, property, infrastructure, and the environment through comprehensive, community-wide strategies.
    a. **Objective 1.1**: Limit new development in hazard areas, and as permissible, build to standards that will prevent or reduce damage.
4. Boost outreach and capacity to improve disaster resilience for vulnerable communities.
    a. **Objective 2.1**: Assure that at-risk populations and those with access and functional needs (AFN) are addressed in all plans and procedures.
    b. **Objective 2.2**: Enhance the safety of the community.
5. Promote regional collaboration to reduce hazard vulnerability and strengthen community resilience.
    a. **Objective 3.1**: Identify and collaborate on hazard mitigation projects that benefit multiple jurisdictions.
    b. **Objective 3.2**: Improve existing capabilities to manage emergency situations.
6. Reduce injury, loss of life, and damage to critical facilities and infrastructure from natural hazards.
    a. **Objective 4.1**: Enhance the ability of community assets so as to minimize damages sustained from potential hazards.
    b. **Objective 4.2**: Develop a comprehensive approach to reducing the level of damage and losses due hazards through utilizing resilient community and critical infrastructure design, management, code enforcement, GIS mapping, improved policies, procedures, training evacuation planning, and planning processes.
    c. **Objective 4.3**: In order to better protect life and property, acquire and develop more accurate, comprehensive countywide GIS data sets.
    d. Objective 4.4: Minimize impacts to critical facilities from dam inundation.
7. Enhance public education and engagement to increase awareness and preparedness for natural, human-health, and human-caused hazards.
    a. **Objective 5.1**: Educate key stakeholders and the public to increase awareness of hazards and opportunities for mitigating hazards
    b. **Objective 5.2**: Curtail the entry and spread of infectious diseases within San Luis Obispo County to minimize human morbidity and mortality.

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c. **Objective 5.3**: Curtail the entry of harmful agricultural pests into San Luis Obispo County to minimize the extent of damage and destruction to forests, crops, farm animals, and humans.

8. Use the best science and data to guide resilience efforts and prioritize mitigation projects for natural hazards and climate change impacts.

   a. **Objective 6.1**: Minimize the harmful effects of climate change by identifying, assessing and preparing for impacts. Coordinate with the incorporated cities and special districts to implement strategies with regional significance.

DMA REQUIREMENT §201.6(C)(3)(II):
[The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

The next step in the mitigation strategy is to identify and analyze a comprehensive range of specific mitigation actions and projects to reduce the effects of each hazard on new and existing buildings and infrastructure.. The HMPC was provided with the following list of categories of mitigation actions, which originate from the National Flood Insurance Program's Community Rating System:

- **Prevention:** Administrative or regulatory actions or processes that influence the way land and buildings are developed and built.
- **Property protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard or remove them from the hazard area.
- **Structural:** Actions that involve the construction of structures to reduce the impact of a hazard.
- **Natural resource protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems.
- **Emergency services:** Actions that protect people and property during and immediately after a disaster or hazard event.
- **Public information/education and awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them.

At the mitigation strategy meeting the HMPC was provided with a matrix showing examples of potential mitigation action alternatives for each of the above categories, and for each of the identified hazards. The HMPC was also provided a handout that explains the categories and provided further examples. Another reference document titled "Mitigation Ideas" developed by FEMA was distributed to the HMPC via an online link and hard copies were circulated during the in-person meeting. The FEMA "Mitigation Ideas" document lists the common alternatives for mitigation by hazard. The HMPC was also instructed to consider both future and existing buildings in considering possible mitigation actions. Other references distributed to the HMPC were FEMA's 2020 "Mitigation Action Portfolio." FEMA guidance provides four categories of mitigation actions that were discussed at the HMPC meeting in addition to the NFIP/CRS categories:

- Plans and Regulations
- Structure and Infrastructure Projects
- Education and Awareness
- Natural Systems Protection

Other alternatives discussed in the third HMPC included the four 'A's' of mitigation:

- **Alter** the physical nature of the hazard – Such as wildfire defensible space and fuels treatments, snow fences etc.
- **Avert** the hazard away from people, buildings, and infrastructure – Can include engineered solutions, drainage, and channel improvements, floodproofing, fuel breaks
- **Adapt** to the hazard – Through land use planning, building codes and design standards, warning systems etc.
- **Avoid** the hazard – Natural systems protection, open space, acquisition, or relocation of properties out of hazardous areas

As part of the review of mitigation options long-term climate change adaptation strategies and drought mitigation strategies were also discussed. HMPC members were encouraged to incorporate climate change adaptation measures into the mitigation strategy of their respective jurisdictions utilizing resources and guidance available on the Cal-Adapt website, such as the California Climate Adaptation Guide (APG). This incorporation process included review of existing climate action and adaptation strategies in municipal Climate Action and Adaptation Plans (CAAPs) and related planning documents.

County Public Works prepared a list of long term drought mitigation strategies. This was provided for consideration of the HMPC at the third HMPC meeting and can be referenced in Appendix B.

A facilitated discussion then took place to examine and analyze the mitigation options; facilitated discussions occurred in-person during the third HMPC meeting and virtually during the fourth HMPC meeting. Appendix B provides the full matrix of all the alternatives considered. During the third HMP Meeting, each proposed new mitigation action was written on a large sticky note or a new mitigation action worksheet and posted on flip charts in meeting room underneath the hazard it addressed.

7.1.1 Prioritization Process

Once the mitigation actions were identified, the HMPC was provided with several decision-making tools, including FEMA's recommended prioritization criteria, STAPLEE, to assist in deciding why one recommended action might be more important, more effective, or more likely to be implemented than another. STAPLEE stands for the following:

- **S**ocial: Does the measure treat people fairly? (e.g., different groups, different generations) Does it consider social equity, disadvantaged communities, or vulnerable populations?
- **T**echnical: Will it work? (Is the action technically feasible? Does it solve the problem?)
- **A**dministrative: Is there capacity to implement and manage the project? (adequate staffing, funding, and other capabilities to implement the project?)
- **P**olitical: Who are the stakeholders? Did they get to participate? Will there be adequate political and public support for the project?
- **L**egal: Does the jurisdiction have the legal authority to implement the action? Is it legal? Are there liability implications?
- **E**conomic: Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?
- **E**nvironmental: Does the action comply with environmental regulations? Will there be negative environmental consequences from the action?

In accordance with the Disaster Mitigation Act requirements, an emphasis was placed on the importance of a benefit-cost analysis in determining action priority. Other criteria used to assist in evaluating the benefit-cost of a mitigation action included:

- Does the action address hazards or areas with the highest risk?
- Does the action protect lives?
- Does the action protect infrastructure, community assets or critical facilities?
- Does the action meet multiple objectives (Multiple Objective Management)?
- What will the action cost?
- What is the timing of available funding?

The mitigation categories, multi-hazard actions, and prioritization criteria are included in Appendix B: Mitigation Categories, Alternatives, and Selection Criteria.

At the mitigation strategy meeting the HMPC used STAPLEE to determine which of the identified actions were most likely to be implemented and effective. With these criteria in mind, team members were given a set of sticky-dots. The team was asked to use the dots to prioritize projects with the above criteria in mind, essentially voting on the projects. The projects with the most points or votes using a sticky dot exercise became the higher priority projects, and those with the next highest number of sticky dots became the medium priority projects. Those projects with less than three or no sticky dots were the low priority projects.

The HMPC decided that the high priority projects would be those the County and participating jurisdictions would focus on for implementation during this planning cycle. The HMPC decided that the low priority actions would not be prioritized for implementation during this planning cycle. The HMPC also re-prioritized projects that were added during final review of the plan to ensure mitigation actions were explicitly linked to each known natural hazard assessed and the key vulnerabilities. Follow-up meetings (i.e., HMPC Meeting #4) were held with each jurisdiction to finalize the actions that are part of this plan. Participating jurisdictions were given the leeway to prioritize the actions specific to them, using the previously mentioned criteria. The end result was the development of a final and focused list of mitigation actions (e.g., full list of mitigation actions consisted of all the draft actions listed in Appendix B plus the recommended actions that would incorporate policies and implementation measures from other planning documents).

This mitigation strategy also carries forward many mitigation actions developed during the 2019 planning process. HMPC members and jurisdictional planning teams were asked to review their existing mitigation actions and report on the progress made toward implementation and decide whether any incomplete actions should be carried forward for continued or future implementation or be deleted. In some cases, mitigation actions were adjusted to reflect new situations or priorities.

The process of identification and analysis of mitigation alternatives allowed the HMPC to come to consensus and to collectively prioritize recommended mitigation actions. During the voting process, emphasis was placed on the importance of a benefit-cost review in determining project priority; however, this was not a quantitative analysis. Benefit-cost was also considered in greater detail in the development of the Mitigation Action Plan detailed below in subsection 7.2.

Recognizing the limitations in prioritizing actions from multiple jurisdictions and departments and the regulatory requirement to prioritize by benefit-cost to ensure cost-effectiveness, the HMPC decided to pursue mitigation action strategy development and implementation according to the nature and extent of damages, the level of protection and benefits each action provides, political support, project cost, available funding, and individual jurisdiction

and department priority. This process drove the development of a prioritized action plan for the San Luis Obispo County planning area. Cost-effectiveness will be considered in greater detail through a formal benefit-cost analysis when seeking FEMA mitigation grant funding for eligible actions associated with this plan.

