

SAN JOAQUIN
— COUNTY —
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San Joaquin County Local Hazard Mitigation Plan

January 2023

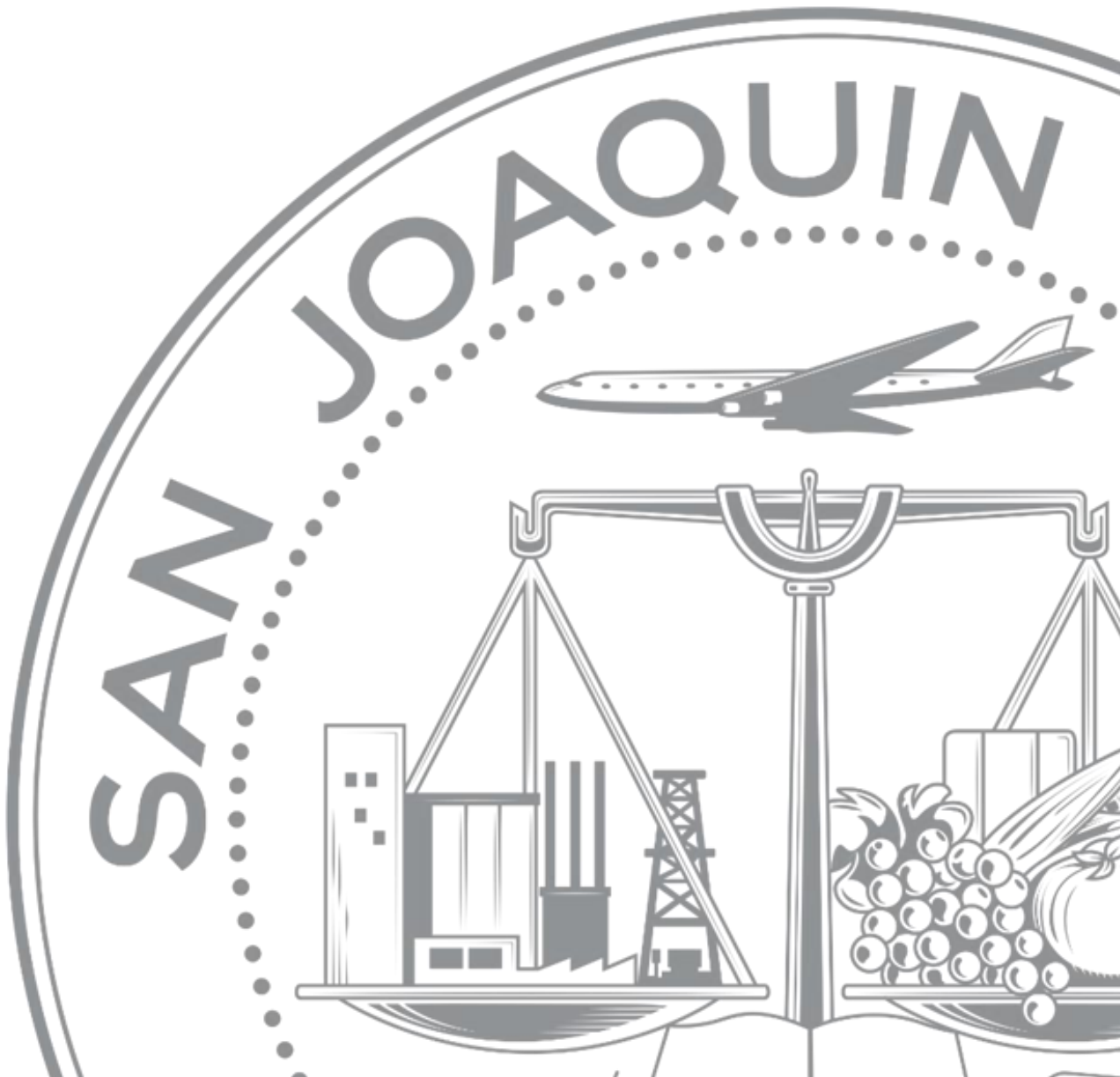


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1 INTRODUCTION

As defined in Title 44 Code of Federal Regulations (CFR) Subpart M, Section 206.401, hazard mitigation is “any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.” As such, hazard mitigation is any work to minimize the impacts of any of hazard event before it occurs. Hazard mitigation aims to reduce losses from future disasters. It is a process that identifies and profiles hazards, analyzes the people and facilities at risk, and develops mitigation actions to reduce or eliminate hazard risk. The implementation of the mitigation actions—, which include short- and long-term strategies that may involve planning, policy changes, programs, projects, and other activities—is the end result of this process.

Over the past two decades, the Disaster Mitigation Act of 2000, known as (DMA 2000,) federal law has driven local hazard mitigation planning. On October 30, 2000, Congress passed the DMA 2000 (Public Law 106-390), amending the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (Title 42 of the United States Code Section 5121 et seq.) and repealing the act’s previous mitigation planning section (409) and replacing it with a new mitigation planning section (322). This new section emphasized the need for state, tribal, and local entities to coordinate mitigation planning and implementation efforts closely. This new section also provided the legal basis for the Federal Emergency Management Agency’s (FEMA) mitigation plan requirements for the Hazard Mitigation Assistance grant programs.

1.1 2023 LOCAL HAZARD MITIGATION PLAN

2018 Local Hazard Mitigation Plan. The goal of the planning process is to assess risks posed by hazards and to develop prioritized action plans to reduce risks in San Joaquin County. The updated information represents progress since 2018 and presents planned hazard mitigation work for the next five years. The plan’s intended scope meets the Federal Disaster Mitigation Act requirement of 2000 (Public Law 106-390). The 2023 LHMP is organized according to the FEMA Local Hazard Mitigation Plan Handbook (March 2013) and was revised to reflect the system upgrades, improvements, and mitigations the County has completed since 2018. The 2023 LHMP will submit to the California Governor’s Office of Emergency Services (Cal OES) for review by January 2023, prior to FEMA approval. The County team will promptly address comments and incorporate requested edits to keep within the Cal OES review schedule. Once the Cal OES review of the 2023 LHMP is complete, the County team will send the plan to FEMA for an assessment and approval period. In response to any FEMA comments, the County team will assign tasks to staff members to incorporate requested edits for the resubmittal of the final plan for FEMA approval.

1.2 PURPOSE

The Local Hazard Mitigation Plan intends to provide strategies for the County and other local jurisdictions to identify and implement mitigation actions for reducing damages from various natural and technological disasters. This Local Hazard Mitigation Plan should develop an ongoing process for mitigating damage before and after a disaster. Revisions of the General Plan(s) will include new suggestions and planning guidance for hazard mitigation goals, objectives, actions, and implementation strategies.

The 2023 LHMP outlines a process for assessing and analyzing those hazards to which San Joaquin County is most vulnerable. The process can improve the County’s resilience by performing a hazard risk assessment, using available tools to complete a capabilities assessment, and then identifying mitigation actions for these hazards.

The 2023 LHMP analyzes the risk posed to people and property by earthquakes, landslides, floods, wildfires, drought, severe weather, and other hazards, such as climate change, and

considers mitigation actions that the County could implement before such events. The goal is to reduce the risk to life and safety and the risk of property damage and service disruption caused by these natural hazards.

Mitigation projects and programs identified in the 2023 LHMP may be given priority for funding and technical assistance by the State and Federal government. The projects most likely to receive financing mitigate more than one hazard and address risks of concern to more than one agency.

This 2023 LHMP establishes prioritized mitigation goals and adopts a five-year implementation timeline, which the County will seek to implement, subject to funding and resource limitations.

1.3 PLAN STRUCTURE

This primary document's goals, actions, and strategies are only for the County's unincorporated areas. Jurisdictions can develop a local hazard mitigation plan for their authority or participate in the County's program. The 2023 LHMP is organized to follow FEMA's Local Mitigation Plan Review Tool, which demonstrates how hazard mitigation plans meet the DMA 2000 regulations. As such, the specific planning elements of this review tool are discussed in their appropriate plan sections.

- **Section 2: Community Profile-** Provides basic information on a broad range of factors and better understands the community's context. . This information permits specific areas, issues, and linkages to be identified and analyzed.
- **Section 3: Planning Process** - Provides an overview of the 2017-2018 planning process. It identifies planning team members and describes their involvement with the planning process. This section details stakeholder outreach, public involvement, and continued public involvement. It provides an overview of the existing plans and reports, details how the Planning Process incorporates those documents into the 2023 LHMP and provides a plan update method and schedule.
- **Section 4: Hazard Identification and Risk Assessment** - Identifies hazards affecting the Operational Area and profiles each risk with a list of past occurrences, threat analysis, and map or geographic description of the risk area.
- **Section 5: Mitigation Strategy** - Documents County mitigation goals, mitigation strategies by hazard type, and a list of projects that would mitigate sites of past or potential future damages.
- **Section 6: Plan Update, Evaluation, and Implantation** - Procedures to maintain this ongoing plan. This element ensures that the County monitors the mitigation projects for modification, adds new projects, and completes mitigation actions.
- **Section 7: Plan Adoption** - Documentation of plan adoption including the County and other jurisdictions, level of participation, risk assessment, and mitigation actions.
- **Section 8: Appendices**

2 COMMUNITY PROFILE

2.1 SAN JOAQUIN COUNTY

San Joaquin County is located in the heart of the central San Joaquin Valley and has a population of approximately 685,300. The County has land use regulatory authority over all unincorporated land within the County, including all areas except land within the city limits of Escalon, Lathrop, Lodi, Manteca, Ripon, Stockton, Tracy, or land owned/managed by either the State or Federal governments (e.g., State Parks, National Parks, Bureau of Land Management areas, and tribal lands) and regions, not under County jurisdiction (e.g., public schools, prisons).

The County's jurisdiction covers approximately 90 percent of all land, the vast majority of which is designated General Agriculture (A/G). However, there are more intensive residential and urban uses in the county's surrounding cities and within unincorporated communities.

Significant population and employment growth are expected to occur within the County over the time frame of the General Plan (i.e., 2035), and where this growth is planned will have an impact on many aspects of the County, including agriculture, unincorporated communities, and employment opportunities. Shifting from historically inefficient development patterns in the Central Valley will require developers to take on new forms that increase the efficient use of existing infrastructure, reduce pollution and other modes of active transportation, and preserve agricultural and open space lands.

As the agricultural center of California, San Joaquin County's farmland and agrarian heritage is preserved. Farms continue to produce a diverse array of high-quality agricultural produce and products. Both traditional and innovative farming practices flourish throughout the County. Residents understand, appreciate, and are proud of the role agriculture plays in the history and economy of the County.

