



MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN



2021-2026

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1 INTRODUCTION

1.1 Purpose of Plan

Merced County including the participating jurisdictions of the have prepared this multi-jurisdictional hazard mitigation plan (MJHMP) to guide hazard mitigation planning to better protect the people and property of the County from the effects of hazard events. This plan demonstrates the community's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This plan was also developed to make Merced County and the participating jurisdictions eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Assistance (HMA) grants including the Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA) and Building resilient Infrastructure and Communities program, as well as to make the County and jurisdictions more disaster resistant. This plan demonstrates the County's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources.

1.2 State and Local Regulatory Framework

The MJHMP was prepared consistent with the Health and Safety Element of the Merced County General Plan, as the planning effort covers common overlapping natural hazard issues and mutually reinforcing policies and implementation programs. The MJHMP and Health and Safety Element are considered complimentary documents that address natural hazards, and both planning documents contain goals, policies, and project actions or implementation programs to enhance the County's mitigation efforts related to public safety.

California Government Code Section 65302.10, also referred to as Assembly Bill (AB) 2140 encourages California counties and cities to adopt their current, FEMA-approved LHMPs into the Safety Element of their General Plan. This adoption by reference or incorporation of the MJHMP into the Safety Element of the General Plan follows plan approval and makes Merced County and each participating jurisdiction eligible to be considered for part or all of its local share costs on eligible public assistance funding to be provided by the state through the California Disaster Assistance Act (CDAA). The CDAA allows the state to pay up to 18.75 percent of the non-federal share that would otherwise fall upon the county or city to pay for public assistance projects. The legislature passed AB 2140 to provide additional funding after a disaster occurs. The local share is 25 percent of the total project cost; therefore, the legislation allows city and counties that comply to be eligible for only the remaining local share (6.25 percent).

AB 2140 is an optional state incentive to help counties and cities become more resilient to natural hazards. Compliance with AB 2140 also expires when the MJHMP expires, and the County must re-adopt the plan into the Safety Element during update cycles to ensure continued compliance and funding eligibility. Additionally, each participating jurisdiction in Merced County must adopt their annex into their own General Plan Safety Element, as the annex jurisdictions are not covered under the County's General Plan Safety Element adoption.

1.3 Background and Scope

Each year in the United States, disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because

additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

Hazard mitigation is defined by FEMA as “any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event.” The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of \$6 in avoided future losses in addition to saving lives and preventing injuries (Natural Hazard Mitigation Saves: 2017 Interim Report).

Hazard mitigation planning is the process through which hazards that threaten communities are identified; likely impacts are determined, prioritized and implemented. This plan continues the hazard mitigation planning process for Merced County, the unincorporated county, and the participating cities of Atwater, Dos Palos, Gustine, Livingston, Los Banos, and Merced. The plan identifies natural and human caused hazards and risks within Merced County, and identifies the hazard mitigation strategy to reduce vulnerability and make the communities of Merced County more disaster resistant and sustainable. Information in this plan can be used to help guide and coordinate mitigation activities and local land use decisions. Proactive mitigation planning will help reduce the cost of disaster response and recovery to the community and its property owners by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruption. The Merced County planning area has been affected by hazards in the past and is thus committed to reducing future disaster impacts and maintaining eligibility for federal funding.

This plan underwent a comprehensive update in 2021 in fulfillment of the five-year update requirement. Several factors underscore the need for this planning effort:

- Merced County is exposed to hazards that have caused past damage.
- Limited local resources make it difficult to be pre-emptive in reducing risk. Eligibility for federal financial assistance is paramount to promote successful hazard mitigation in the area.
- Merced County and its partners participating in this plan want to be proactive in preparing for the probable impacts of natural hazards.

This MJHMP was originally prepared in 2014, pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002 (44 CFR §201.6) . Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act, or DMA. While the act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans (LHMPs) must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). Because the Merced County planning and response area is subject to many kinds of hazards, access to these programs is vital. As a result, the County and their participating jurisdictions completed a comprehensive plan update process in 2021 to bring the MJHMP into compliance with recent legislation related to climate change and to address new human health and natural hazards and emerging concerns.

Information in this plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to the community and its property owners by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruption. The Merced County planning area has been affected by hazards in the past and is thus committed to reducing future disaster impacts and maintaining eligibility for federal funding.

This hazard mitigation plan identifies resources, information, and strategies for reducing risk from natural hazards. Elements and strategies in the plan were selected because they meet a program requirement and because they best meet the needs of the planning partners and their citizens. One of the benefits of multi-jurisdictional planning is the ability to pool resources and eliminate redundant activities within a planning area that has uniform risk exposure and vulnerabilities. FEMA encourages multi-jurisdictional planning under its guidance for the DMA. This plan will help guide and coordinate mitigation activities throughout the planning area. The plan was developed to meet the following objectives:

- Meet or exceed requirements of the DMA.
- Enable all planning partners to use federal grant funding to reduce risk through mitigation.
- Meet the needs of each planning partner as well as state and federal requirements.
- Create a risk assessment that focuses on Merced County hazards of concern.
- Create a single planning document that integrates all planning partners into a framework that supports partnerships within the County and puts all partners on the same planning cycle for future updates.
- Meet the planning requirements of FEMA's Community Rating System (CRS), allowing planning partners that may choose to participate in the CRS program to enhance their CRS classifications.
- Coordinate existing plans and programs so that high-priority initiatives and projects to mitigate possible disaster impacts are funded and implemented.

1.4 Multi-Jurisdictional Planning

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

The Merced County MJHMP is a multi-jurisdictional plan that geographically covers everything within Merced County's jurisdictional boundaries (hereinafter referred to as the planning area). Unincorporated Merced County and the following jurisdictions participated in the 2021 update planning process:

- Merced County
- City of Atwater
- City of Dos Palos
- City of Gustine
- City of Livingston
- City of Los Banos
- City of Merced

The cities of Dos Palos and Gustine are new participating jurisdictions as part of the 2021 MJHMP update process, and this is their first hazard mitigation plan. The City of Merced also prepared a stand-alone LHMP in 2015 and is now participating in the MJHMP update process.