7.2 Mitigation Action Plan

DMA REQUIREMENT §201.6(C)(3)(III):
[The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

This action plan was developed to present the recommendations developed by the HMPC for how the San Luis Obispo County planning area can reduce the vulnerability of people, property, infrastructure, and natural and cultural resources to future disaster losses. Over time the implementation of these projects will be tracked as a measure of demonstrated progress on meeting the plan's goals.

7.2.1 Progress on Previous Mitigation Actions

The HMPC reviewed the status of all mitigation actions identified in the 2019 HMP to evaluate the progress in implementing mitigation actions. San Luis Obispo County and all participating jurisdictions have been working steadily towards meeting the goals of their previous plans. Detailed progress notes on mitigation actions previously identified in the 2019 plan are detailed in Table 7-2 and Table 7-3 for the County and within similar tables in the jurisdictional annexes. Table 7-1 below summarizes progress implementing mitigation actions for all the participating jurisdictions

Table 7-1 Summary of Mitigation Action Updates Since 2019

JURISDICTION	2019 ACTIONS	COMPLETED ACTIONS	DELETED ACTIONS	CONTINUED OR IN-PROGRESS ACTIONS	NEW ACTIONS ADDED	TOTAL 2025 ACTIONS
County	37	9	4	24	34	**58**
Arroyo Grande	17	2		15		**15**
Atascadero	19	1	4	14	12	**26**
Grover Beach	26	4	8	14		**14**
Morro Bay	23	4	0	19	5	**24**
Paso Robles	21	4	1	16		**16**
Pismo Beach	15	1	0	14	4	**18**
San Luis Obispo	26	2		24	17	**41**
Avila Beach CSD	2			2		**2**
Cambria CSD	57	4	0	53	4	**57**
Ground Squirrel Hollow CSD	6	1	2	3		**3**
Heritage Ranch CSD	5	1	1	3		**3**
Los Osos CSD	3	0	1	2	3	**5**
Nipomo CSD	3	1		2		**2**

JURISDICTION	2019 ACTIONS	COMPLETED ACTIONS	DELETED ACTIONS	CONTINUED OR IN-PROGRESS ACTIONS	NEW ACTIONS ADDED	TOTAL 2025 ACTIONS
Oceano CSD	35	7	3	25		**25**
San Miguel CSD	5				2	**2**
San Simeon CSD	3			1	2	**3**
Templeton CSD	3					**0**
SD - Cayucos Sanitary District	3	1	0	2	2	**4**
SD - Port San Luis Harbor District	14					**0**
SD - San Luis Obispo FCWCD	6	2	0	4	4	**8**
SD- South SLO Sanitation Dist.	3	2	0	1		**1**
Total	**332**	**46**	**24**	**238**	**89**	**327**

The 2019 mitigation strategy contained 332 mitigation actions total. Of these actions, 46 have been completed and 24 have been deleted, with 238 carried forward into the plan update as either in-progress or being continued in the mitigation strategy. The participating jurisdictions have developed a further 89 new mitigation actions during the 2025 update process, bringing the total number of actions in the 2025 Mitigation Action Plan to 327. These actions addressed a wide variety of hazards, indicating progress towards achieving mitigation goals and increasing resilience. Table 7-2 provides a detailed summary of the mitigation actions from the 2019 Plan that the County has completed or deleted. More details on in-progress, continued, and new actions for the County can be found in subsection 7.2.2 and Table 7-3 below, with detailed tables for each participating jurisdiction located in their respective annexes.

Table 7-2 San Luis Obispo County Completed and Deleted Mitigation Actions from 2019 Plan

2019 ACTION ID	HAZARD(S) ADDRESSED	MITIGATION ACTION TITLE	LEAD AGENCY	ACTION STATUS NOTES
C.1.2	Multi: adverse weather, coastal storm, coastal erosion, sea level rise, dam incidents, drought, earthquake, flooding, landslides, subsidence, tsunami, wildfire, hazmat	Support and implement education and public awareness programs.	OES	**Completed.** This action was for ongoing annual public information program related to hazard awareness and emergency preparedness, which will continue as an ongoing capability.

2019 ACTION ID	HAZARD(S) ADDRESSED	MITIGATION ACTION TITLE	LEAD AGENCY	ACTION STATUS NOTES
C.1.4	Earthquake	Increase participation in earthquake preparedness and education activities such as the Great California Shake-Out Campaign.	OES	**Completed.** This action was for ongoing annual public information program related to hazard awareness and emergency preparedness, which will continue as an ongoing capability.
C.2.1*	Multi: Drought, flood	Continue to implement low impact development standards to reduce storm water runoff and increase groundwater recharge.	Planning & Building Dept.	**Deleted.** Ongoing requirement for permitted construction activity within Planning and Building purview. This was a code requirement and not mitigation.
C.2.2*	Multi: adverse weather, biological agents, coastal storm, coastal erosion, sea level rise, drought, earthquake, flooding, landslides, subsidence, tsunami, wildfire	Encourage planning staff to attend seminars and lectures on naturally occurring hazards so that they may better assist the appropriate governing bodies as they process future developments.	OES - Lead; All Support	**Deleted.** This action was for ongoing training, which will continue, but is a preparedness activity not mitigation.
C.2.3	Multi	Through Development Review process, require new developments to incorporate community wildfire protection planning.	Planning & Building Dept.	**Deleted.** Ongoing requirement for entitlement / development review as part of preparedness activity, not a mitigation
C.3.2	Multi: wildfire, earthquake, tsunami, landslides, flooding	Emergency Permit Processing/Temporary Housing to allow for mitigation considerations during the disaster recovery process.	Planning & Building Dept.	**Completed.** County P&B coordinated through OES to conduct damage assessment (onsite tagging,) streamlined repair permits and issuance of emergency permit during winter storms 2021 and 2022.
C.3.6	Tsunami	Install tsunami area warning signs.	OES – Lead; Public Works - Support	**Completed.** The installation of tsunami hazard zone signs in the County and Cal Trans Right of Way was completed in 2023.

2019 ACTION ID	HAZARD(S) ADDRESSED	MITIGATION ACTION TITLE	LEAD AGENCY	ACTION STATUS NOTES
C.3.8	Wildfire; Dam incidents; Flood; Debris Flow	Evacuation Planning. Develop enhanced evacuation plans for San Luis Obispo County. Benefits: Reduced evacuation time and potential loss of life	County Fire; County Sheriff; County OES	**Completed.** The County worked with response agencies in their Operational Area and has developed evacuation zones for the entire County and advertised them through an extensive public information campaign. Enhanced evacuation planning has also been completed.
C.3.10	Drought	Develop an umbrella water shortage contingency plan to cover rural communities pursuant to AB 1668 and SB 909 for small water suppliers with less than 15 service connections - guidance is anticipated January 2020. Identify communities vulnerable to drought and water shortages and assess reliability of supply; include drought response actions based on lessons learned in the recent droughts; provide information to property and well owners regarding vulnerability of water supplies when issuing build permits, engaging on preparedness actions, etc.; form executive level drought task force to provide regular updates to the County Website or Board of Supervisors; reference County HMP for related drought mitigation actions. *	Public Works	**Completed.** Guidance was provided via Senate Bill 552 in 2021. Communities vulnerable to drought and water shortages were identified and the reliability of supply was assessed via a Regional Water Infrastructure Resiliency Plan in 2021 and a risk assessment completed in 2025. This MJHMP update includes drought response actions. A standing executive level drought task force (i.e., WRAC) to provide regular updates to the County Website or Board of Supervisors has been established.
C.4.1*	Flood	Maintain compliance with the National Flood Insurance Program (NFIP) requirements.	Planning & Building Dept.	**Completed.** Completed update to County Flood Hazard Standards per FEMA regulations in 2023-24. FEMA review led by County PW

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2019 ACTION ID	HAZARD(S) ADDRESSED	MITIGATION ACTION TITLE	LEAD AGENCY	ACTION STATUS NOTES
				Works, and supported by Planning in updating land use ordinance related to Flood Hazards
C.4.8	Earthquake	Develop seismic retrofit of the existing Lopez Drive Bridge over Arroyo Grande Creek and seek funding for implementation.	Public Works	**Completed.** Project completed in 2025
C.5.3	Biological Agents and Ag Pests and Disease	Support establishment of a Vector Control District in San Luis Obispo County.	Agriculture, Public Health Dept.	**Deleted.** The County decided not to establish a VCD.
C.7.1	Adverse Weather: Extreme Heat	Establish countywide policy relating to cooling centers to be used during adverse weather events involving heat waves. Extreme heat may also result in high ozone levels which would impact sensitive receptors. Cooling centers should be designed to accommodate air quality sensitive receptors if necessary.	OES & Public Health	**Completed.** Countywide cooling center policies were established.

Many of the participating jurisdictions have also successfully completed previously identified actions from their respective mitigation strategies. Information on each jurisdictions progress of previous mitigation actions, where applicable, and new actions developed can be found in each jurisdictional annex.

Continued Compliance with NFIP

Recognizing the importance of the NFIP in mitigating flood losses, an emphasis is placed on continued compliance with the NFIP by San Luis Obispo County and other NFIP participating communities including the cities of Arroyo Grande, Atascadero, Paso Robles, Grover Beach, Morro Bay, Pismo Beach, and San Luis Obispo. As NFIP participants, these communities have and will continue to make every effort to remain in good standing with NFIP. This includes continuing to comply with the NFIP's standards for updating and adopting floodplain maps and maintaining and updating the floodplain zoning ordinance. Other details related to NFIP participation are discussed in the flood vulnerability discussion in Section 5 and in the capability assessment in Section 6 (Section 6.4.8) and the jurisdictional annexes for the municipalities.