The County's economy is diverse and robust in its global role as a source of food and agricultural commodities; a destination for tourists (The Delta, Agro-tourism, Wineries); and a supply of high-tech and "green" manufactured products. Expanded educational opportunities and a highly interconnected shipping system provide a broad range of jobs across diverse industries, including those related to small, local businesses and new start-ups. Excellent schools and leadership programs prepare youth as the next generation of the County's workforce.

San Joaquin County is linked to regional, state, and international destinations through an extensive network of roads, railways, waterways, and airports. Residents and businesses throughout the County are connected to the world through high-speed communications infrastructure. Communities are internally connected through an efficient and safe system of roadways, bridges, transit, bikeways, pedestrian trails, and sidewalks. County residents and farm equipment move together safely on well-managed and maintained roads.

Natural assets, such as air quality, the Delta, river corridors, and soils, are preserved, and residents know their importance. Aggregate resources supply the long-term development needs of the region and state. Energy efficiency and the use of alternative modes of transportation conserve energy resources, and new, sustainable energy resources are fully developed, providing clean and inexpensive energy.

The County values and protects its natural and cultural resources with expanded opportunities for residents and visitors to enjoy the County's heritage and natural setting. Recreation opportunities, such as the Delta, waterways, and regional parks, are available and accessible to all County residents and visitors.

Agriculture, residents, and natural habitats are challenged to receive a continuous, cost-effective, and adequate clean water supply. The groundwater basin is challenged to sustain a state of equilibrium due to inconsistent precipitation throughout the region.

The Delta is a “Place” of statewide significance and maintains its historical role in the County. Delta channels convey water, which supports a thriving agriculture industry, diverse wildlife populations, world-class recreational opportunities, navigable e-boating routes, and the transportation of commercial goods. Fortified and well-maintained Delta levees provide safety and security to residents, patrons, infrastructure, and crops.

Communities and cities maintain their unique geographic identities, separated by agriculture and open space lands. Growth and development occur predominantly within and adjacent to existing communities and cities. A new expansion is carefully planned, including establishing of community services and facilities in keeping with the existing community character.

Every community is desirable because of its range of housing choices, local job opportunities, access to services and shopping, great schools and parks, and sufficient infrastructure. Residents and businesses celebrate the rural heritage and small-town feel of their communities and the ethnic diversity of residents.

Finally, San Joaquin County is celebrated for the health and well-being of its residents. Residents and businesses proactively minimize their impacts on climate change and air quality. The County maintains plans and safeguards against potential hazards, such as flooding and wildland fires.

2.2 FLOODPLAIN MANAGEMENT PLANNING

The Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum National Flood Insurance Program (NFIP) requirements. An additional indicator of floodplain management capability is the active participation of local jurisdictions in the CRS, adding extra local measures to provide protection from flooding. All 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. Under CRS, discounted flood insurance premium rates reflect the reduction in flood risk. They result when community actions meet the three goals of CRS:

- Reducing flood damage to insurable property.
- Strengthening and supporting the insurance aspects of the NFIP.
- Encouraging a comprehensive approach to floodplain management.

In 1993, San Joaquin County joined CRS and currently possesses a class 7 rating, entitling flood insurance policy holders to receive up to a 15% percent premium discount annually. The floodplain management planning activities for Unincorporated San Joaquin County are addressed throughout the 2023 LHMP.

3 THE PLANNING PROCESS

The 2023 LHMP seeks to identify where San Joaquin County can take reasonable actions to minimize the adverse effects and dangers posed by disaster events before they occur. Despite the County's efforts to reduce the potential for damage and harm while increasing readiness to respond to such circumstances, the potential for significant injury and damage arising from natural disasters remains.

3.1 OVERVIEW OF THE LHMP PROCESS

3.1.1 Opportunities for Stakeholders

The Office of Emergency Services staff members work closely with the communities in its Operational Area, including the Special Districts in the County. The OES Staff sent a link to the existing 2018 LHMP plan, announced the beginning of the LHMP planning process, and requested a review and comments. OES Staff sent an email to the identified Planning Teams members with a copy of the LHMP and requested them to review and provide updates on the current status of identified projects or other pertinent information that would be reflected on the 2022 LHMP update.

Stakeholders were invited in writing (email) and during the OES Stakeholder meetings to participate in this LHMP project. Primary outreach efforts focused on County Departments, Special Districts, and neighboring communities. A list of planning team members is on the following page. The Senior Emergency Planner for OES, was project manager for this Local Hazard Mitigation Plan update.

All planning team members attended meetings (See [Appendix A](#) for agendas, sign-in sheets, "drop box" information, and meeting dates) and provided input on the following:

- Types of hazards, their impacts, vulnerabilities, and previous occurrences
- Reviewed a variety of plans, technical reports, and studies.
- Developed mitigation goals
- Reviewed development trends
- Attended public meetings

The County Office of Emergency Services also held various planning meetings within the working group. The planning meetings accomplished several critical LHMP requirements, including defining general priorities, compiling and prioritizing hazard mitigation strategies, and determining the appropriate departments for implementing mitigation strategies. The meetings also involved reviewing preliminary budgets and establishing potential funding sources for improvement projects and planning related to the County.

3.1.2 Plan Development Participants

The primary team comprises County departments, with the Office of Emergency Services as the Lead Agency, which has historically received disaster reimbursement and mitigation funds for measures impacted by a disaster. That LHMP team included:

- | | |
|---------------------------------|---|
| • Department of Public Works | • Environmental Health |
| • Stockton Metropolitan Airport | • Public Health Services |
| • Parks & Recreation | • Agricultural Commissioner |
| • Sheriff's Office | • California Office of Emergency Services |
| • Government Services | • City of Escalon |
| • Office of Emergency Services | • City of Lodi |
| • Community Development (GIS) | |

- City of Tracy
- City of Stockton

- American Red Cross
- Reclamation Districts

3.1.1 Contractors and Outside Assistance

There were no additional contractors or assistance during this revision process.

3.1.2 Planning Team Committee

OES held various planning team meetings and kept the planning team informed by the forum, email, or a planning team drop box to obtain information. The sign-in sheets from the sessions listed below will be in [Appendix A](#).

3.2 PUBLIC INVOLVEMENT

A draft copy of the 2023 LHMP was made available to the public. The review period gave the community two opportunities to comment on the draft 2023 LHMP.

- The draft 2023 LHMP was published on the OES County website (<https://www.sjgov.org/departments/oes/local-hazard-mitigation-planning>) for three weeks, starting on October 17, 2022. OES made changes based on public review comments and incorporated into the 2023 LHMP.
- In addition to the three-week public review comment period, OES also provided an opportunity for public comments on the draft 2023 LHMP at a [public town hall meetings](#) on [XXXX](#). OES advertised the meeting and agenda items on the SJGov website, social media, and general updates information. Public comments received at these meetings were incorporated into the 2023 LHMP.

3.3 PLAN PREPARATION

Revision to this LHMP followed the process of past revisions. This process also was expanded to include additional elements based on Federal review guide procedures and requirements updated. The process for this current revision followed these steps from October through December 2022:

- Contact standing LHMP (County department) committee members and request a review of the current Local Hazard Mitigation Plan for revision comments
- Review the LHMP Review Guide for format and content requirements
- Meet with staff to discuss and assign tasks
- Send participation requests to planning team members
- Update and revise LHMP
- Post ongoing drafts of the revised plan for review and comments
- Implement an official “public comment” schedule to obtain additional feedback on hazard assessment, mitigation projects, and mitigation resources available
- Submit for State and Federal approval
- Submit to the County Board of Supervisors for approval and adoption upon approval from Cal OES and FEMA

3.3.1 Draft Plan Review

As Sections of the plan were reviewed and updated, OES posted the project on the OES website for review and comment.

3.4 USE OF EXISTING PLANS IN THE LHMP PROCESS

3.4.1 Review and Incorporation of existing plans, studies, reports, and technical information.

San Joaquin County OES maintains over 25 plans covering emergency operations, support, hazards, and functions for the Operational Area. Plans are reviewed on a triennial basis and can be reviewed explicitly after a significant incident or training.

Specific plans and programs are reviewed for inclusion in this update for planning consistency among documents. Relevant information from reviewed plans, studies, reports and technical information incorporated into the mitigation plan includes:

- State Hazard Mitigation Plan – OES has examined the State Hazard Mitigation Plan for recent updates on statewide hazard events and data for consistency.
- San Joaquin County’s 2017 Local Hazard Mitigation Plan - Reviewed so OES could update the plan.
- General Plan December 2016 - Demographics and land use were cross-referenced for inclusion into this Plan as part of the overall community profile. Additionally, area vulnerabilities identified in Specific Plan Areas were included as part of the vulnerability and risk assessment for wildfire, landslide, and flood. OES enclosed The General and Specific Plans in the County’s capability assessment inventory
- Emergency Operations Plan – Reviewing the 2022 EOP gathering information about the assessed natural hazards.
- THIRA – The THIRA was reviewed for Hazard Identification and Risk Assessments, updated in November 2016. OES incorporated Hazard maps from the THIRA into the LHMP.
- Emergency Preparedness Plans – Contains agriculture, Medical Health, and public health information.
- Flood and Dam Failure Plan – OES reviewed the plan for consistency for use as a reference in the “flood” section of the LHMP.
- Dam and Reclamation District Emergency Action Plans – Were reviewed for content and Inundation Data to ensure consistency with Cal OES dam inundation data.

3.5 CONTINUED PUBLIC INVOLVEMENT

A completed copy of the plan will be available on the San Joaquin County Office of Emergency Services website in an accessible format. The plan will be open for public review and comment. The LHMP project manager will monitor the LHMP website and County’s social media accounts to notify the public of and seek input on any changes or updates to the 2021 LHMP, including mitigation action implementation and the 2028 LHMP kickoff.

3.6 MONITORING, EVALUATING, AND UPDATING THE PLAN

This section describes OES’s method to monitor, evaluate, and update the LHMP.

3.6.1 Monitor and Evaluation

This plan will be monitored and evaluated by a subset of the planning team, specifically the LHMP project manager. If updated, the plan will be submitted to the Board of Supervisors for approval and publically shared. OES will update every five years. The update process will begin a year before the five-year expiration date.