1.5 Plan Organization

- Section 1: Introduction
- Section 2: Community Profile and Capability Assessment
- Section 3: Planning Process

- Section 4: Hazard Identification and Risk Assessment (HIRA)
- Section 5: Mitigation Strategy
- Section 6: Plan Adoption, Implementation and Maintenance
- Appendix A: Planning Team
- Appendix B: Planning Process Documentation
- Appendix C: Approval and Adoption
- Appendix D: Mitigation Categories and Alternatives
- Appendix E: Annual Progress Meeting Agenda and Report Template
- Appendix F: Outreach Strategy
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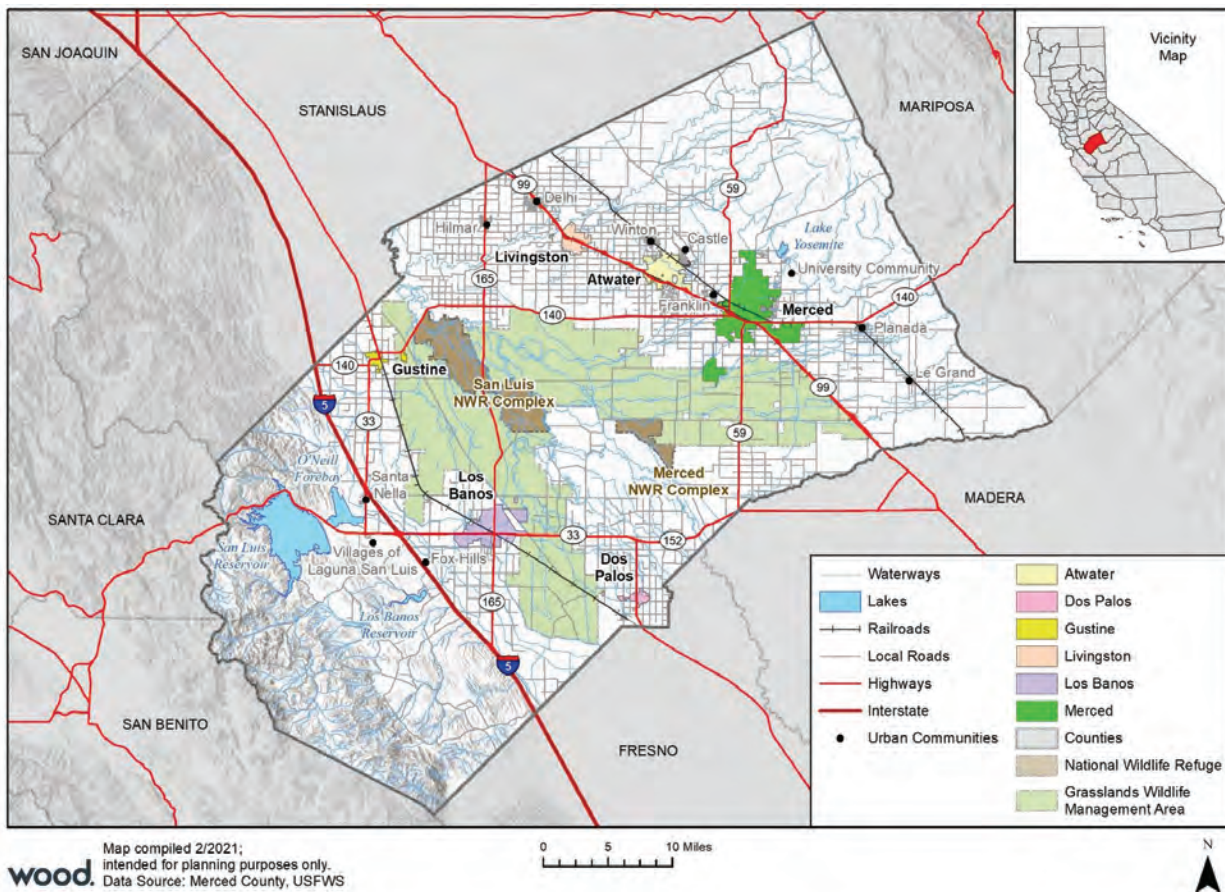
2 COMMUNITY PROFILE AND CAPABILITY ASSESSMENT

2.1 History

An expedition led by Gabriel Moraga in 1806 came upon a river he named *El Río de Nuestra Señora de la Merced* (River of Our Lady of Mercy), or Merced River in which derived the name of the County. During a period between 1841 and 1844, while California was a province of independent Mexico, four Mexican land grants were made which eventually became Merced County. The County was created by the Act of April 19, 1855 and included parts of Mariposa County. Parts of the territory were also given to Fresno County in 1856. Merced County's current boundaries and its location within the State of California is shown in Figure 2-1 below.

The early economy of the County centered on ranching and farming. Settlement in Merced County remained modest throughout much of the county's first century. Merced County is considered to be located in the world's most productive agricultural area, which, today, is a major source of employment, along with food processing, retailing, and light manufacturing.

Figure 2-1 County of Merced Planning Area



2.2 Geography and Climate

Merced County encompasses approximately 2,000 square miles, ranking it the 25th largest out of a total of 58 counties in California. It is located in the heart of the San Joaquin Valley, north of Fresno and southeast of San Jose, and spans from the coastal ranges to the foothills of Yosemite National Park. The City of Merced is the County seat and offers a small community atmosphere, residential neighborhoods characterized by wide, tree-lined streets, and homes in a wide economic range.

The County of Merced is neighbored by the counties of Tuolumne County and Mariposa County to the northeast, Madera County to the south and east, Fresno County to the southeast, San Benito County to the southwest, Santa Clara County to the west, and Stanislaus County to the northwest.

Merced County is home to two national protected areas – Merced National Wildlife Refuge and San Luis National Wildlife Refuge. The former Castle Air Force Base and the United States Penitentiary-Atwater are located in an unincorporated area near Atwater. The Board of Supervisors is the governing body for Merced County.