7.2.2 Updated Mitigation Action Plan

As mentioned above, the 2025 mitigation action plan contains 327 total actions, including 89 new mitigation actions developed during the 2025 update and the 238 actions being carried forward from the 2019 plan. This section contains details on the 2025 Mitigation Action Plan specific only to the County, with the same detail provided for each participating jurisdiction in their own respective annex.

Each action developed for this plan contains a description of the problem and proposed project, expected project benefits, hazard(s) mitigated, the agency or department with primary responsibility for implementation, lead agency (shown in bold) and partners, a cost estimate, potential funding sources, a schedule for implementation, and implementation notes. Development of these project details for each action led to the determination of a High, Medium, or Low priority for each action.

The Cost Estimate column describes the estimated project costs using the following categories:

- **Little to no cost**
- **Low: Less** than $10,000
- **Moderate:** $10,000-$100,000
- **High:** $100,000-$1,000,000
- **Very High:** More than $1,000,000

The Timeline column describes the estimated time of completion for each project using the following categories:

- **Short Term:** 1-2 years
- **Medium Term**: 3-5 years
- **Long Term**: 5+ years
- **Ongoing**: action is implemented every year

The Status/Implementation Notes column that describes progress made on the actions so far, using the following categories, and, where applicable, notes if there were changes in the priority level from the previous plan:

- **Not Started:** Action is carried over from the previous plan; little to no work has begun.
- **In Progress:** Action is carried over from the previous plan; work has begun but not completed.
- **Annual Implementation:** Action is carried over from the previous plan; Ongoing with no specific end date.
- **New in 2025:** The Action is new to this plan update; little to no work has been completed.

Table 7-3 identifies the updated mitigation actions for the County of San Luis Obispo. The HMPC identified and prioritized the following mitigation actions based on the risk assessment, the goals and objectives, and the mitigation action resources. Actions specific to other participating jurisdictions are detailed in similar tables within the jurisdictional annexes.

It is important to note that San Luis Obispo County and the participating jurisdictions have numerous existing, detailed action descriptions, which include benefit-cost estimates, in other planning documents, such as general plan elements, community wildfire protection plans and capital improvement budgets and reports. These actions are considered to be part of this plan, and the details, to avoid duplication, should be referenced in their original source document. The San Luis Obispo County planning area also realizes that new needs and priorities may arise as a result of a disaster or other circumstances and reserves the right to support new actions, as necessary, as long as they conform to the overall goals of this plan.

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Table 7-3 San Luis Obispo County 2025 Mitigation Strategy

MITIGATION ACTION NUMBER	PRIMARY HAZARD(S) MITIGATED	DESCRIPTIONS/BACKGROUND/BENEFITS	LEAD AGENCY & PARTNERS	ESTIMATED COST & POTENTIAL FUNDING SOURCES	2025 PRIORITY	TIMELINE	STATUS/IMPLEMENTATION NOTES
SLO-1	Wildfire	Work with the San Luis Obispo County Fire Safe Council to conduct fuel thinning and chipping projects in high priority areas. Collaborate with property owners and regulatory agencies in order to utilize prescribed fire on private and state-owned lands in the county.	County Fire	Low; HMA Grants, USDA CFPP Grant, Prop 4 funding, USDA NFP, Staff Time, Dept. Budget	High	Ongoing	In Progress. Multiple Executive Actions from the Governor, there has been a significant effort to increase the pace and scale of fuel reduction. Vegetation treatment is likely to increase from several hundred acres per year to several thousand acres per year starting in 2025.
SLO-2	Adverse Weather: Thunderstorm, High Wind, Extreme Heat, Coastal Storm, Coastal Erosion, Sea Level Rise, Dam Incidents, Drought, Earthquake, Flooding, Landslides, Subsidence, Tsunami, Wildfire, Hazmat	Increase involvement of disadvantaged environmental justice communities in disaster preparedness activities and prioritize programs and improvements that address their needs.	**Planning & Building Dept.;** All Support	Little to no cost; Staff Time, Dept. Budget	Medium	Ongoing	In Progress. Safety Element currently is being updated in 2025. SB18 Tribal consultation initiated to obtain public review input.
SLO-3	Tsunami	Update the San Luis Obispo County Tsunami Emergency Response Plan and maps.	OES	Little to no cost; Staff Time, Dept. Budget	Medium	Ongoing	Ongoing. Tsunami inundation maps have been updated for the pre-plans and will be re-printed in 2025. A Tsunami Emergency Response Plan revision should be completed in 2025.
SLO-4	Tsunami	Provide training on changes to tsunami emergency plans and pre-response plans and policies to appropriate agencies.	OES	Little to no cost; Staff Time, Dept. Budget	Medium	Ongoing	Annual Implementation. Provide training on changes to tsunami emergency plans and pre-response plans and policies to appropriate agencies.

MITIGATION ACTION NUMBER	PRIMARY HAZARD(S) MITIGATED	DESCRIPTIONS/BACKGROUND/BENEFITS	LEAD AGENCY & PARTNERS	ESTIMATED COST & POTENTIAL FUNDING SOURCES	2025 PRIORITY	TIMELINE	STATUS/IMPLEMENTATION NOTES
SLO-5	Adverse Weather: Thunderstorm, High Wind, Extreme Heat, Coastal Storm, Coastal Erosion, Sea Level Rise, Dam Incidents, Drought, Earthquake, Flooding, Landslides, Subsidence, Tsunami, Wildfire, Hazmat	Support the development of the County Regional Community Emergency Response Team (CERT) in local areas.	**OES,** CAL - County Fire & Sheriff's Dept	Little to no cost; Staff Time, Dept. Budget	Medium	Ongoing	Annual Implementation. Support the development of the County Regional Community Emergency Response Team (CERT) in local areas.
SLO-6	Adverse Weather: Thunderstorm, High Wind, Extreme Heat, Coastal Storm, Coastal Erosion, Sea Level Rise, Dam Incidents, Drought, Earthquake, Flooding, Landslides, Subsidence, Tsunami, Wildfire, Hazmat	Survey the applicable department and agencies as to their perceived disaster preparedness and mitigation needs. Convene special meetings to prioritize these needs and develop funding strategies.	**OES-Lead**; CAL - County Fire, Sheriff's Dept, and partner agencies	Little to no cost; Staff Time, Dept. Budget	Medium	Ongoing	Annual Implementation. OES convenes regular meetings of the Disaster Planning Advisory Committee.
SLO-7	Multi: coastal storm, coastal erosion, dam	Encourage participation of AFN and medically fragile individuals in the County Evacuation Assistance list.	**OES - Lead**; All Support	Little to no cost; Staff Time, Dept. Budget	High	Ongoing	Annual Implementation. Encourage participation of AFN and medically fragile

MITIGATION ACTION NUMBER	PRIMARY HAZARD(S) MITIGATED	DESCRIPTIONS/BACKGROUND/BENEFITS	LEAD AGENCY & PARTNERS	ESTIMATED COST & POTENTIAL FUNDING SOURCES	2025 PRIORITY	TIMELINE	STATUS/IMPLEMENTATION NOTES
	incidents, drought, earthquake, flooding, landslides, tsunami, wildfire, hazmat						individuals in the County Evacuation Assistance list.
SLO-8	Tsunami	Maintain emergency responder pre-response plans for tsunami inundation areas.	OES	Little to no cost; Staff Time, Dept. Budget	Medium	Ongoing	Annual Implementation. Maintain emergency responder pre-response plans for tsunami inundation areas.
SLO-9	Adverse Weather: Thunderstorm, High Wind, Extreme Heat, Coastal Storm, Coastal Erosion, Sea Level Rise, Dam Incidents, Drought, Earthquake, Flooding, Landslides, Subsidence, Tsunami, Wildfire, Hazmat	Increase involvement of special needs populations (AFN, disabled, elderly) in education and disaster preparedness activities.	**Public Health Dept**. & OES	Little to no cost; Staff Time, Dept. Budget	Medium	Ongoing	Annual Implementation. Public Health works with Health Equity Program to connect with AFN populations and organizations that advocate for them.
SLO-10	Flood	Consider joining CRS to promote affordable flood insurance. This action would look at the cost/benefit of joining the CRS, compared to the number of flood prone properties and insurance policies. Being in the CRS includes going above and beyond the meeting minimum NFIP standards, but is not limited to public notification, community	**Public Works,** Planning & Building	Little to no cost; Staff Time, Dept. Budget	Medium	Medium-term	In Progress. Staff has looked into the scope of work required to implement the program is awaiting direction on the allocation of funding and personnel to implement the program.