The LHMP project manager will complete the Annual Review Tracker every January and after any major disaster to ensure that the 2023 LHMP is relevant and effective in achieving the plan’s

goals. OES will track the annual review in a table in this document. FEMA-funded mitigation projects will continue to be tracked and reviewed using FEMA Mitigation Progress Report forms; OES will include progress summaries in the Annual Review Tracker (Table X) at the beginning of each year.

Year	Disasters	Mitigation Actions	New Studies/ Reports	Public Outreach	Changes made to LHMP
2023					
2024					
2025					
2026					
2027					

4 HAZARD IDENTIFICATION AND RISK ASSESSMENT

Hazard identification consists describes the nature of the hazard, disaster history, location, extent/severity, and probability of future events. According to the Comprehensive Preparedness Guide, 201: Threat and Hazard Identification and Risk Assessment Guide, 2d ed. (CPG 201), dam failure, drought, earthquake, flood, landslide, tsunami, and wildfire are classified as natural hazards. CPG 201 does not classify climate change, outbreak/epidemic/pandemic, or public safety power shutoff. Therefore, the dangers profiled for this LHMP are discussed in alphabetical order and not by CPG 201 classification. The order does not signify the level of risk.

4.1.1 Hazard Categories

Using the following terminology organizes known hazards into local, state, and federal “commonly recognized” categories, especially weather-related threats. Commonly recognized types allow more accessible research into past events and smoother discussions with other jurisdictions and agencies.

Air Pollution: Caused by releasing gases, chemicals, foul odors, or physical materials suspended in the atmosphere. These materials can cause adverse health effects due to the toxicity of the chemical itself or by particulates causing physical duress on the respiratory system. Chemical air pollution includes

- air releases from a hazardous materials spill,
- industrial emissions, or
- Air inversions are trapping vehicle emissions.

Physical material air pollution includes smoke from fires and dust storms. Foul odors can be created by excess or uncontrolled sewage or garbage.

Animal Pests: In San Joaquin County, birds and small mammals damage or consume agricultural products. Insects in all stages can damage crops by consumption or using crops for larvae production. Small mammals such as ground squirrels and birds can cause damage to fruit and nut-producing crops. Animal pests also include burrowing mammals such as gophers, moles, or beavers that can weaken levee structures by their activity.

Animal Diseases: Diseases carried by or that have infected other organisms. Diseases can carry from one species to another (zoonotic) or be unique only to one species (vector).

Civil Disturbance: A general term used to describe some form of disturbance caused by a group. It is usually a protest against political organizations or policies, economic concerns, or even the results of a sports contest. Examples range from passive resistance and sit-ins to riots, acts of sabotage, and all-out civil chaos.

Dam Failure: An event where the dam or part of the dam itself fails, or water otherwise overtops the barrier without the dam failing. Considered “installations containing dangerous forces” under International Humanitarian Law, dam failure has a massive impact on people and the environment.

Dense Fog: During rainy seasons, additional moisture creates a fog that diminishes visibility creates a hazard, especially transportation. San Joaquin County is subject to periods of localized thick fog in the winter called Tule Fog. This dense fog creates a visibility hazard on roads, freeways, airports, and rail lines throughout the county.

Drought: A period of deficiency of the needed water supply. In California, the deficit caused by a lack of precipitation can significantly impact agriculture, cause damage to soils (salt intrusion), and lead to public water use limitations.

Earthquake: A movement in the earth's crust that Seismologists can quantifiably measure by seismic waves. They are most commonly found on plate boundaries but can also be associated with volcanic activity and occur anywhere on the earth. Earthquakes range from small and profound sub-surface events to large-scale near-surface events that have catastrophic effects on artificial structures and natural topography.

Energy Shortages: Loss in the ability of the power grid or energy infrastructure to meet the current needs of a type of consumption. Impairment can include a drop in oil reserves leading to gasoline shortages, the disruption of an electrical power grid (transmission systems), or overloading the power grid due to excessive demand. Events and resources far beyond the boundaries of San Joaquin County can influence energy shortages.

Excessive Rain: A period of precipitation that can overcome the natural ability of the environment or fabricated structures to control the runoff. The deluge may lead to local or widespread flooding.. Excessive rain in areas outside the County, such as the Sierra Nevada Mountains and foothills can still affect the county by having runoff exit through the river systems of the Central Valley and into the Delta.

Expansive Soils: Clay soils (present in San Joaquin County expand with the addition of water and contract when it dries out.. The change in volume when in contact with buildings, roadways, underground utilities, or levees can cause severe damage.

Extreme Temperature - Cold: A period where winter temperature drops below the point where most of the population or agriculture can adequately deal with it. Extreme cold temperatures in San Joaquin County can adversely affect sensitive populations such as the elderly or homeless and seriously affect crops such as fruit trees.

Extreme Temperature - Heat: A span where the temperature rises quickly to a higher than average temperature and then drops (spike). A prolonged period of hot days beyond expectation. For temperatures to be considered extreme, they must adversely impact human health or agriculture.

Flood: An overflow of water that covers the land. The sources of the floodwaters can be diverse. In San Joaquin County, flooding can occur from excessive rain overloading the river and levee system, a dam failure, or a levee failure. Floods can be slow in nature, such as rising water in a river, or rapid such as a catastrophic flood caused by dam or levee failure. Flooding can create significant physical, economic, agricultural, and social harm to affected areas.

General Fire Threats: These are County fires that may spread beyond an initial dwelling or involve chemicals that pose a more significant threat than the fire itself. Examples include fires in intense wind environments moving through residential areas and fires at chemical storage and use facilities such as Port of Stockton.

Ground Contamination: The discharge of chemicals into the soil. Sources of ground contamination are underground storage tanks (often fuels), the application of pesticides, leachate from landfills, and the dumping of chemicals and other waste directly onto the soil. Contaminated soils damages water supplies, make land areas untenable for habitation or other human use, and requires expensive long-term remediation.

Hazardous Material Emergencies: Events where the release of dangerous material, substance, or waste threatens people, property, or the environment. A hazardous material emergency will

require the response of specially trained personnel with the correct equipment to contain, control, and clean up the material involved.

High Winds: Wind that causes physical damage to structures, trees, or agriculture within the county. High winds can also pose a flying debris hazard to the public and interfere with transportation systems.

Landslide: The downslope movement of rock and soil over a surface that can no longer maintain stability (incompetence). Influenced by gravity, landslides can be exacerbated by water flow, earthquakes, erosion, and manufactured disruptions such as excavation and construction..

Land Subsidence: A lowering of the land surface in response to subsurface weathering, the collapse or slow settlement of underground mines, or the removal of subsurface fluids such as oil or water from an aquifer.

Levee Break: Like a dam, a break is where the levee can no longer control the water. Generally, when levees do break, they are under stress due to the significant retention of water between the levee banks. Water saturation (boils), overtopping and erosion, land subsidence, earthquake, burrowing animals, or general lack of maintenance cause levee breaks.

Noise Pollution: Unwanted and unpleasant human, animal, or machine-created sound that interferes with the activity or balance of human or animal life. Sources of noise pollution include transportation systems, motor vehicles, car alarms, emergency service sirens, office equipment, barking dogs, power tools, audio entertainment systems, loudspeakers, and noisy people.

Plant Pathogens: Diseases carried by organisms (vectors) or caused by environmental conditions. Organisms that cause plant diseases include fungi, viruses, protozoa, bacteria, and parasitic plants.

Plant Pests: Insect that destroys plant or crop through consumption or use of the plant as a receiver for larvae. San Joaquin County monitors plant pests closely. Abatement programs are in place by the County Agricultural Commissioner's office.

Public Health Emergency: An emergency declared by the county or the state public health officer of a health threat to the general populace of the county. Public Health Emergency could be a pandemic such as COVID-19, H1N1 flu, an epidemic of West Nile Virus or a period of excessive temperatures.

Soil Erosion: The gradual loss or movement of surface soil due to energy or friction created by gravity, water, or wind. Soil erosion can intensify when forceful and persistent winds act upon loose soil. Essentially, this can cause dust storms posing a significant adverse health effect, an environmental hazard, and an agricultural disaster.

Terrorism: Defined by the U. S. Department of Defense as "the unlawful use of, or threatened use of violence to inculcate fear, intended to coerce or intimidate governments or societies as to the pursuit of goals that are generally political, religious or ideological."

Tornadoes and Severe Thunderstorms: An associated period of severe weather that can cause catastrophic damage. Although relevant, they are uncommon in San Joaquin County.

Train Derailment: An accident on a railway in which a train leaves the rails resulting in damage, injury, and death. Broken or misaligned rails, excessive speed, faults in the train and its wheels, and collisions can cause derailment with obstructions on the track. Derailment can also be a secondary effect in the aftermath of a collision between two or more trains. The most significant derailment hazard is when a freight train with cars of LNG or LPG is involved. Derailed LNG and LPG cars involved in a fire with the right circumstances create a catastrophic explosion and fire called a BLEVE (Boiling Liquid Expanding Vapor Explosion).

Water Pollution: A material that harms a water body. The most common type of water pollution is a discharge of oil. However, almost any liquid or solid may be a water pollutant. Water pollution can adversely affect the biomass of an impacted area, damage water supply sources, injure those who come into contact, and create significant economic harm.

Weapons of Mass Destruction (WMD): Weapons designed to kill or injure large numbers of people and damage the physical infrastructure. Weapons of Mass Destruction may also cause environmental harm that would adversely affect people. WMDs also include nuclear, biological, radiological, and chemical (NBC) weapons.

Wildland Fires: Uncontrolled fires in rural areas and sparsely populated regions with limited vehicle access. A wildland fire is different from general fire threats by their sometimes-extensive size, the speed at which they can travel, and the ability to change direction and jump gaps. San Joaquin County is increasingly becoming a Wildland Urban Interface (WUI) zone. The WUI is the zone of transition between unoccupied land and human development. It is the line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

Winter Storms: Periods of intense weather can include low temperatures, heavy rain, snow or sleet, high winds, and icing conditions. The general climate in San Joaquin County is not known for severe weather conditions, but the potential is there for winter storms to occur.

4.1.2 Omission of Natural Hazards

No known hazards have been omitted at this time.