Elevation in Merced County, according to data gathered by the Shuttle Radar Topography Mission ranges from 6 feet above mean sea level (msl) ranking it 20 in terms of lowest elevations when compared to a total of 58 counties in California, to 1,781 feet above msl ranking it 54 in terms of highest elevation when compared to a total of 58 counties in California. The rivers in this region include the Merced and Chowchilla, which are both tributaries of the San Joaquin River. On average, there are 263 sunny days per year in Merced County. The number of days with any measurable precipitation is 49 with an average of approximately 12 inches of rain per year. The month of July is the warmest month with an average high around 96 degrees. The month of January is the coolest month with an average low of 37 degrees.

2.3 Economy

Merced County is located in the heart of California's rapidly growing San Joaquin Valley, the richest agricultural area in the world. With that distinction also come the challenges of an economy which has historically been dependent on seasonal agriculture and low wages. Select 2019 economic characteristics estimated for Merced County by the U.S. Census Bureau American Community Survey (ACS) are shown in Table 2-1.

Table 2-1 Merced County Economic Characteristics

	Merced County
Families Below Poverty Level	17.2%
Individuals Below Poverty Level	21.2%
Median Home Value	\$252,700
Median Household Income	\$53,672
Per Capita Income	\$23,011
Population > 16 Years Old in Labor Force	59.6%
Population Employed	52.6%

Source: U.S. Census Bureau ACS 2015-2019 5-Year Data Profile

Merced County provides a broad range of services to its residents, businesses, and visitors, and manages and operates its facilities to meet community needs. Agriculture is the foundation of Merced County's economy, and the County consistently ranks as one of California's top five producers of milk and cream,

chickens, almonds, alfalfa, cattle and calves, silage, and tomatoes. Merced County is home to four agricultural processing facilities that are among the largest of their kind in the world: Ernest and Julio Gallo winery, Hilmar Cheese production facility, Ingomar Packing Company tomato processing plant, and Foster Farms poultry processing facility. The ACS 5-Year data profiles also provide estimates for total employment by industry sector. These employment trends are shown below in Table 2-2.

Table 2-2 Merced County Employment by Industry Sector

Industry Sector	Percent of Workforce
Educational services, and health care and social assistance	21.60%
Agriculture, forestry, fishing and hunting, and mining	12.90%
Manufacturing	11.30%
Retail trade	11.20%
Arts, entertainment, and recreation, and accommodation and food services	7.80%
Construction	7.10%
Professional, scientific, and management, and administrative and waste management services	6.20%
Transportation and warehousing, and utilities	5.90%
Other services, except public administration	4.50%
Public administration	4.50%
Wholesale trade	3.20%
Finance and insurance, and real estate and rental and leasing	2.90%
Information	0.90%

Source: U.S. Census Bureau ACS 2015-2019 5-Year Data Profile

2.4 Population

The total estimated population of Merced County in 2019 was 271,382 up from 255,793 people in 2010. This constitutes an approximately 6% increase in population since the last census. Table 2-3 and Table 2-4 show several key demographic and social characteristics of Merced County, how those characteristics have changed over the last five years, and how those characteristics compare to the rest of the state and nation. Increases in population growth also increase exposure to severe weather-related hazards, pandemic/epidemics as well as earthquakes. This increase in growth also puts more demand on water resources and can increase vulnerability to drought.

Table 2-3 Merced County Demographic and Social Characteristics, 2015-2019

Merced County	2015	2019	% Change
Population	263,885	271,382	2.84%
Median Age	30.4	31.1	2.30%
Total Housing Units	84,063	85,251	1.41%
Housing Occupancy Rate	92.40%	93.80%	1.52%
% of Housing Units with no Vehicles Available	7.50%	6.90%	-8.00%
Median Home Value	\$161,200	\$252,700	56.76%
Unemployment	9.70%	7.10%	-26.80%
Mean Travel Time to Work (minutes)	26.1	28.6	9.58%
Median Household Income	\$42,462	\$53,672	26.40%
Per Capita Income	\$18,204	\$23,011	26.41%

Merced County	2015	2019	% Change
% of Individuals Below Poverty Level	26.10%	21.20%	-18.77%
# of Households	77,692	80,008	2.98%
Average Household Size	3.32	3.32	0.00%
% of Population Over 25 with High School Diploma	67.90%	69.10%	1.77%
% of Population Over 25 with Bachelor's Degree or Higher	13.10%	13.80%	5.34%
% with Disability	15.70%	13.00%	-17.20%
% Speak English less than "Very Well"	22.80%	22.70%	-0.44%

Source: U.S. Census Bureau ACS 5-Year Data Profiles, 2015-2019

Table 2-4 Demographic and Social Characteristics Compared to the State and Nation

Demographic & Social Characteristics (as of 2019)	County	California	U.S.
Median Age	31.1	36.5	38.1
Housing Occupancy Rate	93.80%	92.00%	87.90%
% of Housing Units with no Vehicles Available	6.90%	7.10%	8.60%
Median Home Value	\$252,700	\$505,000	\$217,500
Unemployment	7.10%	3.80%	3.40%
Mean Travel Time to Work (minutes)	28.6	29.8	26.9
Median Household Income	\$53,672	\$106,916	\$62,843
Per Capita Income	\$23,011	\$36,955	\$34,103
% of Individuals Below Poverty Level	21.20%	13.40%	13.40%
Average Household Size	3.32	2.95	2.62
% of Population Over 25 with High School Diploma	69.10%	83.30%	88.00%
% of Population Over 25 with bachelor's degree or Higher	13.80%	33.90%	32.10%
% with Disability	13.00%	10.60%	12.60%
% Speak English less than "Very Well"	22.70%	17.80%	8.40%

Source: U.S. Census Bureau ACS 5-Year Data Profiles, 2015-2019

Table 2-5 breaks down the demographics of the county by sex and race.