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MITIGATION ACTION NUMBER	PRIMARY HAZARD(S) MITIGATED	DESCRIPTIONS/BACKGROUND/BENEFITS	LEAD AGENCY & PARTNERS	ESTIMATED COST & POTENTIAL FUNDING SOURCES	2025 PRIORITY	TIMELINE	STATUS/IMPLEMENTATION NOTES
		education classes, and other measures to raise awareness of flood hazards and promote flood safety. Actions need to be documented to allow FEMA/ISO to determine the appropriate class rating. Benefits: Reduction in flood insurance rates for the general public of the unincorporated area, greater understanding of flood hazards by residents, better property protection.					
SLO-11	Flood	Enhance the ability of community assets, particularly critical facilities, located in the 100-year floodplain to withstand flood impacts.	Planning & Building Dept.	Little to no cost; Staff Time, Dept. Budget	Medium	Ongoing	In Progress. Ongoing requirement for entitlement / development review as part of preparedness activity, not a mitigation
SLO-12	Wildfire	Prevent wildfires through aggressive code enforcement efforts by working with Engine Company Captains and Fire Prevention staff to increase the education and enforcement of PRC 4291, defensible space rules.	County Fire	Little to no cost; Staff Time, Dept. Budget	High	Ongoing	In Progress. Defensible space inspections in SRA areas have increased annually exceeding 9,500 in 2024.
SLO-13	Wildfire	In order to assist fire prevention efforts and to better manage large fires when they occur, continue to improve GIS mapping and tracking efforts by gathering and maintaining relevant GIS data layers and imagery and utilizing the best available mapping applications and software.	County Fire	Little to no cost; Staff Time, Dept. Budget	High	Ongoing	In Progress. Continued to develop new map products and produce a variety of pre-attack map products to aid Incident Commanders.
SLO-14	Wildfire	Create and maintain fuel breaks in strategic locations.	County Fire	Low; HMA Grants, Staff Time, Dept. Budget, Prop 4 funding	High	Ongoing	In Progress. Significant progress has been made and continues in several areas including Cambria, Nipomo, Parkhill, Huasna and Lake Nacimiento. New

MITIGATION ACTION NUMBER	PRIMARY HAZARD(S) MITIGATED	DESCRIPTIONS/BACKGROUND/BENEFITS	LEAD AGENCY & PARTNERS	ESTIMATED COST & POTENTIAL FUNDING SOURCES	2025 PRIORITY	TIMELINE	STATUS/IMPLEMENTATION NOTES
							equipment has been acquired to help specifically with fuel break maintenance
SLO-15	Wildfire	Utilizing grant funding, develop a Community Wildfire Protection Plan for the County that will: Assess the fire hazard in the County; Prioritize treatment areas; Enhance collaboration among all fire agencies and stakeholders; Streamline environmental review process	County Fire	Low; HMA Grants/Staff Time/Dept. Budget	High	Ongoing	In Progress. San Luis Obispo Fire Safe Council acquired a FY 2023/24 grant from CAL FIRE for this purpose. Collaborating with all other fire jurisdictions in the County.
SLO-16	Earthquake	Develop seismic retrofit, or replacement, of the existing South Bay Boulevard Bridge over Los Osos Creek. Seek funding for implementation.	Public Works	Little to no cost; Staff Time, Dept. Budget	Medium	Ongoing	In Progress. Project in final design; construction to begin in 2026, to be completed in 2027.
SLO-17	Biological Agents/Pandemic	Continue communication and coordination efforts amongst Public Health, local hospitals, healthcare workers and first responders to provide information about the effects and transmission of diseases causing epidemics along with specific preventative measures.	Public Health Dept.	Little to no cost; Staff Time, Dept. Budget	High	Ongoing	Annual Implementation. Public Health facilitates the SLO County Disaster Healthcare Coalition to ensure regular communication and coordination among medical and health partners (including hospitals, healthcare workers and first responders) to prepare for, respond to, and recover from public health emergencies, including infectious diseases. www.slopublichealth.org/Coalition
SLO-18	Biological Agents/Pandemic	Continue general public and patient education regarding basic hygiene, cough etiquette and other disease prevention methods.	Public Health Dept.	Little to no cost; Staff Time, Dept. Budget	Medium	Ongoing	Annual Implementation. Continue general public and patient education regarding basic hygiene, cough etiquette and other disease prevention methods.
SLO-19	Ag Pests and Disease	Continue Agricultural Commissioner's pest detection, exclusion and eradication efforts.	County Agriculture Dept.	Little to no cost; Staff Time, Dept. Budget	Medium	Ongoing	In Progress. The Department maintains an extensive program designed to either intercept (exclude) invasive pests prior to establishment or detect invasive pests early enough that eradication is a feasible option. The targeted pests may vary over time due

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MITIGATION ACTION NUMBER	PRIMARY HAZARD(S) MITIGATED	DESCRIPTIONS/BACKGROUND/BENEFITS	LEAD AGENCY & PARTNERS	ESTIMATED COST & POTENTIAL FUNDING SOURCES	2025 PRIORITY	TIMELINE	STATUS/IMPLEMENTATION NOTES
							to changes in pest distribution, additional scientific information regarding destructiveness or invasiveness, or shifts in pest level prioritization.
SLO-20	Ag Pests and Disease	Continuing general public education regarding existing and potential threats from various pests, the necessity for pest exclusion, and the role the public and applicable businesses have in excluding unwanted pests from the County.	County Agriculture Dept.	Little to no cost; Staff Time, Dept. Budget	Medium	Ongoing	In Progress. Continuing general public education regarding existing and potential threats from various pests, the necessity for pest exclusion, and the role the public and applicable businesses have in excluding unwanted pests from the County.
SLO-21	Ag Pests and Disease	Implement eradication and/or control strategies appropriate to the pest species when a pest infestation is detected. Continue to improve rapid response efforts and long-term follow up.	County Agriculture Dept.	Little to no cost; Staff Time, Dept. Budget	Medium	Ongoing	In Progress. Implement eradication and/or control strategies appropriate to the pest species when a pest infestation is detected. Continue to improve rapid response efforts and long-term follow up.
SLO-22	Adverse Weather: Extreme Heat, Coastal Storm, Coastal Erosion, Sea Level Rise, Drought, Flooding, Wildfire	Support efforts to reduce greenhouse gas emissions and mitigate the adverse effects of climate change	Public Works	Little to no cost; Staff Time, Dept. Budget, Prop 4 Funding	High	Ongoing	Annual Implementation. (1) Delivered WBS 350177 to replace 16 natural-gas powered water heaters with electric Heat Pump Water Heaters at 14 different facilities. The project is estimated to reduce the County's entire municipal portfolio of natural gas use by nearly nine percent per year, or about 34,000 therms per year, while electricity use is only expected to rise by less than a third of one percent per year. The project will offset an estimated 1685 metric tons of greenhouse gas emissions. (2) Planned a project (WBS 350198) for delivery in Summer of 2025 to install solar photovoltaic carport canopies in Parking Lot 4 at the Airport to offset over 100% of the annual facility energy use. Over 20

MITIGATION ACTION NUMBER	PRIMARY HAZARD(S) MITIGATED	DESCRIPTIONS/BACKGROUND/BENEFITS	LEAD AGENCY & PARTNERS	ESTIMATED COST & POTENTIAL FUNDING SOURCES	2025 PRIORITY	TIMELINE	STATUS/IMPLEMENTATION NOTES
							years, the panels will offset 20,962 metric tons of carbon dioxide equivalent.
SLO-23	Multi: Adverse Weather: Thunderstorm, High Wind, Extreme Heat, Coastal Storm, Coastal Erosion, Sea Level Rise, Drought, Flooding, Wildfire	Consider potential climate change impacts when planning new facilities and critical infrastructure.	**Public Works** & Planning & Building Dept.	Little to no cost; Staff Time, Dept. Budget	Medium	Ongoing	Annual Implementation. New facilities are designed to be in compliance with the California Building Code, including CalGREEN.
SLO-24	Multi: Adverse Weather: Extreme Heat, Coastal Storm, Coastal Erosion, Sea Level Rise, Drought, Flooding, Wildfire	Continue to promote energy efficiency and renewable energy within the County to reduce peak load demand.	**Public Works** & Planning & Building Dept.	Little to no cost; Staff Time, Dept. Budget, Prop 4 Funding	High	Ongoing	Annual Implementation. Tesla Battery Energy Storage Systems were installed and are in operation (2023) at the Lopez Water Treatment Plant. Energy storage helps to smooth variable energy generation, reduce peak load demand, and allows the system to accept more diverse and sustainable energy resources.
SLO-25	Adverse Weather: Thunderstorm/ Heavy Rain/ Hail/ Lightning; Flooding	New bridge over Arroyo Grande Creek on Cecchetti Road: During the incident period of the federally declared storm events 4683;DR-CA and 4699DR-CA from December 27, 2022 to March 21, 2023 SLO County Experienced severe storms that resulted in damage to the creek crossing. The collapse of the existing facility has resulted in an indefinite closure of this roadway that is utilized by community members. The County has proposed a short bridge or arched, open bottom culvert to limit the effects of high water	**SLO County Public Works**	Very High; FEMA Hazard Mitigation Assistance Grant, General Fund	Medium	Medium-term	New in 2025