4.2 TABLE OF PREVIOUS INCIDENTS

Previous Occurrences – Earth Movement		
Date:	Location:	Comments:
1881	Linden	This quake possibly located on the Tracy-Stockton Fault had an estimated Modified Mercalli intensity of VII.
1906	Countywide	The San Francisco earthquake of 1906, which caused historic destruction in the City, also caused strong seismic shaking in San Joaquin County.
1940	Linden	Two small quakes occurred with a Richter Magnitude of 4. It is not known if these earthquakes were connected to the Tracy-Stockton fault.
1979	Countywide	- Seismic shaking with unverified impacts in the Delta
1980	Countywide	- Seismic shaking with unverified impacts in the Delta.
1983	Countywide	- Seismic shaking with unverified impacts in the Delta.
1983	Countywide	- Seismic shaking with unverified impacts in the Delta.
1984	Countywide	- Seismic shaking with unverified impacts in the Delta.
1989	City of Tracy Countywide	-Localized damages occurred within the City. -Rolling seismic waves were felt throughout the County.
2006	Corral Hollow Rd	-Heavy rains caused a landslide along Corral Hollow Road at a Lawrence Livermore Labs site.
2019	RD 2064 along Stanislaus River	A large tree fell into the river causing the water to divert into the SJC side of the bank which led to erosion of a portion of the levee.
Previous Occurrences – Energy Shortage		
Date:	Location:	Comments:
1973-74	Countywide	Middle East Oil Embargo

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1978-83	Countywide	Gasoline/Energy Shortage & Recession
1991	Countywide	Iraq's invasion of Kuwait resulting in U.S. military Action
2000	Countywide	Statewide energy shortage causes rolling blackouts
2019	Out of County	San Joaquin County communication systems are threatened during PSPS event in Calaveras Co.
2020	Countywide	Public Safety Power Shut Offs during wildfire season
2022	Countywide	Excessive heat event stressed the power grid and caused sporadic instances of power loss.
Previous Occurrences – Fire		
Date:	Location:	Comments:
2002	Contiguous counties to Calaveras County	USDA Secretarial – winds, drought & fire
2002	Eligible contiguous County business owners	SBA – physical and economic injury disaster loans – Santana Row Fire – Santa Clara County
2020	Multiple locations throughout Santa Clara County, Alameda County, Contra Costa County, San Joaquin County, Merced and Stanislaus County	SCU Complex Fire- 396,624 acres burned along the Coastal Range from Merced County into San Joaquin County.
Previous Occurrences – Floods		
Date:	Location:	Comments:
1980	Reclamation Districts: 2 Union West 38 Staten 524 Middle Roberts 544 Upper Roberts 548 Terminous 684 Lower Roberts 756 Bouldin 2023 Venice 2027 Mandeville 2028 Bacon 2029 Empire 2030 McDonald 2033 Brack 2037 Rindge 2039 Upper Jones 2040 Victoria 2041 Medford 2042 Bishop 2044 King 2072 Woodward	FEMA Declaration 3078, Public Assistance \$604,400, Individual Assistance \$1,454,800 TOTAL: \$2,059,200
1980	Reclamation Districts: 2038 Lower Jones 2039 Upper Jones	FEMA Declaration 633, Public Assistance \$2,730,329 Individual Assistance \$8,077,400 TOTAL: \$10,807,729
1982	Countywide damages, include: Reclamation Districts: 2 Union West 38 Staten 348 New Hope	FEMA Declaration 651, Public Assistance \$427,000 Individual Assistance \$200,000 TOTAL: \$627,000

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	548 Terminous 684 Upper Roberts 756 Bouldin 2023 Venice 2027 Mandeville 2029 Empire 2030 McDonald 2033 Brack 2037 Rindge 2038 Lower Jones 2040 Victoria 2041 Medford 2044 King 2113 Fay	
1982	2030 McDonald	FEMA Declaration 669, Public Assistance \$4,642,500 Individual Assistance \$5,245,789 TOTAL: \$9,888,289
1982	Reclamation Districts: 2 Union West 38 Staten 348 New Hope 524 Middle Roberts 544 Upper Roberts 548 Terminous 684 Lower Roberts 756 Bouldin 773 Fabian 1007 Pico & Nagle 2023 Venice 2027 Mandeville 2028 Bacon 2029 Empire 2030 McDonald 2033 Brack 2037 Rindge 2038 Lower Jones 2039 Upper Jones 2040 Victoria 2041 Medford 2042 Bishop 2044 King 2058 Pescadero 2072 Woodward 2086 Canal Ranch 2089 Stark 2113 Fay	FEMA Declaration 677, Public Assistance \$ 23,455,600 Individual Assistance \$ 3,224,510 TOTAL: \$ 26,680,110
1986	Countywide, including: Reclamation District: 348 New Hope	FEMA Declaration 758, Public Assistance \$ 8,239,000 Individual Assistance \$ 11,500,000 TOTAL: \$19,739,000
1994	2027 Mandeville	TOTAL: \$750,000
1996	Countywide including: Reclamation Districts: 2058 Pescadero 2062 Stewart	FEMA Declaration 1155, Public Assistance \$ 14,725,364 Individual Assistance \$ 84,937,350 TOTAL: \$99,662714

	2064 River Junction 2075 McMullin 2095 Paradise 2096 Wetherbee Lake 2107 Mossdale	
1998	Countywide	FEMA Declaration 1203, Public Assistance \$ 1,437,000 Individual Assistance \$ 1,666,000 TOTAL: \$ 3,103,000
2004	Reclamation Districts:2038 Lower Jones 2039 Upper Jones	FEMA Declaration 1529, Public Assistance \$ 42,488,326 Individual Assistance \$44,977,071 TOTAL: \$ 87,465,397
1995	Countywide	State Proclamation
1997	Countywide	State Proclamation
2006	Countywide	State Proclamation
2017	Countywide	(January Storms) Local Proclamation \$ unknown as of 9/2017
2017	Countywide	(February Storms) Local Proclamation \$ unknown as of 9/2017
2017	Countywide	FEMA Declaration 4308 , \$ unknown as of 9/2017
Previous Occurrences – Hazardous Materials		
1998	Tracy	Tracy Tire Fire
1989	Manteca	Freight train derailment
2006	Stockton	Freight train derailment
Annually	Countywide	Hazardous Materials - County agencies typically respond to more than 200 spills/incidents per year
Previous Occurrences – Train Derailment		
1989	Mariposa Road	Amtrak derailment 53 injured
Previous Occurrences – Public Health Emergencies		
2009	San Joaquin County	11 Hospitalizations, 0 Deaths 7
2004	Countywide	West Nile Virus – 3 human cases reported
2005	Countywide	West Nile Virus – 36 human cases reported
2006	Countywide	West Nile Virus – 8 human cases reported
2020-Current	Countywide	2019 Novel Coronavirus (COVID-19) Pandemic
2022-Current	Countywide	2022 Monkeypox Outbreak
Previous Occurrences – Drought		
1977	Countywide	Drought
1990	Countywide	Drought
2002	Countywide	Drought - USDA – Ag
2004	Countywide	Drought with associated agricultural losses
2008	Countywide, Central Valley Drought	Drought
2014	Statewide	Drought (2014-2017)
2021	Statewide	Drought (2020-current)
Previous Occurrences – Weather : Extreme Temperature		
2003	Countywide	Extreme heat with agricultural and economic losses
2006	Countywide	Extreme heat. At least 23 human deaths attributed to heat conditions, crop damages, loss of agricultural productivity, and livestock fatality. Agricultural losses in production expected to continue into 2007.

		Agricultural Losses up to \$21,052,101
2013	Countywide	Freeze Event
2016	Countywide	Cold temperatures
2022	Countywide	Extreme Heat event that impacted the majority of the State.
Previous Occurrences – Weather : Severe Thunderstorms		
1982	Countywide	Excessive Rain – USDA Cost- \$48,097,424
1990	Countywide	Excessive Rain – Local Disaster – Cherries Cost - \$35,000,000
1993	Countywide	Excessive Rain – FEMA Cost - \$10,250,000
1995	Countywide	Storm - FEMA – Crop damage Cost - \$6,020,000
1995	Countywide	Storm - FEMA-1046-DR-CA
1995	Countywide	Excessive Rain – Local Disaster - Cherry crop Damage Cost - \$11,050,000
2002	Contiguous counties to Calaveras County	Winds, drought & fire out of County – USDA Secretarial - ag losses
2005	Countywide	Hail and excessive rain
2006	Countywide	Heavy winds & excessive rain
2021	Countywide	October Atmospheric River created flooding issues as local pumps and storm drains were unable to keep pace with the deposition of precipitation in the County.
2022	Countywide	Tornado touchdown 8 miles ESE of Isleton
Previous Occurrences – Civil Disturbance		
2020	Sporadic	George Floyd Protests in various cities around the County.
Previous Occurrences – Terrorism		
1989	Stockton	Cleveland Elementary School Shooting,

4.2.1 Hazard Ranking

This table illustrates known hazards in San Joaquin County that the Planning Team has ranked. Though some risks are "highly likely," there will not be projects listed because they are not under the County's jurisdiction/authority.

Hazard Descriptions	Highly Likely	Likely	Not Likely	Occasional
Animal Pests	3	1		1
Animal Diseases	2	2	1	
Plant Pathogens	1	2	1	
Plant Pest	2	1	2	
Civil Disturbance		1	3	2
Terrorism		1	4	1
Weapons of Mass Destruction (WMD)			4	2
Earth Movement				
Earthquake			2	2
Expansive Soils			3	1
Land Subsidence			4	
Landslides			4	
Energy Shortage				5

Fire				
Wildland Fire			3	3
Flood / Excessive Rain	2	4		
Dam Failure		1	3	1
Levee Break	3	1	1	
Hazardous Materials	3	1		
Water Pollution	2			2
Air pollution	4	1		
Movement/Transportation				
Public Health	2	2	1	
Weather				
Dense Fog	3			
Extreme Temperature				
Heat	3	1		
Cold		1	1	
Drought	2	2		
High Winds		2		2
Tornados/Thunderstorms		3	2	1
Noise Pollution			3	1
Ground Contamination		3		1
Train Derailment	2	1	1	1
Climate Change	1	3	1	1

4.3 IMPACTS AND VULNERABILITIES

4.3.1 Flooding

Impact: Flooding in San Joaquin impacts many areas, such as people, roads, buildings residential /commercial, parks/recreation areas, agriculture, and critical facilities.

Fiscal ramifications from flooding can happen due to road closures that affect businesses, County-owned park closures, and airport closures. County staff working during a flood event can cause a financial burden on San Joaquin’s economy.

Vulnerabilities: Acampo Road and State Route 99, known as “Cooper’s Corner,” historically floods (approximately every ten years) during heavy rainfall. When this area floods, there is repeated damage to local elementary schools, residences, and businesses. There have been road closures and evacuations due to the flooding in this area.