Table 2-5 Merced County Demographics by Race and Sex

Merced County	Population	%
Total Population	271,382	---
Male	136,987	50.50%
Female	134,395	49.50%
Hispanic or Latino	161,814	59.6%
White alone	75,037	27.6%
Black alone	7,812	2.9%
Asian alone	19,650	7.2%
American Indian and Alaska Native alone	931	0.3%
Native Hawaiian and Other Pacific Islander alone	607	0.2%
Some other race alone	226	0.1%
Two or more races alone	5,305	2.0%

Source: U.S. Census Bureau ACS 5-Year Data Profiles, 2015-2019

2.5 County's Mitigation Capabilities

The following section assesses the County's and each participating jurisdictions' existing capabilities to pursue hazard mitigation. The capability assessment analyzes Merced County's capabilities that can be leveraged to mitigate hazards. Combining the risk assessment with the mitigation capability assessment

results in the County's "net vulnerability" to disasters, and more accurately focuses the goals, objectives, and proposed actions of this plan.

The Hazard Mitigation Planning Team (HMPT) used a two-step approach to conduct this assessment for the County and jurisdictions. First, an inventory of common mitigation activities was made through the use of a matrix. The purpose of this effort was to identify policies and programs that were either in place, needed improvement, or could be undertaken if deemed appropriate. Second, the HMPT conducted an inventory and review of existing policies, regulations, plans, and programs to determine if they contributed to reducing hazard-related losses or if they inadvertently contributed to increasing such losses.

This assessment is divided into four sections: regulatory mitigation capabilities; administrative and technical mitigation capabilities; fiscal mitigation capabilities; and mitigation outreach and partnerships. Additional information on jurisdiction capabilities can also be found in the participating jurisdiction's annexes.

2.5.1 Regulatory Mitigation Capabilities

The regulatory and planning capabilities table lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicate those that are in place in Merced County. Table 2-6 identifies the planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in Merced County.

Table 2-6 Regulatory Mitigation Capabilities

Regulatory Tool (ordinances, codes, plans)	Merced County	Atwater	Dos Palos	Gustine	Livingston	Los Banos	Merced
General Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zoning ordinance	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subdivision ordinance	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Growth management ordinance			Yes	No	Yes		No
Floodplain ordinance	Yes	Yes	No	No	Yes	Yes	Yes
Other special purpose ordinance (storm water, steep slope, wildfire)	Yes	N/A	N/A	No	Yes, Fire Protection Ordinance	Yes, Storm Water Pollution Plan	N/A
Building code	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fire department ISO rating	Yes	Yes, Rating 3	Yes	Yes	Yes, Rating 5	Yes, Rating 3	Yes, Rating 2
Erosion or sediment control	Yes	N/A	No	No	No	Yes	Yes
Storm water management program	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Site plan review requirements		Yes	Yes	Yes	Yes	Yes	Yes
Capital improvements plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economic development plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local Emergency Operations Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other special plans	N/A	N/A	n/a	No	No	Yes	N/A

Regulatory Tool (ordinances, codes, plans)	Merced County	Atwater	Dos Palos	Gustine	Livingston	Los Banos	Merced
Flood insurance study or other engineering study for streams	Yes	Yes	No - NSFHA	Yes	Yes	N/A	Yes
Elevation certificates (for floodplain development)	Yes	No	No	No	No	N/A	Yes

Source: HMPT

Related Plans and Regulations

Merced County General Plan, 2013 - A comprehensive 2030 Merced County General Plan was adopted December 2010. This General Plan defines the County's goals, objectives and policies that guide the physical growth, use and development of land under the jurisdictional authority of the County through the year 2030. The General Plan may address other topics that the community deems relevant to its development, such as economic development, historic preservation, and urban design. There are five principles highlighted as the core issues facing the Merced County community in the adoption of the General Plan: Agriculture, Economic Development, Environmental Quality, Public Facilities and Services, and Transportation. The County also promotes their public safety goals through the Health and Safety Element, among their ten other General Plan elements.

The purpose of the Public Health and Safety Element is to reduce or eliminate long-term risk to people and property from natural or human caused hazards. Traditionally viewed as an element that focuses on planning for catastrophes, this element is now expanded to include community health and community safety related issues that are more commonly associated with the built environment as affecting the health and safety of residents living within the County. The Element also covers goals and policies focused on geologic and seismic hazards, flood hazards, fire hazards, airport safety, hazardous materials, climate adaptation, noise, and environmental justice.

Merced County Emergency Operations Plan, 2013 - The Emergency Operations Plan addresses the planned response to emergency situations associated with natural disasters, technological incidents, human caused events and national security emergencies in or affecting Merced County. The plan establishes the emergency management organization required to mitigate any significant emergency or disaster affecting Merced County; identifies the policies, responsibilities, and procedures required to protect the health and safety of communities, public and private property, and the environmental effects of natural, human caused and technological emergencies and disasters; and establishes the operational concepts and policies for disaster response and recovery.

County of Merced Fire Management Plan -The County of Merced reorganized their Fire Department and entered into a Cooperative Fire Protection Agreement with the California Department of Forestry and Fire Protection (CAL FIRE) for the provision of fire protection services. The contract began in 1988. The CAL FIRE agreement provides daily staffing at fire stations, dispatch, management, incident command, training, investigation and fire prevention activities. Through the Cooperative Agreement CAL FIRE also manages the Office of Emergency Services for the County. The County's Fire Management Plan is a product of the implementation of the State Fire Plan. The State Fire Plan provides an analysis procedure utilizing, in part, computer based geographical information data that is validated by experienced fire managers to assess fire fuel hazards and risks in order to design and implement mitigating activities. The Fire Management Plan provides background information, fuels and fire data, proposed projects, and individual Battalion reports outlining mitigating activities commonly carried out each year.

Madera-Mariposa-Merced Unit (MMU) 2020 Strategic Fire Plan – The MMU Strategic Fire Plan is an annual fire plan establishing goals and priorities that align with CAL FIRE’s Strategic Plan and the California Fire Plan, while also identifying goals and priorities specific to the Unit. The California Fire Plan is the road map for reducing the risk of wildfire in California, where as the MMU Strategic Fire Plan identifies strategic goals and objectives that target the anticipation and reduction of wildfire within the boundaries of the Unit. For the challenges facing the Unit, such as extreme heat, tree mortality, and drought conditions across the three counties, the plan addresses problem areas and risk. This plan also seeks to improve operational effectiveness, budgetary and fiscal circumstances, foster a healthy ecosystem, and improve firefighter safety by identifying working projects specific to each Battalion within the MMU.