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		events and limit the frequency of road closure at this crossing.					
SLO-26	Adverse Weather: Thunderstorm/ Heavy Rain/ Hail/ Lightning; Flooding	New bridge over Franklin Creek on Chimney Rock Road. During the incident period of the federally declared storm events 4683; DR-CA and 4699DR-CA from December 27, 2022 to March 21, 2023 SLO County Experienced severe storms that resulted in damage to the creek crossing. Initial damage in January 2023 was temporarily repaired to restore this sole access point, but was irreparably damaged again in March 2023. The County has proposed a new bridge to prevent the loss of access and emergency service routes to the area.	**SLO County Public Works**	Very High; FEMA Hazard Mitigation Assistance Grant, General Fund	Medium	Medium-term	New in 2025
SLO-27	Adverse Weather: Thunderstorm/ Heavy Rain/ Hail/ Lightning/ Freeze, Adverse Weather: High Wind/ Tornado, Adverse Weather: Extreme Heat, Biological Incidents, Dam Incidents, Drought and Water Shortage, Earthquake, Flooding Dam/levee failure, Landslides and	Evacuation route planning and improvement. Create through technology evacuation routes to include potential road widening, road brushing, traffic management. Improvements will also create firebreaks.	SLO County, **Public Works**, Planning	High; FEMA Hazard Mitigation Assistance Grant, General Fund, Private Non-Profit	High	Long-term	New in 2025

MITIGATION ACTION NUMBER	PRIMARY HAZARD(S) MITIGATED	DESCRIPTIONS/BACKGROUND/BENEFITS	LEAD AGENCY & PARTNERS	ESTIMATED COST & POTENTIAL FUNDING SOURCES	2025 PRIORITY	TIMELINE	STATUS/IMPLEMENTATION NOTES
	Debris Flow, Coastal Storm/ Coastal Erosion/ Sea Level Rise, Subsidence, Tsunami and Seiche, Wildfire, Hazardous Materials Incident						
SLO-28	Adverse Weather: Thunderstorm/ Heavy Rain/ Hail/ Lightning/ Freeze, Adverse Weather: High Wind/ Tornado, Adverse Weather: Extreme Heat, Dam Incidents, Drought and Water Shortage, Flooding Dam/Levee Failure, Landslides and Debris Flow, Hazardous Incident	Water and wastewater facility sites storm hazard assessment. Assess risks at sites for hazards related to storm that impacts operations of facilities or access to facilities. Implement mitigation strategies to protect facility operation and access.	SLO County	Very High; FEMA Hazard Mitigation Assistance Grant, General Fund	High	Short-term	New in 2025
SLO-29	Adverse Weather: Thunderstorm/ Heavy Rain/ Hail/ Lightning/ Freeze, Adverse Weather: High Wind/ Tornado, Adverse	Backup Power Resiliency at water and wastewater facilities. Study and implement backup generation needs at water and wastewater sites. Loss of power disrupts water and wastewater service; a plan studying backup generation needs to each facility and identifying solutions	**SLO County Public Works**, Regional Partners, PG&E, HOAs at respective CSA's	High; FEMA Hazard Mitigation Assistance Grant	Medium	Medium-term	New in 2025

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	Weather: Extreme Heat, Drought and Water Shortage, Earthquake, Wildfire	to maintain operations during power outages. Procure and construct electrical systems to supply backup generation at water and wastewater sites.					
SLO-30	Drought and water Shortage	Drought emergency services program. Program to identify emergency water supplies available to the public and to educate them about water supplies, vulnerabilities and the services available during droughts, including establishing agencies that provide emergency water supplies for the public and providing for reimbursement to the agencies providing supplies. Provide general public education for their area including 1. Water shortage vulnerability 2. Water supplies 3. Groundwater basin information 4. Watershed information	SLO County OES, **SLOFCWCD**	Very High; FEMA Hazard Mitigation Assistance Grant, General Fund, Other California Department of water Resources	Low	Medium-term	New in 2025
SLO-31	Hazardous Materials Incident	Implement lead and copper rule improvements, replace lead service lines in community water systems. Lead and Copper Rule Improvements are required to reduce lead contamination in drinking water systems across the United States. It mandates water systems nationwide to identify and replace lead pipes within the next 10 years (2034) and re-quires more rigorous testing and transparent communication to protect communities from the harmful effects of lead.	**SLO County Public Works**, Private property owners with galvanized service lines needing replacement	High; FEMA Hazard Mitigation Assistance Grant, General Fund, Private Non-Profit	Low	Ongoing	New in 2025

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		The County has completed an inventory of our systems and have identified 2 communities requiring service line replacements: • CSA 10A Cayucos – 66 customer service lines need replacement • CSA 23 Santa Margarita – 25 customer service lines need replacement Homeowners are encouraged to replace the galvanized portion of their service lines that they own. The County will be required to replace the water system owned portion of lead service lines or those classified as GRR within 10 years. The County is committed to exploring available Federal and State grants to help offset these costs to the CSA 10A and CSA 23 Water Systems and homeowners. The County will be preparing a service line replacement plan that will identify the water system requirements and the homeowner requirements.					
SLO-32	Adverse Weather: Extreme Heat, Drought and Water Shortage, Coastal Storm/Coastal Erosion, Subsidence	Wastewater disposal beneficial use study. Assess wastewater effluent disposal methods and alternatives at County Wastewater Facilities. Evaluate options for recycled water use (indirect potable reuse), treatment, and disposal to reduce impacts on groundwater basins, reduce seawater intrusion, off-set potable water use. Implement and construct projects.	**SLO County Public Works**. Regional Agencies, CSA partners, permitting agencies	Very High; FEMA Hazard Mitigation Assistance Grant, General Fund	Medium	Short-term	New in 2025

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SLO-33	Drought and water Shortage	SB 552 County Rural Communities Drought Resilience Implementation. Implement feasible actions specific to domestic wells and State Small Water Systems identified through drought planning including. 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.	**Public Works**, SLOFCWCD, California DWR	High; FEMA Hazard Mitigation Assistance Grant, General Fund, Other: California Department of Water Resources	Medium	Medium-term	New in 2025
SLO-34	Adverse Weather: Thunderstorm/ Heavy Rain/ Hail/ Lightning/ Freeze, Biological Incidents, Drought and Water Shortage, Flooding Dam/Levee Failure, Hazardous Materials Incident	Sewer collection facility assessment. Assess hazards and risks associated with sewer collection system failure. Include planning, design, and construction for risk mitigation at wastewater sites. Failure of sewer collection facilities would impact public health and safety and drinking water supply sources.	**SLO County Public Works**, Regional Partners, CSA's, permitting authorities	Very High; FEMA Hazard Mitigation Assistance Grant, General Fund	High	Short-term	New in 2025
SLO-35	Tsunami and Seiche	Become a Tsunami Ready Community. The county has not yet become certified by NWS as a Tsunami Ready community. The county has installed Tsunami Ready hazard zone signs to inform the public of the hazard, but becoming certified as Tsunami Ready would make residents eligible for credit points from the Federal Emergency Management Agency's Community Rating System, which	**County Office of Emergency Services,** Cities of Grover Beach, Pismo Beach, Morro Bay, Cal OES, and National Weather Service	Low; General Fund	Low	Medium-term	New in 2025

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		provides discounts on flood insurance in participating communities. We have implemented many of the requirements already, but still need to implement additional public education, map distribution, drills, and exercises.					
SLO-36	Adverse Weather: Thunderstorm/ Heavy Rain/ Hail/ Lightning/ Freeze, Landslide and Debris Flow, Coastal Storm/ Coastal Erosion/ Sea Level Rise	Lucern Rd. Slope Stabilization. During the incident period of the federally declared storm events 4683-DR-CA and 4699DR-CA from December 27,2022 to March 21,2023 SLO County experienced severe storms that resulted in damage to this roadway. The loss of the pedestrian walkway and eventual threat to the loss of roadway will continue to add additional mitigation costs to the county. The County proposes slope stabilization measures to ensure access for the community and prevent roadway failure.	**SLO County Public Works**	Very High; FEMA Hazard Mitigation Assistance Grant, General Fund	High	Short-term	New in 2025
SLO-37	Adverse Weather: Thunderstorm/ Heavy Rain/ Hail/ Lightning/ Freeze, Landslide and Debris Flow, Coastal Storm/ Coastal Erosion/ Sea Level Rise	Lynch Canyon Road Repairs & Slope Stabilization. During the incident period of the federally declared storm events 4683-DR-CA and 4699DR-CA from December 27,2022 to March 21,2023 SLO County experienced severe storms that resulted in damage to this roadway. The loss of roadway and destabilization of road slope embankments has created difficulties to community access and additional mitigation costs by the county. The County proposes slope stabilization measures to ensure access for the	**SLO County Public Works,** County Office of Emergency Services, Non-Profits	High; FEMA Hazard Mitigation Assistance Grant, General Fund	Medium	Short-term	New in 2025

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		community and emergency services are uninterrupted.					
SLO-38	Adverse Weather: Thunderstorm/ Heavy Rain/ Hail/ Lightning/ Freeze, Landslide and Debris Flow, Coastal Storm/ Coastal Erosion/ Sea Level Rise	N Ocean Ave, Toro Creek Rd. & Righetti Rd Bridge Repairs. During the incident period of the federally declared storm events 4683-DR-CA and 4699DR-CA from December 27,2022 to March 21,2023 SLO County experienced severe storms that resulted in damage to these bridges. Temporary protective measure have been enacted as we wait for environmental permitting and FEMA cost obligation. The County proposes repair and mitigation measures to provide continued serviceability of these bridges in order to ensure access for the community and emergency services are uninterrupted.	**SLO County Public Works**, County Office of Emergency Services, Non-Profits	Very High; FEMA Hazard Mitigation Assistance Grant, General Fund	High	Short-term	New in 2025
SLO-39	Adverse Weather: Thunderstorm/ Heavy Rain/ Lightning/ Dense Fog/ Freeze, Dam Incidents, Flooding Dam/ Levee Failure	Purchase properties within inundation zone from dam rupture.	**Real Property Services**, Planning and Buildings, Public Works	Very High; General Fund, HMA Grants	Medium	Medium-term	New in 2025
SLO-40	Adverse Weather: Thunderstorm/ Heavy Rain/ Lightning/ Dense Fog/ Freeze, Landslides and Debris Flow, Coastal Storm/ Coastal Erosion	Prefumo Canyon Road Repairs & Slope Stabilization. During the incident period of the federally declared storm events 4683-DR-CA and 4699DR-CA from December 27,2022 to March 21,2023 SLO County experienced severe storms that resulted in damage to this roadway. The loss of roadway and destabilization of road slope embankments has created	**SLO County Public Works**, County Office of Emergency Services, Non-Profits	Very High; FEMA Hazard Mitigation Assistance Grant, General Fund	High	Short-term	New in 2025