The undercrossing at State Route 99 continues to flood due to vandalism and a poorly functioning backflow valve on the levee side of the Mokelumne River. Equipment failure has resulted in frequent flooding of the frontage road beneath the underpass. Frequent flooding causes damage to the roadway, and the inundation impacts the farms, businesses, and residences in this area.

Culverts located at Kenefick Road just north of Liberty Road have washed away during heavy rains. Damaged conduits destroyed over 100 feet of Kenefick Road, temporarily eliminating access to properties north of Liberty Road, which is the only access point for that area.

Howard Road Bridge, located over the San Joaquin River, suffered a slip-out failure on an uppermost portion of the northeast side of the eastern approach to the bridge. This failure is approximately 100 feet long by 40 feet wide, which has compromised the integrity of the roadway/bridge. Failure of the roadway in this area would limit access to critical portions of French Camp and Lathrop communities. The collapse will affect local businesses and residents traveling on this road/bridge.

Due to poor drainage and mix-use properties on the south side of West Larch Road, sheet runoff occurred going north into the County's southern conveyance ditch located at the south side of West Larch Road. The runoff was over capacity for the current ditch, which was reduced due to encroachments and undersized driveway culvert crossings. Overflow from these issues resulted in the inundation of West Larch Road and properties (businesses/residences) in the drainage areas.

Continuous rains have caused the outer banks of the lake in the park to erode, affecting the park benches, picnic areas, and recreational equipment rental.

Chrisman Road residential area continues to flood during heavy rainstorms, which cause homes in the area to retain water in residential buildings due to flooding.

Purdy culvert system located at end of Partridge Road (this is a private road, non-county maintained) in Acampo, in mixed residential and agricultural use area, needs to be replaced or upgraded due to flooding causing the area to overflow.

4.3.2 Dam Incidents

Hazard/Problem Description: Dam failure is the breakdown, collapse or other failure of a dam structure characterized by the uncontrolled release of impounded water that results in downstream flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream. An uncontrolled breach is the unintentional discharge from the impounded water body and is considered a failure. Dam failure can result from natural events or human-induced events. Dams have received more attention recently in the emergency management community as a potential target for terrorist acts.

Dams are 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

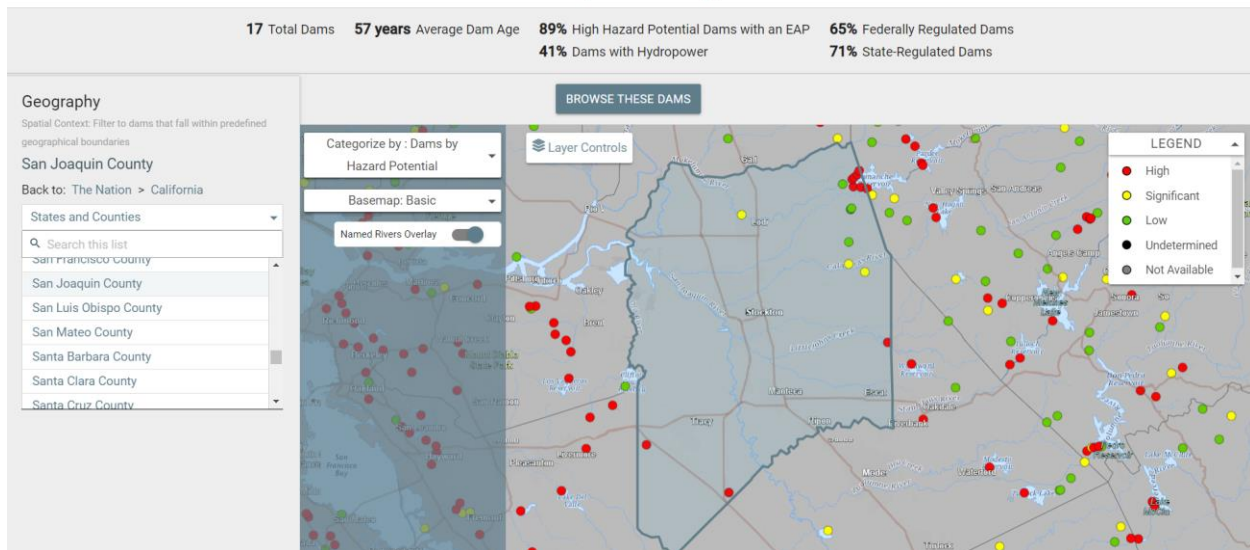
Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources 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. The best way to mitigate dam failure is through the proper construction, inspection, maintenance, and operation of the dam.

Controlled release or spillway flooding: Spillways are designed to relieve pressure on dams and prevent dam failures. Flooding downstream often results when spillways flow, though the potential for flooding as a result of discharge from dam outlet structures can also result from excessive rain events. However, controlled releases of water from dams is a measure that can prevent or minimize spillway flooding or structure failure, by regulating capacity in a managed way. Even controlled releases can lead to unwanted or unpredicted flooding, depending on environmental and weather conditions, or even 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: the downstream 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.

Geographic Area: Significant- According to the California Department of Water Resources' (DWR) Jurisdictional Dams and the National Inventory of Dams (NID) databases there are 20 dams of concern to San Joaquin County; seven of which are in the County and 13 upstream of the County. **Table XX** lists the high and significant hazard dams within and upstream of San Joaquin County. It is important to note that the inundation areas shown do not represent all dams that pose a risk; some of this information is not available in GIS or allowed for release in a public document. Virtually no urban areas in the County are free from flooding in the event of dam failure. Potential impacts are greatest for all major cities in the County, as well as rural communities such as Clements, Lockeford, Mokelumne, Linden, etc.

Dams of San Joaquin County, California



CALIFORNIA DEPARTMENT OF WATER RESOURCES
DIVISION OF SAFETY OF DAMS

Jurisdictional Dams
Listed Alphabetically by County
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Dam Number	Dam Name		Owner Name	Dam Height	Reservoir Capacity	Certified Status	Condition Assessment	County
National ID No.	Latitude	Longitude	Owner Type	Crest Length	Dam Type	Downstream Hazard	Reservoir Restrictions	Year Built
576-0	Beggs		Private Entity	40	81	Certified	Satisfactory	San Joaquin
CA01291	38.22	-121.05	Individual owner	300	ERTH	Low	No	1971
31-16	Camanche		East Bay Municipal Utility District	171	417,120	Certified	Satisfactory	San Joaquin
CA00173	38.23	-121.02	Park, sanitation, utility, or water district	2,400	ERTH	Extremely High	No	1963
572-2	Davis No. 2		Private Entity	26	1,400	Certified	Satisfactory	San Joaquin
CA00656	38.06	-121.03	Individual owner	1,653	ERTH	Significant	No	1955
573-0	Foothill Ranch		Private Entity	15	100	Certified	Satisfactory	San Joaquin
CA00657	38.10	-121.03	Individual owner	380	ERTH	Low	No	1952
571-0	Gilmore		Private Entity	28	550	Certified	Satisfactory	San Joaquin
CA00655	38.04	-120.99	Individual owner	1,080	ERTH	Significant	No	1918
577-0	Maria		Studley Company	48	277	Certified	Satisfactory	San Joaquin
CA01468	37.71	-121.53	Private company, corporation, LLC, partnership	610	ERTH	High	No	2003
71-2	New Woodbridge Diversion		Woodbridge Irrigation District	31	1,583	Certified	Satisfactory	San Joaquin
CA01461	38.16	-121.30	Park, sanitation, utility, or water district	600	INFL	Significant	No	2006

Count: 7

Extent (Magnitude/Severity): Catastrophic- Since the County has several high and significant hazard dams, there is potential for loss of life and property damage. 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. The extent

of impacts depends on the nature of failure and location of the dam. The largest populations potentially at risk would be in Lodi, Stockton, Lathrop, and Manteca. The hazard risk also applies to the County's most rural communities. A severe storm, earthquake or erosion of the embankment and foundation leakage may cause the collapse and structural failure of dams in the County or other nearby counties. Seismic activity may also cause inundation by the action of a seismically induced wave that overtops the dam without causing failure of the dam, but significant flooding downstream. Landslides flowing into lakes and reservoirs may also cause dams to fail or overtop.

Past Occurrences: There is no history of dam failure affecting the County, but according to the historical information, there have been recurring issues with flooding due to high flows released below dams in the area.

Climate Change Considerations: UC Davis researchers discussed the effects of climate change on reservoir operations in a journal published in 2014. This journal and other relevant studies imply that climate change will impact the traditional operation measures and flow regimes used for dams because river conditions and water levels will be fluctuating due to climate change. For example, climate change may worsen drought conditions, which lessen the water available while climate change can also produce intense sudden storms that causes water levels to suddenly increase. Therefore, reservoir operators may need to change operations to mitigate for climate change's impact on rivers and overall water levels (Rheinheimer and Viers 2014). However, the potential for climate change to affect the likelihood of dam failure is not fully understood now. With a potential for more extreme precipitation events as a result of climate change, this could lead to large inflows to reservoirs. However, this could be offset by generally lowering reservoir levels if storage water resources become more limited or stretched in the future due to climate change, drought and/or population growth.

4.3.3 Drought

Impact: Drought cycles in San Joaquin impacts have fluctuated during the last 20 years. In 2016-2017, heavy rain showers ended the current 11-year drought conditions. If drought conditions were to return, it would affect agricultural lands, wells, new construction, and the public's general welfare.

Vulnerabilities: During a drought cycle, the vulnerable areas could be Countywide affecting agricultural businesses, including farming, livestock grazing areas, and the people who live in drought-prone areas. The County will prepare for the next drought by producing a "Drought Plan."

4.3.4 Climate Change Vulnerability Assessment

Climate change is a growing threat to California's economy, environment, and public health. California is leading the efforts in the United States in introducing legislation and providing tools and incentives to local governments to help reduce greenhouse gas emissions, which are warming the planet. The state is also taking action to prepare for the unavoidable impacts of climate change, including the increased likelihood of flooding and drought, both high vulnerability risks for San Joaquin County.