Emergency Services Ordinance, Chapter 2.72 - The purposes of this ordinance are to provide for the preparation and implementation of plans for the protection of people and property within the County in the event of an emergency; the direction of the emergency organization; and the coordination of the emergency functions of the County with the cities in the County and with all other public agencies, corporations, organizations, and affected private persons. The ordinance establishes the Merced Operational Area Council and designates the membership of the council. The council’s powers include the development of emergency and mutual aid plans and agreements and the ordinances and resolutions to implement them.

Fire Mitigation Ordinance Chapter 9.24 – The purpose of this ordinance is to impose a fee on new buildings and improvement projects because they contribute to the increase for potential fire danger in Merced County, it is in the best interest of the citizens of the County and promotes and protects the health and welfare of the residents of Merced County. It is necessary that persons who carry out such projects within the County pay a reasonable fee to mitigate such fire danger.

Floodplain Management Ordinance Chapter 18.30 - It is the purpose of the ordinance to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by legally enforceable regulations applied uniformly throughout the community to all publicly and privately owned land within flood prone, mudslide [i.e. mudflow] or flood related erosion areas. These regulations are designed to:

- Protect human life and health;
- Minimize expenditure of public money for costly flood control projects;
- Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- Minimize prolonged business interruptions;
- Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in areas of special flood hazard;
- Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future blighted areas caused by flood damage;
- Ensure that potential buyers are notified that property is in an area of special flood hazard; and
- Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

Merced Groundwater Subbasin Groundwater Sustainability Plan – The Sustainable Groundwater Management Act (SGMA) requires the formation of local Groundwater Sustainability Agencies (GSAs) to oversee the development and implementation of Groundwater Sustainability Plans (GSPs). The goal of the GSPs is to achieve sustainable management of the State’s groundwater basins. The purpose of the Merced Groundwater Subbasin GSP is to bring the Merced Groundwater Basin (Merced Subbasin), a critically over drafted basin located within the San Joaquin Valley, into sustainable groundwater management by 2040. This subbasin is heavily reliant on groundwater and the County water users recognize the basin has been in overdraft. This plan is the outcome of collaboration among the County of Merced and numerous water

districts and cities within the Merced Subbasin. The 2019 GSP outlines how the GSAs will achieve sustainable groundwater management on a long-term basis by increasing recharge and reducing groundwater pumping through various implementation programs and projects.

Merced Integrated Regional Water Management Plan. The Merced Integrated Regional Water Management Plan (IRWMP) is the first IRWMP for the Merced Region. The plan was developed as a multi-stakeholder process that builds on the Region's history of collaboration on water resource management issues. The IRWMP is a water resources planning document for the Region and serves as a blueprint for water resources management. It was developed based on Proposition 84 IRWM program guidelines and from input from a Regional Advisory Committee. Similar to the GSP, the IRWMP establishes several objectives and performance measures selected to provide long-term direction towards meeting project goals related to managing flood flows for public safety, water supply, recharge, and natural resource management; meeting water demands (agriculture, urban, and environmental needs); correcting groundwater overdraft conditions; and improving coordination of land use and water resource planning. The IRWMP also includes objectives that address water use efficiency, water quality, natural resource management, water-related needs of disadvantaged communities, recreation opportunities, climate change adaptation and mitigation; and public outreach and enhancing communication among stakeholders in the Region.

2.5.2 Administrative and Technical Mitigation Capabilities

Table 2-7 below identifies the county personnel responsible for activities related to mitigation and loss prevention in Merced County and the unincorporated areas. Many positions are full time and/or filled by the same person. A summary of technical resources follows.

Table 2-7 Merced County Administrative and Technical Mitigation Capabilities

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	Yes	Public works/ Deputy Director Roads
Engineer/professional trained in construction practices related to buildings and/or infrastructure	Yes	Public works/ Deputy Director Roads
Planner/engineer/scientist with an understanding of natural hazards	Yes	Public works/ Deputy Director Roads
Personnel skilled in Geographic information systems (GIS)	No	
Full time building official	Yes	Community and Economic development Building Division
Floodplain manager	Yes	Community and Economic development Building Division
Emergency manager	No	Office of Emergency Services (OES)
Grant writer	Yes	
Other personnel	N/A	
GIS Data Resources (Hazard areas, critical facilities, land use, building footprints, etc.)	No	
Warning Systems/Services (Reverse 9-11, cable override, outdoor warning signals)	Yes	OES
Other	N/A	

Source: HMPT

Office of Emergency Services

The Merced Office OES provides preparedness before, and coordination direction during, large-scale emergencies and disasters. Merced OES coordinates with partner agencies including the six incorporated cities within the county, special districts, and key private agencies in providing planning, response, recovery, and mitigation activities as a result of disaster related incidents.

Merced County, in conjunction with the cities of Merced, Los Banos, Livingston, Gustine, Dos Palos, emergency fire, law enforcement, health, and Emergency Medical Service agencies, launched the Emergency Notification System (ENS) – a technical capability service allowing residents throughout the entire county to be alerted of an emergency or an important community alert in their area. The improved Merced County ENS will allow residents throughout the County alternate ways of being contacted during an emergency, such as cell phones, business phones, home phones, emails, text messages or hearing-impaired receiving devices. More importantly, individuals can choose how they will be notified and in what preference order. When an emergency message is issued about a potential safety hazard or concern, messages will be sent to all standard voice and text communication devices registered in the system, including home phones, cell phones, email, and more. Residents and businesses with listed telephone numbers are already included in the system. Those residents having only a cell phone or wanting to be contacted through different methods can provide the information using the registration link at www.co.merced.ca.us/alert.