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		difficulties to community access and additional mitigation costs by the county. The County proposes slope stabilization measures to ensure access for the community and emergency services are uninterrupted.					
SLO-41	Adverse Weather: Thunderstorm/ Heavy Rain/ Lightning/ Dense Fog/ Freeze, Landslides and Debris Flow, Coastal Storm/ Coastal Erosion	Salinas Ave Road & Culvert Repair. During the incident period of the federally declared storm events 4683-DR-CA and 4699DR-CA from December 27,2022 to March 21,2023 SLO County experienced severe storms that resulted in damage to this roadway and culvert system. The destabilization of the road subgrade at these culverts will soon create difficulties to community access and additional mitigation costs by the county. The County proposes upgrading the storm damaged culverts with an arched, open bottom culvert to limit the effects of high water events and limit the frequency of road closure and property damage from this crossing.	**SLO County Public Works**, County Office of Emergency Services, Non-Profits	High; FEMA Hazard Mitigation Assistance Grant, General Fund	High	Short-term	New in 2025
SLO-42	Adverse Weather: Thunderstorm/ Heavy Rain/ Lightning/ Dense Fog/ Freeze, Landslides and Debris Flow, Coastal Storm/ Coastal Erosion	Santa Rita Road Repair & Slope Stabilization. During the incident period of the federally declared storm events 4683-DR-CA and 4699DR-CA from December 27,2022 to March 21,2023 SLO County experienced severe storms that resulted in damage to this roadway. The loss of roadway and destabilization of road slope embankments has created difficulties to community access and	**SLO County Public Works**, County Office of Emergency Services, Non-Profits	Very High; FEMA Hazard Mitigation Assistance Grant, General Fund	Medium	Short-term	New in 2025

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		additional mitigation costs by the county. The County proposes slope stabilization measures to ensure access for the community and emergency services are uninterrupted.					
SLO-43	Adverse Weather: Thunderstorm/ Heavy Rain/ Lightning/ Dense Fog/ Freeze, Landslides and Debris Flow, Coastal Storm/ Coastal Erosion	Santa Rosa Road Repair & Slope Stabilization. During the incident period of the federally declared storm events 4683-DR-CA and 4699DR-CA from December 27,2022 to March 21,2023 SLO County experienced severe storms that resulted in damage to this roadway. The loss of roadway and destabilization of road slope embankments has created difficulties to community access and additional mitigation costs by the county. The County proposes slope stabilization measures to ensure access for the community and emergency services are uninterrupted.	**SLO County Public Works**, County Office of Emergency Services, Non-Profits	Very High; FEMA Hazard Mitigation Assistance Grant, General Fund	High	Short-term	New in 2025
SLO-44	Adverse Weather: Thunderstorm/ Heavy Rain/ Lightning/ Dense Fog/ Freeze, Landslides and Debris Flow, Coastal Storm/ Coastal Erosion	Suey Creek Rd Repair & Slope Stabilization. During the incident period of the federally declared storm events 4683-DR-CA and 4699DR-CA from December 27,2022 to March 21,2023 SLO County experienced severe storms that resulted in damage to this roadway. The loss of roadway and destabilization of road slope embankments has created difficulties to community access and additional mitigation costs by the county. The County proposes slope stabilization measures to ensure access for the	**SLO County Public Works**, County Office of Emergency Services, Non-Profits	High; FEMA Hazard Mitigation Assistance Grant, General Fund	High	Short-term	New in 2025

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		community and emergency services are uninterrupted.					
SLO-45	Adverse Weather: Thunderstorm/ Heavy Rain/ Lightning/ Dense Fog/ Freeze, Landslides and Debris Flow, Coastal Storm/ Coastal Erosion	Turri Rd Repair & Slope Stabilization. During the incident period of the federally declared storm events 4683-DR-CA and 4699DR-CA from December 27,2022 to March 21,2023 SLO County experienced severe storms that resulted in damage to this roadway. The loss of roadway and destabilization of road slope embankments has created difficulties to community access and additional mitigation costs by the county. The County proposes slope stabilization measures to ensure access for the community and emergency services are uninterrupted.	**SLO County Public Works**, County Office of Emergency Services, Non-Profits	Very High; FEMA Hazard Mitigation Assistance Grant, General Fund	Medium	Short-term	New in 2025
SLO-46	Coastal Storm/ Coastal Erosion/ Sea Level Rise	Protection of Coastal Public Access Infrastructure. Coastal access infrastructure utilized by the public for recreation and access/egress to safety zones currently risks damage including complete failure from Coastal Storm/Coastal Erosion/Sea Level Rise. Mitigation for these facilities needs to be assessed, planned, then implemented.	SLO County Parks and Recreation and **SLO County Public Works**	Very High; FEMA Hazard Mitigation Assistance Grant, General Fund, In-Kind, Private Non-Profit, Prop 4 Funding	Medium	Long-term	New in 2025
SLO-47	Coastal Storm/ Coastal Erosion/ Sea Level Rise	Protection of coastal infrastructure and private property- Ocean Front Ave, Cayucos. Coastal infrastructure and private property along Ocean Front Ave in Cayucos, including seawall, walkway, roadway, commercial and residential buildings, risk damage from Coastal	SLO County Parks and Recreation and **SLO County Public Works**	Very High; FEMA Hazard Mitigation Assistance Grant, General Fund, In-Kind, Private Non-Profit	Medium	Long-term	New in 2025

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		Storm/Coastal Erosion/Sea Level Rise. Mitigation that increases the seawall protection for this area needs to be assessed, planned, then implemented.					
SLO-48	Drought and water Shortage	Develop emergency water logistics plan. Coordinate with vendors and create SOPs for water hauling and tank placement. Include: -Deploy bottled water stations in high-risk areas (Paso Robles, Atascadero, Santa Maria) for emergency drinking water access. -Provide delivered bottled or bulk water to residents with failing domestic wells. -Distribute 2,500-5,000-gallon storage tanks and establish refill partnerships with local fire departments/utilities.	**County OES and WRAC**, Cal OES, CAL FIRE, Department of Public Works, Environmental Health Department, Local NGOs, Community Service Districts, Water Purveyors, Utility Providers	Moderate; Cal OES, FEMA PA, County Emergency Funds, CDBG	High	Short-term	New in 2025
SLO-49	Drought and water Shortage	Expand groundwater monitoring network. Install monitoring wells in fractured rock areas and create data sharing MOUs	**Environmental Health Department,** GSAs	Very High; DWR SGMA Implementation Grant, FEMA BRIC, USGS NGWMN, Prop 68	High	Short-term	New in 2025
SLO-50	Drought and water Shortage	Create Drought Risk Communication Plan. Include multilingual materials and conduct outreach via community events and mailers.	**County OES and WRAC**, Cal OES, CAL FIRE, Department of Public Works, Environmental Health Department,	Moderate; Cal OES Hazard Mitigation Grant Program, CDBG, USDA RCDI	Medium	Short-term	New in 2025

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			Local NGOs, Community Service Districts, Water Purveyors, Utility Providers				
SLO-51	Drought and water Shortage	Establish dry well reporting and response protocol. Incorporate online reporting and response triage criteria.	**Environmental Health Department**, GSAs, WRAC	Moderate; DWR Emergency Drought Funding, Cal OES HMGP, State Water Board	High	Short-term	New in 2025
SLO-52	Drought and water Shortage	Integrate Drought Resilience Plan into General Plan, including amending relevant plan elements, aligning with FEMA and Cal OES guidance.	Planning Department	Moderate; FEMA BRIC, Cal OES HMGP	High	Short-term	New in 2025
SLO-53	Drought and water Shortage	Establish a flexible funding mechanism to assist residents with well deepening, repair, or replacement.	**County Water Resources Division,** Environmental Health Department	Very High; State Water Board, DWR, CDBG-DR, Prop 1/68	High	Long-term	New in 2025
SLO-54	Drought and water Shortage	Install mobile reverse osmosis/nitrate removal systems in areas with contaminated domestic wells.	**County Public Works,** Environmental Health	High; SWRCB SAFER, EPA Drinking Water SRF, DWR	Medium	Short-term	New in 2025
SLO-55	Drought and water Shortage	Provide certified treatment systems for homes with nitrate or arsenic contamination.	**Environmental Health Department;** NGOs	Moderate; SWRCB SAFER, CDBG, Prop 1, Prop 4 Funding	Medium	Medium-term	New in 2025
SLO-56	Drought and water Shortage	Develop Managed Aquifer Recharge sites to replenish groundwater and stabilize declining levels.	**County Public Works**, Water Districts	Very High; DWR, IRWM, Prop 68, Prop 4 Funding	High	Long-term	New in 2025

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SLO-57	Drought and water Shortage	Offer financial assistance (grants/loans) to help residents replace or deepen failing wells.	**Water Resources Division**, NGOs	Very High; SWRCB SAFER, USDA Water & Waste Disposal, Prop 1/68	High	Long-term	New in 2025
SLO-58	Drought and water Shortage	Set up accessible water filling stations at strategic locations in rural communities.	**Public Works Department,** County Planning, CAL FIRE	Moderate; Cal OES, DWR Emergency Drought Funds, County Capital Improvement	Medium	Medium-term	New in 2025

*Mitigates losses to future development

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8 Implementation and Monitoring

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. This is Planning Step 10 of the 10-step planning process. This section provides an overview of the overall strategy for plan implementation and maintenance, and outlines the method and schedule for monitoring, updating, and evaluating the plan. The section also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

8.1 Implementation

DMA REQUIREMENT §201.6(C)(4)(II):
[The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

Once adopted, the plan faces the truest test of its worth: implementation. While this plan contains many worthwhile actions, the participating jurisdictions will need to decide which action(s) to undertake first. Two factors will help with making that decision: the priority assigned the actions in the planning process and funding availability. Low or no-cost actions most easily demonstrate progress toward successful plan implementation.