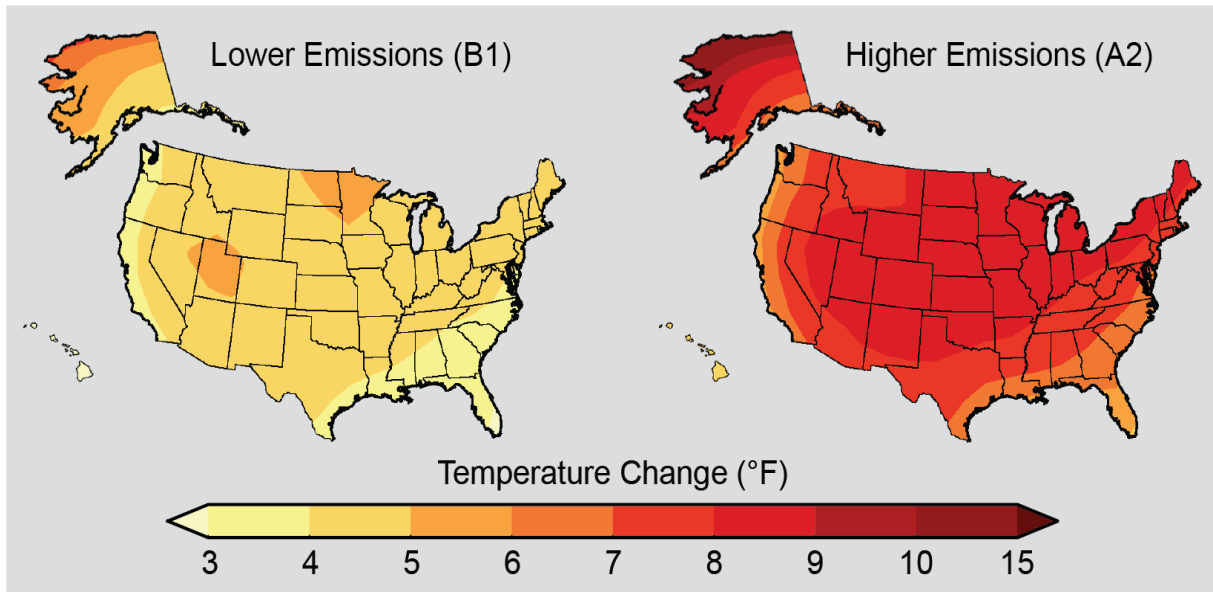
Among the initiatives implemented in California was the passage of Senate Bill (SB) 379 (Jackson). This bill requires cities and counties to review and update their general plans' safety elements to address climate adaptation and resiliency strategies applicable to the city or county. Local officials gave an option to enact the requirements of its bill, including within the update of their Local Hazard Mitigation Plans on or after January 1, 2017.

Accordingly, the following vulnerability assessment for climate change within the San Joaquin County region will discuss the risks climate change poses and the impacts on existing vulnerabilities.

According to the California Natural Resource Agency (CNRA), climate change has already affected California. The effects will continue, including increased temperatures, rising sea levels, reduced winter snowpack, altered precipitation patterns, and more frequent storm events. San Joaquin County has seen this impact not only through increased temperatures throughout the Central Valley but also through more severe storms, increased snow melt run-off, and drought. Over the long term, reducing greenhouse gases can help make these changes less intense, but the Central Valley cannot avoid the changes entirely. Considering mitigation actions to help mitigate the impacts of climate change will be noted in the mitigation actions section of this plan. It will consider secondary consequences of climate change, including the effects on human health and safety, economic continuity, ecosystem integrity, and provision of essential services.

4.3.4.1 Projected Temperature Change – Lower and Higher Emissions Scenario

Projected Temperature Change



The National Climate Assessment’s 2014 Climate Adaptation Strategy (CAS) provided vital information and projections on how climate change may impact and exacerbate natural hazards in the future; this includes:

- Increased temperature
- Decreased precipitation
- Reduced snowpack
- Reduced tourism
- Ecosystem change
- Sensitive species stress
- Increased wildfire

Within San Joaquin Valley, climate change modeling forecasts increased frequency, intensity, and duration of extreme heat events, likely to increase the risk of mortality and morbidity due to heat-related illness and exacerbation of existing chronic health conditions. Those most at risk and

vulnerable to climate-related sickness are the elderly, individuals with chronic conditions such as heart and lung disease, diabetes, and mental illnesses, infants, the socially or economically disadvantaged, and those who work outdoors.

Additionally, the higher temperatures throughout California will cause an earlier melting of the snowpack resulting in high water, stress on the Delta Levee system surrounding San Joaquin County, and less drinking water available to citizens in non-rainfall months of the year. Although the probability of drought expects to increase throughout the 21st century due to the impacts of climate change, the possibility of increased intense rainfall with historical runoffs is projected. The current high flood risk throughout San Joaquin County could have widespread consequences throughout the County and the entire San Joaquin Valley region, including floods, levee and dam failures, and issues with salt water intrusion into the Delta water supply.

San Joaquin did not identify the fire as a high vulnerability risk. It is important to note that within climate change projections, warmer weather, reduced snowpack, and earlier snowmelt expects to increase wildfire risk due to increased fuel and ignition risks. These changes can also increase plant moisture stress and insect populations, which could have long-term effects on agriculture within the County and region. According to the California Adaptation Planning Guide (APG), the risk of these possible future conditions will increase vulnerability extent and intensity and public safety risks, property damage, and emergency response costs to government, watershed, and water quality impacts, vegetation conversions, and habitat fragmentation. The APG also outlined the secondary risks of climate change related to the above-noted vulnerabilities, including significant implications for ocean and coastal resources, water management, forest and rangeland, biodiversity and habitat, agriculture, and infrastructure.

The California APG further provides input on adaptation considerations for the San Joaquin Valley Region. The specific regional impacts outlined in the APG include the following:

- **Ecosystems and Biodiversity:** Exacerbated by new regional development, climate change can cause habitats to shift, creating conditions that stress ecosystems and endemic species. Continued changes in hydrologic flow regimes and increased temperatures will further stress these systems' regional habitats supporting many special-status species.
- **Snowpack and Flooding:** Climate-related decrease in snowpack can significantly affect the areas that depend on this water. In addition, a reduction in snowpack can increase impacts from flooding, landslide, and loss of economic base related to a drop in tourism. Recreation, tourism, and home development will likely suffer due to lower water levels in waterways and reservoirs. The declining snowpack increased flood events can further stress the region and increase flood-related impacts and damages.
- **Wildfire:** Climate change projects significant increases in wildfire frequency and size, which will further compound the wildfire problem. In addition, potential impacts following fires, such as heavy rains causing landslides and erosion in post-burn areas, can have significant consequences on waterways and entire watersheds.
- **Public Health, Socioeconomic, and Equity Impact:** Increased temperatures throughout the San Joaquin Valley region can cause vulnerable populations risk that is more significant. In addition to the elderly population found in this region, people who work and play outdoors are also vulnerable.
- **Future Development:** San Joaquin County could see population fluctuations due to climate impacts relative to those experienced in other regions. These fluctuations expect to impact demand for housing and other development state and nationwide. For example, sea level rise may disrupt economic activity and housing in coastal

communities, resulting in migration to inland urban areas. Other interior western states may experience an exodus of the population due to challenges in adapting to heat even more extreme than that projected to occur here. While no formal studies of migration patterns impacting the San Joaquin County region exist, climate-induced migration was recognized within the UNFCCC Conference of Parties Paris Agreement of 2015. It will be the focus of future studies.

- **Impact on Development:** Research has shown increased demand for smaller homes that require fewer resources, use less energy, are easier to maintain, and can be more readily adapted or moved in response to changing conditions related to climate change. Compact, mixed-use, and infill developments that can help residents avoid long commutes and vulnerabilities associated with the transportation system will likely continue to grow in popularity. The value of open space and pressure to preserve it will increase due to its restorative, recreational, environmental, and habitat benefits but also its ability to sequester carbon, help mitigate the accumulation of greenhouse gas in the atmosphere and slow down the global warming trend. Higher flood risks, especially with increased federal flood insurance rates, may decrease market demand for housing and other floodplain development types. In contrast, the increased risk of wildfires may do the same for new developments in the urban-wildland interface. Flood risks may also inspire further action and building codes that elevate structures while maintaining streetscapes and neighborhood characteristics.
- **Stress on water resources:** While the APG states that water is an issue in every region, it is particularly significant to the San Joaquin Valley, its agriculture, and its economy. Drought, related to reduced precipitation, increased evaporation, and increased water loss from plants, is a critical issue in many U.S. regions, especially in the West. Floods, water quality problems, and impacts on aquatic ecosystems and species are caused by climate change. The ability to secure and provide water for new development requires ongoing monitoring. The recommended ability to provide a reliable water supply from the appropriate water purveyor continues to be in the conditions for project approval. Such assurances shall be verified and in place before issuing building permits.
- **Protecting and enhancing water supply:** California's Sustainable Groundwater Management Act (SGMA) will contribute to addressing groundwater and aquifer recharge needs. Good groundwater management will buffer against drought and climate change and provide reliable water supplies regardless of weather patterns. California depends on groundwater for a significant portion of its annual water supply, and sustainable groundwater management is essential to a reliable and resilient water system. Protection of critical recharge areas should be addressed across the County in the respective Groundwater Management Plans. Further, these plans should include provisions that guide development or curtail development in the regions that would harm or compromise recharge areas.
- **Effects on transportation:** The transportation network is vital to San Joaquin County and the region's economy, safety, and quality of life. While widely recognized that transportation emissions impact climate change, the climate will also likely have significant implications for transportation infrastructure and operations. Examples of specific impacts include softening of asphalt roads and the warping of railroad rails; damage to roads; flooding of roadways, rail routes, and airports from extreme events; and interruptions to flight plans due to severe weather. Climate change impacts in the plan include extreme temperatures; increased precipitation, runoff, and flooding; increased wildfires; and landslides. Although landslides are not a direct result of