Merced County Fire Department

The primary mission of the Merced County Fire Department is to provide a range of programs aimed at protecting the lives and property of the people of Merced County from the adverse effects of fires, sudden medical emergencies, exposure to hazardous materials, or other dangerous conditions. The programs maintained by the department include:

- Comprehensive fire protection planning
- Fire prevention education
- Fire law and code enforcement
- Suppression and recovery

The Merced County Fire Department provides first responder-level Emergency Medical Services (EMS), including rescue and extrication, as well as control and mitigation of hazardous materials emergency incidents. The Merced County Fire Department personnel and equipment are also available to provide mutual aid fire/rescue/EMS services to cooperating agencies and participate in the statewide fire and rescue mutual aid system.

In addition, assistance and support are also provided for other non-fire emergencies such as floods, earthquakes, and other disasters.

Extreme Heat Preparedness

The County of Merced manages extreme heat events by providing cooling zones and centers for County residents. When the heat index is expected to exceed 105 degrees, various cooling centers in the County were opened to help residents cope with the extreme temperatures. Cooling centers were open during the summer months of 2021 in six of the participating jurisdictions, and at 12 Merced County libraries. In events of extreme heat, the County OES provides public notification alerts to residents with information on the location and hours of operations of cooling centers throughout the County. Transportation to these centers is also often provided free of charge. Additional information on health and safety measures for residents is also provided. Public notifications flyers distributed during the summer of 2021 are shown below.

Figure 2-2 Public Notification for Extreme Heat and Safety Preparedness



Source: Merced County Public Information Officer 2021

2.5.3 Fiscal Mitigation Capabilities

The following table identifies financial tools or resources that the county could potentially use to help fund mitigation activities. There are currently no specific funding sources for hazard mitigation.

Table 2-8 Merced County Financial Capabilities

Financial Resources	Accessible/ Eligible to Use	Comments/Has this been used for mitigation in the past?
Community Development Block Grants	Yes	No
Capital improvements project funding	Yes	No
Authority to levy taxes for specific purposes	Yes	Has not been used. Must be approved by voters.
Fees for water, sewer, gas, or electric services, new development	Yes	Has not been used. Services provided through cities or districts and levied through property assessments
Incur debt through general obligation bonds	Yes	No
Incur debt through special tax bonds	Yes	Has not been used. Must be approved by two-thirds voters.
Incur debt through private activities	Yes	Has not been used. Do not have any in place.
Federal Grant Programs (HMGP)	Yes	Has not been used. Various departments in Merced County are eligible.

Source: Planning Team

2.5.4 Other Mitigation Programs and Partnerships

Table 2-9 below summarizes some of the mitigation partnerships and education or outreach capabilities available to Merced County.

Table 2-9 Merced County Education and Outreach Capabilities

Education & Outreach	Yes/No	Comments
Local Citizen Groups That Communicate Hazard Risks	Yes	See below
Firewise USA	No	6 communities within the county are Firewise communities
StormReady	Yes	UC Merced is a participant
Other		

American Red Cross: The American Red Cross identified several capability enhancements through collaboration with the county, cities, and fire departments of Merced County. Programs such as outreach campaigns for preparedness education, continuing shelter inspections, and updating existing points of contact for shelter sites. These efforts will improve the American Red Cross' ability to conduct mitigation, preparedness, and response efforts in Merced County.

2.5.5 Opportunities for Enhancement

The 2021 MJHMP update provided the County and the participating jurisdictions an opportunity to review and update the capabilities currently in place to mitigate hazards. This also provided an opportunity to identify where capabilities could be improved or enhanced. Specific opportunities could include:

Plan Updates: Merced County has identified several plans which could be updated, such as the County Emergency Operations Plan, Disabled, Access, and Functional Needs plans, and the Flood Annex to the EOP. During the update process of each of these plans there is an opportunity to reference the MJHMP and enhance the capabilities for implementation of goals and objectives of each plan. The City of Livingston has also identified potential updates to their Emergency Response and Disaster Plan. The City of Merced identified an update to the Water System Response Plan, which would meet the requirements of the America's Water Infrastructure Act. As mentioned above, updates to related plans such as these provide an opportunity to both build resilience and enhance the cross-plan integration of the MJHMP.

Training: Provide training opportunities to help inform County staff on how best to integrate hazard information and mitigation projects into their departments. Merced County has identified a multi-year training and exercise plan which would cover all county departments. The City of Los Banos has identified an inter-departmental training effort to be undertaken. The City of Dos Palos has also identified providing opportunities for Incident Command System training for city staff.

Firewise: Firewise USA® is a voluntary program that provides a framework to help neighbors get organized, find direction, and take action to increase the ignition resistance of their homes and community. The program is co-sponsored by the USDA Forest Service, the U.S. Department of the Interior, and the National Association of State Foresters. As of June 2021, neither Merced County nor any of the incorporated jurisdictions in the county were participants in the program. In order to become a Firewise USA site, a neighborhood, community, city, or county must form a board or committee comprised of residents and stakeholders, obtain a written wildfire risk assessment, develop and maintain an action plan, and contact the applicable state liaison to the program.

Storm Ready: As of June 2021, neither Merced County nor any of the incorporated jurisdictions in the county are certified as Storm Ready communities. The UC Merced is certified Storm Ready. The National Weather Service's Storm Ready program helps local governments handle extreme weather and improve the timeliness and effectiveness of hazardous weather-related warnings for the public. To be officially Storm Ready, a community must:

- Establish a 24-hour warning point and emergency operations center
- Have more than one way to receive severe weather warnings and forecasts and to alert the public

- Create a system that monitors weather conditions locally
- Promote the importance of public readiness through community seminars, and
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises

Community Rating System (CRS): An additional indicator of floodplain management capability is the active participation of local jurisdictions in the CRS. The CRS is an incentive-based program that encourages counties and municipalities to undertake defined flood mitigation activities that go beyond the minimum requirements of the NFIP, adding extra local measures to provide protection from flooding. All of the 18 creditable CRS mitigation activities are assigned a range of point values. As points are accumulated and reach identified thresholds, communities can apply for an improved CRS class. Class ratings, which run from 10 to 1, are tied to flood insurance premium reductions. As class ratings improve (decrease), the percent reduction in flood insurance premiums for NFIP policy holders in that community increases. These potential discounts in flood insurance premiums through CRS are summarized in Table 2-10 below. As of 2021 neither Merced County nor any of the incorporated jurisdictions in the county participate in the CRS. Should the City of Merced and Merced County decide to join the CRS, it would be an opportunity for enhancement of existing mitigation capabilities and help make flood insurance more affordable in the future.