Implementation will be accomplished multiple ways. First, the timelines established for each mitigation action should be followed. Section 7 contains relevant schedules for county mitigation actions; the jurisdictional annexes provide schedules for respective mitigation actions. Second, implementation must be promoted through constant, pervasive and energetic efforts to network and highlight the multi-objective, win-win benefits of each hazard mitigation project to the San Luis Obispo County community and its stakeholders. These efforts include the routine actions of monitoring agendas, attending meetings, and promoting a safe and resilient community.

Another way the MJHMP update will be implemented is through ongoing monitoring of funding opportunities for mitigation action projects.. Funding opportunities to be monitored include special pre- and post-disaster funds, special district budgeted funds, state and federal earmarked funds, and other grant programs, including those that can serve or support multi-objective applications. In addition, maintaining a bank of ideas on how to meet local match or participation requirements will improve participating jurisdiction's ability to capitalize on funding opportunities.

8.1.1 Role of Hazard Mitigation Planning Committee in Implementation and Maintenance

With adoption of this plan, the participating jurisdictions will be tasked with plan implementation and maintenance. The HMPC identified in Appendix A (or a similar committee) will reconvene annually each year to ensure the mitigation projects are being implemented; the County Office of Emergency Services will lead this effort. The participating jurisdictions, led by the County of San Luis Obispo Office of Emergency Services, agree to:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters;

- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Report on plan progress and recommended changes to the County of San Luis Obispo Board of Supervisors and the governing boards of the other participating jurisdictions; and
- Inform and solicit input from the public.

The primary duty of the participating jurisdictions is to see the plan successfully carried out and to report to their community governing boards and the public on the status of plan implementation and mitigation opportunities. At that time, recommendations can be made to modify timeframes for completion of mitigation projects, tracking funding resources, and updating responsible partners. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on the county website (and others as appropriate).

8.1.2 Process for Incorporation into Existing Planning Mechanisms

Another important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other county and city plans and mechanisms. Where possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. This plan should also be cross-referenced when related planning mechanisms are updated. Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. As described in this plan's capability assessment and jurisdictional annexes, the county and participating jurisdictions already implement policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms.

These existing mechanisms include (but not limited to) the following:

- County and local general plans
- Community service district area plans and master plans
- Community Wildfire Protection Plans (CWPP)
- San Luis Obispo County Fire Safe Council FIRESHED Project
- County and local emergency operations plans (EOP)
- County and local ordinances
- Flood/stormwater management/master plans
- Implementation of the three Groundwater Sustainability Plans (GSP) in SLO County
- Integrated Regional Water Management Plans (IRWMP)
- Participation in the Drought Task Force and development of the County Drought Resilience Plan
- Participation in the Water Resources Advisory Council (WRAC)
- Stormwater Resource Plans
- Urban Water Management Plans (UWMP) and Capital improvement Plans (CIP) and budgets

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- Water Shortage Contingency Plan (WSCP)
- Climate Action and Adaptation Plans (CAAP)
- Sea Level Rise Assessments in compliance with AB 691
- Other plans and policies outlined in the capability assessments in the jurisdictional annexes
- Other plans, regulations, and practices with a mitigation focus

HMPC members involved in the updates to the planning mechanisms will be responsible for integrating the findings and recommendations of this plan with these other plans, programs, etc., as appropriate. As an action step to ensure integration with other planning mechanisms the County Office of Emergency Services Manager and the County Planning & Building Department or designee will discuss this topic at the annual meeting of the HMPC described below in subsection 8.2.1. The HMPC will discuss where there are opportunities to incorporate the plan into other planning mechanisms and who would be responsible for leveraging those opportunities. HMPC members representing local jurisdictions will work with their jurisdictional planning teams to integrate their identified mitigation actions into their own local plans and programs. Efforts to integrate the MJHMP into local plans, programs, and policies will be reported on at the annual HMPC plan review meeting, and a record of successful integration efforts will be kept.

Examples of a process for incorporation of the LHMP into existing planning mechanisms include:

- As recommended by California Government Code Section 65302.10, also known as Assembly Bill (AB) 2140, each community should adopt (by reference or incorporation) this MJHMP into the Safety Element of their General Plan(s). The adoption by reference or incorporation of the MJHMP into the Safety Element of the General Plan follows plan approval and makes the County and participating municipalities eligible to be considered for part or all of its local-share costs on eligible public assistance funding to be provided by the State under the California Disaster Assistance Act (CDAA). As such, AB 2140 compliance provides additional funding after a disaster occurs and provides an optional state incentive to help counties and cities become more resilient to natural hazards. Evidence of such adoption (by formal, certified resolution) shall be provided to Cal OES and FEMA. The 2025 update occurred ahead of the update of the County's General Plan Safety Element and in coordination with the County Planning and Building Department. This allows for the related goals and hazard mitigation projects to be consistent with and cross referenced in the goals and policy statements included in the County's General Plan Safety Element. Compliance with AB 2140 expires when the MJHMP expires, therefore the County must readopt the plan into their Safety Element during the 8-year update cycles to ensure continued compliance and funding eligibility. Additionally, the participating municipalities must adopt their annex into their own General Plan Safety Element, as the annex jurisdictions are not covered under the County's General Plan Safety Element adoption.
- Climate change considerations consistent with SB 379, including adaptation strategies and adaptation projects from the municipality's CAAPs, have been incorporated into the MJHMP update and cross linked with related Safety Element considerations (see summary in Appendix F).
- California Senate Bill (SB) 552 mandates and assists all counties to improve the resilience of small water systems and domestic wells to drought by establishing a standing Drought and Water Shortage Task Force and developing a County Drought Resilience Plan. The task force is currently assembled as part of the Water Resources Advisory Committee (WRAC)

and the drought resilience plan components per SB 552 were incorporated into the 2025 HMP. More details are provided in Section 8.1.3.

- Integration of wildfire actions identified in this mitigation strategy with the actions and implementation priorities established in existing CWPP. Future annual reviews should also integrate projects from the San Luis Obispo Fire Safe Council's FIRESHED project.
- Continuing to use the risk assessment information to inform the hazard analysis in the San Luis Obispo County EOP when that plan is updated.
- Informing and cross referencing the development of a Drought and Water Shortage annex of the County EOP.

Efforts should continuously be made to monitor the progress of mitigation actions implemented through these other planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this hazard mitigation plan.

Planning mechanisms and processes specific to each participating jurisdiction also exist and can be used to apply elements of this County MJHMP in local contexts. Section 3.4.1 provides insight to these opportunities and jurisdiction-specific annexes to this MJHMP update provide a more robust discussion relevant to each jurisdiction (refer to Section 6.1 of each annex).

8.1.3 Drought Resilience Planning – Short and Long Term Measures and Funding Sources

As previously mentioned, SB 552 requires each county to develop a drought and water shortage plan in consultation with its drought task force. The drought and water shortage plan documents potential drought and water shortage risk in the county and this MJHMP is designed to function as the County Drought Resilience Plan (DRP). Specific to small water systems and domestic wells, the plan is further required to propose interim (short-term) and long-term actions to reduce the risk of water service disruption. Requirements exist in SB 552 for the drought and water shortage plan to document opportunities for specific short-term response and long-term mitigation strategies, including the following.

9. Consolidations of existing water systems and domestic wells.
10. Domestic well drinking water mitigation programs.
11. Provision of emergency and interim drinking water solutions.
12. An analysis of the steps necessary to implement the plan.
13. An analysis of local, state, and federal funding sources available to implement the plan.

Short and Long term drought resilience actions are addressed in Chapter 7 (i.e., dry well abandonment, drought monitoring, water system consolidation) and the WRAC will also oversee implementation of ongoing drought monitoring. Additional short-term drought and water shortage response procedures will be addressed in the EOP and the corresponding Drought and Water Shortage Response Annex.

Local Assistance Programs

At a local scale, where resources are available, SLO county is free to develop their own local assistance programs to provide technical or financial assistance to state small water systems and domestic wells to support grant applications for installing a new well or rehabilitating an existing well (including deepening).