- climate change, these events expect to increase in frequency due to increased rainfall, runoff, and wildfire. These events can potentially cause injuries or fatalities, environmental damage, property damage, infrastructure damage, and interruption of operations. These trails serve as secondary transportation facilities during flood events when roadways are blocked or otherwise impassible. Including dual or multi-purpose facilities and amenities as part of all new development provide desirable community amenities and critical infrastructure for climate resiliency..
- **Effect on land uses and planning:** Development could be impacted by climate change, shifting demographics, and market conditions. Demand may increase for smaller dwellings that are less resource intensive, more energy efficient, easier to maintain, and more readily adapted or even moved in response to changing conditions. Compact, mixed-use, and infill developments that can help residents avoid long commutes and vulnerabilities associated with the transportation system will likely continue to grow in popularity. The value of open space, urban greening, green infrastructure, tree canopy expansion, and pressure to preserve it will likely increase, due in part to its restorative, recreational, environmental, and habitat, and physical and mental health benefits but also for its ability to sequester carbon and cool the surrounding environment..
 - **Effect on Utilities:** Utility efforts to deal with the impacts of climate change range from emergency and risk management protocols to new standards for infrastructure design and resource management techniques. California is already experiencing the effects of climate change, such as an increased number of wildfires, sea level rise, and severe drought. Utilities are just beginning to build additional resilience and redundancy into their infrastructure investments from a climate adaptation perspective. However, they have been doing so from an overall safety and reliability perspective for decades. Significant efforts were made in areas that overlap with climate change mitigation, such as the diversification of resources, adding more renewables to the portfolio mix, and implementing demand response efforts to curb peak demand. Steps are also underway to upgrade the distribution grid infrastructure, which should also add significant resilience to the grid. Next, they will issue a guidance document that expands upon the vulnerability assessments phase and includes plans for resilience solutions, including cost/benefit analysis methodologies. This work's outcomes will help inform the following steps on how infrastructure, the grid, and related operations will be modified to address climate change. The new development will have to adapt and incorporate these new approaches as they evolve. The existing and further action will be affected by impacts that include diminished capacity from all utility assets from generation to transmission and distribution and the cost consequences resulting from prevention, replacement, outage, and energy loss. These have the potential to impact significantly not just residential development but commercial, industrial, and all utility users.
 - **Urban Heat Islands and Heat Events:** New development will contribute to urban heat island (UHI) impacts and will need to incorporate urban greening methods into all aspects of development; interior and exterior of buildings, surrounding environment, and beyond. The new expansion will need to reduce its impacts on the overall UHI impacts affecting the County and surrounding region. Ongoing and expanding heat wave awareness and assistance will also involve new development. During heat waves in San Joaquin County, a heat alert issues and news organizations are provided with tips on how vulnerable people can protect themselves. Health departments use programs to engage with thousands of block captains to check on the elderly and other vulnerable residents. Public cooling places extending their hours or local businesses

welcoming residents into their companies to stay cool are examples of programs and services that will be necessary. Other programs that could involve hospitals and clinics are operating a "heat line" with nurses or other healthcare professionals ready to assist callers with heat-related health problems. In addition, continued funding for weatherization, reduced utility rates, and similar programs that help elderly, low-income residents to install roof insulation, solar, trees, and cool surfaces to save energy and lower indoor temperatures.

4.3.4.2 Cal Adapt Climate Projections Effect within Northern California

Effect	Ranges
Temperature Change, 1990-2100	January increase in average temperatures: 2.5 °F to 4°F by 2050 and 6°F to 7°F by 2100. The largest changes are observed in the southern part of the region. July increase in average temperatures: 4 °F to 5°F by 2050 and 1 0°F by the end of the century, with the greatest change in the northern part of the region. (Modeled average temperatures; high emissions scenario)
Precipitation	Precipitation decline is projected throughout the region. The amount of decrease varies from 3 to 5 inches by 2050 and 6 inches to more than 10 inches by 2100, with the larger rainfall reductions projected for the southern portions of the region. (CCSM3 climate model; high carbon emissions scenario)
Heat wave	Heat waves are defined as five consecutive days over 83 °F to 97°F depending on location. By 2050, the number of heat waves per year is expected to increase by two. A dramatic increase in annual heat waves is expected by 2100, eight to 1 0 more per year
Snowpack	Snowpack levels are projected to decline dramatically in many portions of the region. In southern portions of the region, a decline of nearly 15 inches in snowpack levels - a more than 60 percent drop - is projected by 2090. (CCSM3 climate model; high carbon emissions scenario)
Wildfire	Wildfire risk is projected to increase in a range of 1. 1 to 1 0.5 times throughout the region, with the highest risks expected in the northern and southern parts of the region. (GFDL climate model; high carbon emissions scenario)

Source: Cal Adapt

4.3.4.3 Past Occurrences

Climate change has never been directly linked to any declared disasters. Climate change is virtually certain to continue without immediate and effective global action. According to NASA, 2016 was on track to be the hottest year on record, and 15 of the 17 hottest years have occurred since 2000. Without significant global action to reduce greenhouse gas emissions, the Intergovernmental Panel on Climate Change (IPCC) concludes in its Fifth Assessment Synthesis Report (2014) that average global temperatures is likely to exceed 1.5 C by the end of the 21st century, with consequences for people, assets, economies and ecosystems, including risks from heat stress, storms and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea level rise and storm surges.

4.4 SEVERE OR REPETITIVE LOSS PROPERTIES

The list of repetitive loss properties maintained by FEMA identifies one redundant loss property within the County of San Joaquin. This property is in the City of Lathrop, a single-family dwelling.

5 MITIGATION STRATEGY

5.1 EXISTING AUTHORITIES, POLICIES, PROGRAMS AND RESOURCES

Existing authorities, policies, programs and resources available to accomplish hazard mitigation is as follows:

Codes, Ordinances etc.

Building Codes
Zoning Codes
Storm water
Real Estate Disclosure
Public Health
Environmental Protection
Fire Codes

Planning Documents

General Plan
Capital Improvement Plan
Emergency Operations Plan
Fire Plan
Flood Plan
Drought Plan
Threat and Hazard Identification & Risk Assessment
Hazard Mitigation Plan
Continuity of Operations Plan
Various taxes
Various user fees
Various bonds
General Fund
Delta Flood Response Plan Grant

Delta Plan

Administrative and Technical Capability

Public Works Director
Engineers
Floodplain Manager
GIS personnel
Scientist
Director of Office of Emergency Services
Sr. Emergency Planners
Grant Writers
Building Official
Director of General Services
Agriculture Commissioner

Fiscal Capabilities

Community Development Block Grants
Hazard Mitigation Grant Fund
Emergency Management Performance Grant

Training, Education and Outreach

Tabletop exercises
Dam Inundation exercises
Public Event outreach
Social media outreach

San Joaquin County routinely performs activities such as issuing building permits, approving development plans, and repairing roads. The County is conscious that these activities should reflect our vision and goals by using the most current building code, restricting development in hazard-prone areas, or making infrastructure decisions based on our risk assessment findings. As a result, goals are 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.

San Joaquin County Office of Emergency Services reviews and updates different types of plans annually. County staff participates in many emergency management training, exercises, and drills, such as Emergency Action Planning exercises (Dam Inundation), Earthquake Preparedness, SEMS/NIMS, and other State and Federal training. If the budget allows, San Joaquin County either would have the ability to hire staff permanently or limited term, given the circumstances. The Office of Emergency Services researches grant opportunities for emergency management or hazard mitigation.

5.2 NATIONAL FLOOD INSURANCE PLAN

5.2.1 National Flood Insurance Program (NFIP)

The NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities. For most participating communities, FEMA has prepared a detailed Flood Insurance Study (FIS). The study presents water surface elevations for floods of various magnitudes, including the 1% annual chance flood (or 100-year flood) and the 0.2% annual chance flood (or 500-year flood). Base flood elevations and the boundaries of the 100- and 500-year floodplains are shown on Flood Insurance Rate Maps (FIRM), which are the principal tools for identifying the extent and location of the riverine flood hazard. FIRMs are the most detailed and consistent data source available, and for many communities they represent the minimum area of oversight under their floodplain management program. Participants in the NFIP must, at a minimum, regulate development in floodplain areas in accordance with NFIP criteria. Before issuing a permit to build in a floodplain, participating jurisdictions must ensure that three criteria are met:

- New buildings and those undergoing substantial improvements must, at a minimum, be elevated to protect against damage by the 100-year flood.
- New floodplain development must not aggravate existing flood problems or increase damage to other properties.
- New floodplain development must exercise a reasonable and prudent effort to reduce its adverse impacts on threatened salmonid species.
- Interpret flood zones show on the FIRM upon request from residents, realtors, and insurance agents to help determine if flood insurance is required
- Provide, at no charge, copies of elevation certificates for new structures and substantially improved installations that have been constructed since 1992.

Given the flood hazard and risk in the planning area and recognizing the importance of the NFIP in mitigating flood losses, an emphasis is placed on continued compliance with the NFIP by San Joaquin County. 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 requirements for adopting official FEMA floodplain maps and maintaining, enforcing, and updating local floodplain regulations.

5.3 MITIGATION GOALS

- Goal 1: Prevent Future Hazard Related Losses of Life and Property
- Goal 2: Increase Public Awareness/Action of Vulnerability to Hazards
- Goal 3: Improve Community Emergency Services/Management Capability
- Goal 4: Implement and Complete Identified High Priority Projects Listed in the Plan

The Staplee Process was implemented to analyze and prioritize San Joaquin County's mitigation actions. The risk assessment was reviewed, and impacts were analyzed to help prioritize mitigation actions. Each mitigation action was evaluated on the above-listed goals.

5.4 MITIGATION ACTIONS

5.4.1 Action #1- Acampo Area Drainage Innovation Project

Hazards Addressed: Flooding

Project: New storm drain system, which includes the following- Installation of drain inlets, pipelines, and a storm drain pump station.

Responsible office and Name or Title: Matthew Ward, Engineer IV Department of Public Works

Priority: 1

Cost Estimate: 2.4 million dollars

Potential Funding Source: HMGP, PDM, Road Fund, or General Fund

Time Frame: 36 months

5.4.2 Action #2- Howard Road Northeast side on the eastern approach to the bridge over the San Joaquin River

Hazards Addressed: The embankment on Howard Road bridge approach over the San Joaquin River suffered a slip-out failure on the upper most portion of the northeast side of the eastern approach to bridge.

Project: Embankment reinforcement

Responsible office and Name or Title: Kris Balaji (Director of Public Works), Public Works, Project Manager/Working Contact- David Mendoza

Priority: 2

Cost Estimate: Option #2 \$1,424,099.00

Potential Funding Source: Hazard Mitigation Grant Program, Pre-disaster Mitigation Grant, Highway users tax account (HUTA), or Measure K local streets repair

Time Frame: 12 months

5.4.3 Action #3- Kennefick Road

Hazards Addressed: Flooding resulting from heavy rains washed away the culverts and destroyed over 100 feet of Kennefick Road eliminating access to properties north of Liberty Road

Project: Project is to increase the drainage capacity beneath Kennefick Road with a larger diameter culverts or a box culvert

Responsible office and Name or Title: Kris Balaji (Director of Public Works), Public Works, Project Manager/Working Contact- David Mendoza

Priority: 3

Cost Estimate: \$ 587,191.00

Potential Funding Source: Hazard Mitigation Grant Program, Pre-disaster Mitigation Grant, Highway users tax account (HUTA), or Measure K local streets repair

Time Frame: 8 months

5.4.4 Action #4- North Frontage Road backflow valve (North 99 Frontage Road)

Hazards Addressed: Flooding poses a safety risk for users of the roadway and has caused damaged to the structural section of the roadway.