Table 2-10 CRS Premium Discounts

Class	Discount	Class	Discount	SFHA (Zones A, AE, A1-A30, V, V1-V30, AO, and AH): Discount varies depending on class. SHFA (Zones A99, AR/A, AR/AE, AR/A1-A30, AR/AH, and AR/AO): 10% discount for Classes 1-6; 5% discount for Classes 7-9. Non-SFHA (Zones B, C, X, D): 10% discount for Classes 1-6; 5% discount for Classes 7-9. In determining CRS premium discount, all AR and A99 Zones are treated as non-SFHAs.
1	45%	6	20%	
2	40%	7	15%	
3	35%	8	10%	
4	30%	9	5%	
5	25%	10	--	

Source: FEMA CRS Coordinators Manual

Financial Capability Improvements: There are several financial resources listed in Table 2-8 that the County could leverage in the future for funding mitigation efforts. In particular, the LHMP provides eligibility for the FEMA HMA grants. County OES staff can attend workshops and trainings regarding the grant application process and how to develop successful grant applications under the HMGP. The California Office of Emergency Services (Cal OES) periodically hosts related trainings and webinars. Understanding the types of projects that can be funded, and the components of a successful application will enhance chances of a successful grant award.

3 PLANNING PROCESS

Requirement §201.6(b) and §201.6(c)(1):

An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

- (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;*
- (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process; and*
- (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.*

[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

3.1 Background on Mitigation Planning in Merced County

The primary purpose of the Merced County MJHMP update is to reduce or eliminate long-term risk to people and property from natural hazards and their effects on the Merced County planning area. Merced County recognized the need and importance of a LHMP and initiated its development in 2013 after receiving a grant from FEMA, which also served as the primary funding source for this plan.

The plan underwent a comprehensive update in 2021. The planning process followed during the update was similar to what was used in the original plan development. This planning process utilized the input from a multi-jurisdictional HMPT. A significant change from the 2014 Plan is the inclusion of all of the incorporated communities within the planning area (six), versus three in the previous update. Wood Environment & Infrastructure Solutions, Inc. (Wood) was procured to assist with the update in 2021. The process is described further in this section and documented in Appendix B.

3.2 What's New in the Plan Update

DMA Requirement §201.6(d)(3):

A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

The updated MJHMP complies with FEMA guidance and California Office of Emergency Services guidelines for LHMPs. The update followed the requirements noted in the DMA of 2000 and FEMA's 2013 Local Hazard Mitigation Planning Handbook.

This MJHMP update involved a comprehensive review and update of each section of the 2014 plan and includes an assessment of the progress in evaluating, monitoring and implementing the mitigation strategy outlined in the initial plan. The planning process provided an opportunity to review jurisdictional priorities related to hazard significance and mitigation actions, and revisions were made where applicable

to the plan and the municipal annexes. Another major change in priority was the desire to include all incorporated jurisdictions in the County, including new annexes for the municipalities of Dos Palos, Gustine and Merced. Only the information and data still valid from the 2014 plan was carried forward as applicable into this MJHMP update.

3.2.1 Plan Section Review and Analysis – 2021 Update

During the 2021 plan update, the HMPT updated each of the sections of the previously approved plan to include new information. Wood developed a summary of each section in the plan and guided the HMPT through the elements that needed updating during the kickoff webinar in December 2020. This included analyzing each section using FEMA's local plan update guidance (2013) to ensure that the plan met the latest requirements. In addition, the FEMA Local Mitigation Plan Review Tool that was provided with the approval of the 2014 version of this plan was referenced, in particular the 2014 FEMA comments on opportunities for improvement were considered and addressed in the 2021 update. The HMPT and Wood determined that nearly every section of the plan would need revision to align the plan with the latest FEMA planning guidance and requirements and recent California legislation. A summary of the changes in this plan update is highlighted in the table below.

Table 3-1 Merced County Hazard Mitigation Plan Update Highlights

Plan Section	Summary of Plan Review, Analysis, and Updates
1. Introduction	Revised to reflect updated plan and 2021 planning process
2. County Profile and Capability Assessment	Updated with recent census data and current economy description Updated land use and development trends
3. Planning Process	Describes and documents the planning process for the 2019 update, including coordination among agencies Describes how 2014 plan was integrated with/into other planning efforts. Removed 2014 planning process info. Describes changes to jurisdictional participation Describes 2021 public participation process Describes the Hazard Mitigation Planning Committee Describes the 10-step process followed for the update
4. Hazard Identification and Risk Assessment	Drought is now profiled as separate hazards and are no longer part of Severe Weather Discussion on levee failure has been added to Flood Climate change information has been added to each hazard profile Updated list of disaster declarations to include recent data. Updated tables to include recent National Center for Environmental Information data. Updated past occurrences for each hazard to include recent data. 2014 Plan on Vulnerability Assessment is now included with the Risk Assessment section as subsections by hazard. Updated critical facilities identified from the 2014 plan. Updated growth and development trends to include recent census and local data sources. Updated historic and cultural resources using local/state/national sources. Updated property values for vulnerability and exposure analysis, using updated building information based on assessor's data. Updated estimate flood losses using the latest Digital Flood Insurance Rate Map (DFIRM) and assessor's data.