State Assistance Programs

At the State level, technical and financial assistance including grants or loans, are provided by State agencies, including DWR and the State Water Board. This assistance could help SLO County in planning and implementation of short-term response actions and long-term mitigation strategies and actions to alleviate the water shortage risks for state small water systems and domestic wells. Examples of potential State funding include:

- Grants and loans by DWR for drought relief, including local planning and project implementation needs.
- Proposition 4 funds: In November 2024, voters approved Proposition 4, a $10 billion bond measure focused on increasing the state's resilience to the impacts of climate change. Categories include Safe Drinking Water, Drought, Flood, and Water Resilience.
- Grants and loans by State Water Board resources:
  - Countywide and Regional Funding Program, through which counties are eligible to develop a program for State Water Board funding to specifically support their state small water systems and domestic wells. Activities can include risk assessment, and implementation of interim and long-term solutions. The program also can cover some county administration costs.
  - Emergency financial assistance programs in the form of grants and loans for drought funding. These funds are typically focused on water systems rather than domestic wells, but may be relevant in some cases.
  - Funding incentives for consolidation and regionalization projects for larger public water systems that will expand their service area to include smaller public water systems, and state small water systems and domestic well clusters.
  - Emergency drought funding is typically focused on responding to community water system emergencies, rather than domestic wells, but may be relevant in some cases.
  - Direct technical assistance prioritized to help develop projects benefiting small, disadvantaged communities.
- Integrated Climate Adaptation and Resiliency Program Grant Programs that provide funding to help fill local, regional, and tribal adaptation planning and resilience needs, provide resources, and support the development of a pipeline of climate-resilient projects.

Additionally, current information regarding state-level funding opportunities is available through the California Grants Portal, where most of the State funding is advertised. Useful search terms include "drinking water," "domestic well," and "small community water systems."

Federal Assistance Programs

At the federal level, resources exist in the form of grants and loans. Assistance programs with immediate nexus for assisting counties to reduce water shortage risks for state small water systems and domestic wells include the following.

- The Rural Development Program of U.S. Department of Agriculture (USDA) provides rural communities technical assistance and financing options to develop drinking water and waste disposal systems. Note that certain assistance programs target individual well owners directly to address their needs for improvement. While counties are not eligible for such assistance, they can promote the awareness of this assistance program to well owners and provide technical assistance for the application.
- Through its WaterSMART program, the Bureau of Reclamation provides many planning and implementation grants for water purveyors and other eligible parties to improve their water supply reliability and drought resilience.

- The National Integrated Drought Information System provides funding opportunities related to drought early warning research.

Additional, current information regarding federal-level grant availability and eligibility requirements can be obtained through GRANTS.GOV, where most federal grants are announced.

Additional Resources for Both State and Federal Assistance Programs

Similar to the California Grant Portal, the California Financing Coordinating Committee (CFCC) Funding Fair is another venue for learning about available State and federal funding to support individual project implementation. DWR, State Water Board, California Infrastructure and Economic Development Bank, California Department of Housing and Community Development, Reclamation, and USDA are among CFCC members. The CFCC website provides a detailed list of State, federal, nonprofit, and other funding programs that counties are strongly encouraged to explore for additional opportunities. DWR will continue to work with other State agencies to develop technical assistance programs to help counties implement their County DRP.

8.2 Maintenance, Monitoring and Evaluation

DMA REQUIREMENT §201.6(C)(4)(I):
[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as progress, roadblocks, or changing circumstances are recognized.

8.2.1 Maintenance and Monitoring Schedule

The Emergency Services Coordinator at the San Luis Obispo County Office of Emergency Services is responsible for initiating plan reviews and will consult with the heads of participating departments and other participating jurisdictions. In order to monitor mitigation action progress and update the mitigation strategies identified in the action plan, the San Luis Obispo County Office of Emergency Services will revisit this plan annually and after each hazard event. The annual review will be conducted by re-convening the HMPC in November of each year. The agenda for these meetings will be coordinated through the Office of Emergency Services and the HMPC. At a minimum, the meeting will include the review of the mitigation actions ranked high and medium priority.

This plan will be updated, approved and adopted within a five-year cycle as per Requirement §201.6(c)(4)(i) of the Disaster Mitigation Act of 2000 unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule. With the approval of this plan occurring in the third quarter of 2025, the plan will need to be updated, reviewed by Cal OES and FEMA Region IX, and re-adopted by all participating jurisdictions by mid-2030. To facilitate the 2030 MJHMP update, the county will monitor planning grant opportunities from Cal OES and FEMA for funds to assist with the update. These grants should be pursued as early as 2027, as some grants have a three-year performance period to expend the funds, plus there is no guarantee that the grant will be awarded when initially submitted. This allows time to resubmit the grant in 2028 if needed.

8.2.2 Maintenance and Evaluation Process

The planning team will continually observe the incorporation process, evaluation method, updating method, continued public participation, and completion of the action/projects to

assure that the planning team and the plan itself are performing as anticipated and effective. By monitoring these processes, the planning team will then be able to evaluate them at the time of the plan update, determining if any changes are needed. The Emergency Services Coordinator at the San Luis Obispo County Office of Emergency Services will be responsible for plan effectiveness.

The MJHMP plan update every five years provides an opportunity to determine whether there have been any significant changes in the county that may, in turn, necessitate changes in the types of mitigation actions proposed. New development in identified hazard areas, an increased exposure to hazards, the increase or decrease in capability to address hazards, and changes to federal or state legislation are examples of factors that may affect the necessary content of the MJHMP.

The plan review provides county officials with an opportunity to evaluate those actions that have been successful and to explore the possibility of documenting potential losses that were avoided due to the implementation of specific mitigation measures. The plan review also provides the opportunity to address mitigation actions that may not have been successfully implemented as assigned.

During the five-year plan update process, the following questions will be considered as criteria for assessing the effectiveness and appropriateness of the Plan:

- Do the goals address current and expected conditions?
- Are the goals and objectives consistent with changes in State and Federal policy?
- Complete status update on all mitigation projects. What strategies should be revised?
- Has the nature or magnitude of risks changed (current and expected conditions)?
- Are the current resources appropriate for implementing the MJHMP?
- Are there implementation problems, such as technical, political, legal or coordination issues with other agencies?
- Have the outcomes occurred as expected?
- Did the county and participating agencies and other partners participate in the plan implementation process as assigned?

The County of San Luis Obispo is committed to involving the public in the continual reshaping and updating of the MJHMP, as discussed in 8.3. Further, in keeping with the five year update process, the Emergency Services Coordinator at the County of San Luis Obispo Office of Emergency Services will convene public meetings to solicit public input on the plan and its routine maintenance and the final plan deliverable will be adopted by the County Board of Supervisors and the participating jurisdiction's councils/boards.

8.2.3 Disaster Proclamation or Declaration

Following a disaster proclamation or declaration, the MJHMP will be revised as necessary to reflect lessons learned, or to address specific issues and circumstances arising from the event. Disasters provide opportunities to identify and mitigate new vulnerabilities, and can provide a funding source through the FEMA Hazard Mitigation Grant Program or Section 406 of the Public Assistance program. It will be the responsibility of the Office of Emergency Services to reconvene the HMPC and ensure the appropriate stakeholders are invited to participate in the plan revision and update process following declared disaster events.

8.3 Continued Public Involvement

DMA REQUIREMENT §201.6(C)(4)(III):

[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

Activities related to public involvement during the 2025 update are documented in Section 3 *Planning Process* and Appendix C.

Continued public involvement is imperative to the overall success of the plan's implementation. Efforts will be made to involve the public in the plan maintenance, evaluation, and review process. This effort will be the responsibility of the Emergency Services Coordinator at the San Luis Obispo Office of Emergency Services and will include maintaining a digital version of the plan on the County Office of Emergency Services website for public review. In addition, information on who to contact within the Office of Emergency Services will be posted with the plan. The San Luis Obispo County Office of Emergency Services will maintain a file of comments received for reference during the next five-year update. Any revisions to the plan that may occur as a result of a disaster will also be made public and posted on the county website.

The next five-year update process also provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stories from the plan implementation and seek additional public comment. A public hearing(s) or survey to receive public comment on the plan will be held during the plan update period. When the HMPC reconvenes for the update, they will coordinate with all stakeholders participating in the planning process, including those who joined the HMPC after the initial effort, to update and revise the plan. Public notice will be posted and public participation will be invited, at a minimum, through available website postings and press releases to the local media outlets as well as email and social media announcements.

This chapter can also serve as a reference for continued public involvement over the next several years and lays the foundation for outreach associated with the next formal five-year update. The HMPC should also incorporate the following engagement concepts from the MJHMP's Outreach Strategy:

- Recognizing that not everyone participates in the same way or at the same time, include a mix of participation strategies that provides for a broad and diverse set of engagement opportunities that consider the diversity of the County's planning area.
- Ensure that the public has an opportunity to provide input during the planning process and prior to the finalization of the County's MJHMP update.
- Ensure a "whole community" approach to building stakeholder and public support for, and ultimately ownership of, the County's MJHMP.
- Identify specific outreach activities and document activities as the planning effort progresses.
- Distribute emails and postcards and newsletters to the public about hazard mitigation.
- Participate in existing community events to share information about hazard mitigation (e.g., community farmer's markets, library events, senior centers).
- Continue to use the County's MJHMP Webpage as a distribution point or repository for MJHMP information.

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