Project: Project is to reduce the flooding of the roadway section with the design and construction of n improved backflow prevention valve and theft proof enclosure. In addition, repair of the roadway section that has been flooded.

Responsible office and Name or Title: Kris Balaji (Director of Public Works), Public Works, Project Manager/Working Contact- David Mendoza

Priority: 4

Cost Estimate: \$ 226,092.00

Potential Funding Source: Hazard Mitigation Grant Program, Pre-disaster Mitigation Grant, Highway users tax account (HUTA), or Measure K local streets repair

Time Frame: 14 months

5.4.5 Action #5- Larch Road between South Corral Hollow Road North Tracy Boulevard, concerning the southern ditch that runs along the length of the project (approx. 5,200 feet).

Hazards Addressed: The objective of this project is to mitigate the impact of flooding. Poor drainage on the rural residential and mix-use properties along the south side of west Larch Road results in sheet flow runoff towards the north that finds its way into the County's southern conveyance ditch on the south side of West Larch Road. This runoff overwhelms this ditch's current capacity, reduced by encroachment and undersized culvert crossings. The trench is approximately 5,200 feet long and drains to southerly flowing drainage along north Tracy Boulevard.

Project: The project is to reduce the flooding of the roadway section with the design and construction of an improved backflow prevention valve and theft-proof enclosure. In addition, repair the roadway section that flooded..

Responsible office and Name or Title: Kris Balaji (Director of Public Works), Public Works, Project Manager/Working Contact- David Mendoza

Priority: 5

Cost Estimate: \$ 226,092.00

Potential Funding Source: Hazard Mitigation Grant Program, Pre-disaster Mitigation Grant, Highway users tax account (HUTA), or Measure K local streets repair

Time Frame: 14 months

5.4.6 Action #6 200 Year Flood Plain Code

Hazards Addressed: Flooding

Project: Develop 200 Year Flood Plain code for new construction in County.

Responsible office and Name or Title: Community Development Department

Priority: 6

Cost Estimate: \$ 100,000

Potential Funding Source: Hazard Mitigation Grant Program, Pre-disaster Mitigation Grant, General Fund

Time Frame: 12 months

5.4.7 Action #7- Purdy Culvert Replacement

Hazards Addressed: Flooding

Project: Installation of an additional storm drain culvert

Responsible office and Name or Title: Matthew Ward, Engineer IV, Department of Public Works

Priority: 7

Cost Estimate: \$ 10,000

Potential Funding Source: Hazard Mitigation Grant Program, Pre-disaster Mitigation Grant, General Fund, or Road Fund

Time Frame: 18 months

5.4.8 Action #8 - Corral Hollow Creek/Chrisman Road Elevation of residences

Hazards Addressed: Flooding

Project: Elevation of Homes

Responsible office and Name or Title: Matthew Ward, Engineer IV, Department of Public Works

Priority: 8

Cost Estimate: \$ 300,000

Potential Funding Source: Hazard Mitigation Grant Program, Pre-disaster Mitigation Grant, General Fund, or Road Fund

Time Frame: 36 months

5.4.9 Action #9 - Oak Grove Regional Park Lake Bank Erosion Mitigation

Hazards Addressed: Erosion of the Oak Grove Lake's embankment has created safety concerns for the public to be in severe danger of harm or loss of life.

Project: Re-stabilization of the bank of the levee will be restored

Responsible office and Name or Title: General Services/Regional Parks, Michael Cockrell, SJC - OES Director, Charles Ruiz, Parks Maintenance Supervisor

Priority: 9

Cost Estimate: \$ 369,895

Potential Funding Source: Hazard Mitigation Grant Program, Pre-disaster Mitigation Grant

Time Frame: 20 months

5.4.10 Action #10 - San Joaquin County Drought Plan

Hazards Addressed: Drought

Project: Develop a county wide drought plan

Responsible office and Name or Title: San Joaquin County Office of Emergency Services

Priority: 10

Cost Estimate: \$ 50,000

Potential Funding Source: Emergency Management Plan Grant, Hazard Mitigation Grant Program, Pre-disaster Mitigation Grant, General Fund

Time Frame: 24 months

5.4.11 Action #11 - San Joaquin County Climate Change Plan

Hazards Addressed: Climate Change

Project: Develop a county wide climate change plan

Responsible office and Name or Title: San Joaquin County Office of Emergency Services

Priority: 11

Cost Estimate: \$ 100,000

Potential Funding Source: Emergency Management Plan Grant, Hazard Mitigation Grant Program, Pre-disaster Mitigation Grant, General Fund

Time Frame: 24 months

5.5 ACTION PLAN FOR PRIORITIZING MITIGATION ACTIONS

If San Joaquin County receives State grant funding, a benefit-cost analysis will be completed for each project. Economic considerations will be a crucial factor in project selection. Qualitative benefits, including quality of life and help to the community, will also be considered. The County and Planning Team used the Staplee Process to prioritize the mitigation actions below.

Implementation Strategy				
Action I.D.	Lead Agency	Funding Source(s)	Completion Date	Critical Interim or Pilot Activities
Howard Rd: Stabilize/reinforce slope	SJC Public Works	Measure K; HMPG; PDMG; Highway User Tax Account	12 months	- Prepare a design concept report with alternatives - Begin encumbering rights of way
Kennefick Rd: Increase drainage capacity	SJC Public Works	Measure K; HMPG; PDMG; Highway User Tax Account	6 months	- Project design - Stabilize/reinforce
N. Frontage Rd: Backflow Prevention Valve	SJC Public Works	Measure K; HMPG; PDMG; Highway User Tax Account	18 months	- Project design with alternatives - Construct/install valve - Repair roads
Larch Rd: Flood Mitigation	SJC Public Works	Measure K; HMGP; PDMG; Highway User Tax Account	12 months	- Remove existing culverts - Install larger culverts - Widen or line ditch
Oak Grove Park: Erosion Mitigation	SJC General Services/Regional Parks	HMGP; PDMG	20 months	- Stabilize bank - Provide erosion control measures
Acampo Area: Drainage	SJC Public works	HMGP, PDMG, Road Fund; General Fund	36 months	-New storm drain system which includes the following: -Installation of drain inlets, pipelines, and a storm drain pump station.
Purdy Culvert Replacement	SJC Public Works	Measure K; HMGP; PDMG; Highway User Tax Account	18 months	- Installation of an additional storm drain culvert
Countywide Drought Plan	Office of Emergency Services	EMPG, HMGP, PDMG, General Fund	24 months	- Develop a County wide Drought plan
Corral Hollow/Chrisman Rd: Residence Elevation	SJC Public Works	HMGP; PDMG; Road Fund; General Fund	36 months	- Elevation of homes
200 Year Flood Plain	Community Development	HMGP; PDMG; Road Fund; General Fund	12 months	-Develop 200 Year Flood Plain code for new construction in County.

5.6 INTEGRATION OF LOCAL HAZARD MITIGATION PLAN

When the County updates the above plans, they should review the Local Hazard Mitigation Plan to see what information can be pulled from the plan and integrated into other planning mechanisms. They should also check the LHMP to help develop other plans. For instance, they can look at the vulnerable areas from flooding when updating the flood plan.

- Emergency Evacuation Plans - maps from LHMP have been, and are, used to help with evacuation routes
- County Flood Plan – Hazard Flood Maps were compared and evaluated to help develop the County Flood Plan.
- Fire Maps – Fire Hazard Maps were used to determine high fire hazard zones in the County
- General Plan – AB2140 Hazard mitigation plan will be adopted into the Safety Element of the General Plan.
- Delta Flood Protection Plan –The hazard analysis section of LMHP can be used to develop the Delta flood protection strategy.

6 REVIEW, EVALUATION AND IMPLEMENTATION

6.1 CHANGES IN DEVELOPMENT

Due to the economy last 3-5 years, there has been very little development within the unincorporated area of the County. Therefore, the hazard-prone regions have not increased in vulnerability since the last plan approval. Even though the County General Plan has specific build-outs for development, steps will be taken to lessen the hazard-prone areas.

6.2 PROGRESS IN MITIGATION EFFORTS

Previous mitigation actions from the last LHMP reflect completed, either deferred, ongoing, or deleted. See Mitigation Action table below.

Project Name	New	Completed	On-going	Deferred	Cancelled
Elevation of structures			X		
Alternate pump power at low underpass					
Improve public drainage system			X		
Seismic retrofit essential facilities			X		
Provide alternate EOC resources					X
Storm drainage facilities			X		
Master drainage plans					X
Levee seismic/erosion improvements			X		
Erosion and Sediment Control Regulations			X		
Howard Rd Stabilize/reinforce slope			X		
Kenefick Rd: Increase drainage capacity			X		
N. Frontage Rd: Backflow Prevention Valve			X		
Larch Rd: Flood Mitigation			X		
Oak Grove Park: Erosion Mitigation			X		
Acampo Area: Drainage			X		
Purdy Culvert Replacement			X		
200-year Floodplain Code			X		
Corral Hollow/Chrisman Rd: Residence Elevation			X		
Countywide Drought Plan		X			

6.3 CHANGES IN PRIORITIES

Priorities have changed since the last plan update due to incidents involving agricultural pests and disease, cyber threats, dam incidents, earthquake, extreme heat, flooding, landslides, public health hazards: epidemic/pandemic, Severe Weather: Dense Fog, Severe Weather: Heavy Rain,

Thunderstorms, Hail, and Lightning, Severe Weather: High Wind/Tornado, and wildfire. Many flood projects are identified as priority projects.

7 PLAN ADOPTION

OES operates under the oversight and guidance of a Board of Supervisors. As part of creating and implementing the LHMP, a preliminary version of this plan was presented to the Board of Directors for approval on January 1, 2023. Following the support of the Board, the LHMP was submitted to Cal OES and, ultimately, FEMA for review and acceptance.

Within approximately four weeks of FEMA's approval of the 2023 LHMP, OES will present the final plan to the Board of Supervisors during a regularly scheduled meeting for formal adoption.

8 REFERENCES

Department of Water Resources (DWR). 2022. Central Valley Flood Protection Plan Update. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Flood-Management/Flood-Planningand-Studies/Central-Valley-Flood-Protection-Plan/Files/CVFPPUpdates/2022/2022updateCVFPP22_layout_v9_plus_Append_BC.pdf

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9 APPENDIX

9.1 A