Plan Section	Summary of Plan Review, Analysis, and Updates												
	Updated National Flood Insurance Program (NFIP) data and Repetitive Loss structure data from the previous plan. Incorporated new hazard loss estimates since 2014, as applicable. Used updated GIS inventory data to assess wildfire threat to the County Updated HAZUS-MH Level I earthquake vulnerability analysis data Updated information regarding specific vulnerabilities to hazards, including maps and tables of specific assets at risk, specific critical facilities at risk, and specific populations at risk. Revisited and updated hazard significance/priority levels. Updated maps in plan where appropriate.												
5. Mitigation Strategy	Indicated what actions have been implemented that may reduce previously identified vulnerabilities. Updated mitigation strategy based on the results of the updated risk assessment, completed mitigation actions, and implementation obstacles and opportunities since the completion of the 2014 plan. Reviewed and updated goals and objectives based on HMPT input. Included updated information on how actions are prioritized, or how priorities changed. Reviewed mitigation actions from the 2014 plan and developed a status report for each; identified if actions have been completed, deleted, or deferred/carried forward. Updated priorities on actions. Identify examples of successful implementation to highlight positive movement on actions identified in 2014 plan. Identified new mitigation actions proposed by the HMPT with more detail on implementation than the previous plan. Developed a summary table of mitigation actions for all participating jurisdictions.												
6. Plan Review, Evaluation and Implementation	Reviewed and updated procedures for monitoring, evaluating, and updating the plan. Revised to reflect current methods. Updated the system for monitoring progress of mitigation activities by identifying additional criteria for plan monitoring and maintenance. Added a process for incorporation of the HMP into existing mechanisms												
7. Plan Adoption	Updated to reflect 2021 process.												
Jurisdictional Annexes	*Developed annexes for new participating jurisdictions in 2021. Updated previous participants' annexes with recent census data. Updated past event history and hazard loss estimates. Added new maps and updated old maps as needed. Updated mitigation actions from 2016 and added new mitigation actions. Updated and integrated the following existing and new annexes: <table data-bbox="565 1612 852 1816"> <tr><td>A</td><td>City of Atwater</td></tr> <tr><td>B</td><td>City of Dos Palos*</td></tr> <tr><td>C</td><td>City of Gustine*</td></tr> <tr><td>D</td><td>City of Livingston</td></tr> <tr><td>E</td><td>City of Los Banos</td></tr> <tr><td>F</td><td>City of Merced*</td></tr> </table>	A	City of Atwater	B	City of Dos Palos*	C	City of Gustine*	D	City of Livingston	E	City of Los Banos	F	City of Merced*
A	City of Atwater												
B	City of Dos Palos*												
C	City of Gustine*												
D	City of Livingston												
E	City of Los Banos												
F	City of Merced*												
Appendices	Appendix A: Planning Team												

Plan Section	Summary of Plan Review, Analysis, and Updates
	Appendix B: Planning Process Documentation Appendix C: Approval and Adoption Appendix D: Mitigation Categories and Alternatives Appendix E: Annual Progress Meeting Agenda and Report Template Appendix F: Outreach Strategy

3.3 Multi-Jurisdictional Participation

In the 2021 MJHMP update, the following jurisdictions participated in the planning process and will be adopting the updated plan following FEMA approval. All incorporated cities in the County participated in this planning process. As noted previously, the cities of Dos Palos, Gustine, and Merced are new to the multi-jurisdictional planning process.

Lead Jurisdiction:

- Merced County

Municipalities:

- City of Atwater
- City of Dos Palos
- City of Gustine
- City of Livingston
- City of Los Banos
- City of Merced

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

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

For the Merced County planning area's HMPT, "participation" meant the following:

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

The County and all jurisdictions with annexes to this plan and seeking FEMA approval met all of these participation requirements. In most cases one or more representatives for each jurisdiction attended the multi-jurisdictional webinars/meetings described in Table 3-3 Schedule of Planning Meetings and brought together a local planning team to help collect data, identify mitigation actions and implementation

strategies, and review and provide data on annex drafts. In some cases, the jurisdictions had limited capacity to attend or had conflicts with HMPT meetings; in these cases, alternative forms of communication were used to provide input into the process, and some instances a representative from a different jurisdiction's department attended the HMPT meeting on behalf of the main representative. Appendix B provides additional information and documentation of the planning process.

3.4 Planning Process

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

- Organize Resources
- Assess Risks
- Develop the Mitigation Plan
- Implement the Plan and Monitor Progress

Into this process, Wood integrated a more detailed 10-step planning process used for FEMA's CRS and FMA programs. Thus, the modified 10-step process used for this plan meets the requirements of major grant programs including: FEMA's HMGP, PDM program, FMA Program, and flood control projects authorized by the U.S. Army Corps of Engineers.

In 2013, FEMA released the Local Mitigation Planning Handbook that has become the official guide for local governments to develop, update and implement local mitigation plans. While the requirements under §201.6 have not changed, the Handbook provides guidance to local governments on developing or updating hazard mitigation plans to meet the requirements under the Code of Federal Regulations (CFR) Title 44 – Emergency Management and Assistance §201.6, Local Mitigation Plans for FEMA approval and eligibility to apply for FEMA HMA grant programs. It also offers practical approaches, tools, worksheets and local mitigation planning examples for how communities can engage in effective planning to reduce long-term risk from natural hazards and disasters. The Handbook complements and liberally references the Local Mitigation Plan Review Guide (October 1, 2011), which is the official guidance for federal and state officials responsible for reviewing local mitigation plans in a fair and consistent manner.

Table 3-2 shows how the modified 10-step process fits into FEMA's four-phase process, and how these elements correspond to the tasks in the FEMA Mitigation Planning Handbook.

Table 3-2 Merced County Hazard Mitigation Planning Process

FEMA's 4-Phase DMA Process	Modified 10-Step CRS Process	FEMA Local Mitigation Planning Handbook Tasks
1) Organize Resources		
201.6(c)(1)	1) Organize the Planning Effort	1: Determine the planning area and resources
201.6(b)(1)	2) Involve the Public	2: Build the planning team - 44 CFR 201.6 (C)(1)
201.6(b)(2) and (3)	3) Coordinate with Other Departments and Agencies	3: Create an outreach strategy - 44 CFR 201.6(b)(1)
		4: Review community capabilities - 44 CFR 201.6 (b)(2)&(3)
2) Assess Risks		
201.6(c)(2)(i)	4) Identify the Hazards	

FEMA’s 4-Phase DMA Process	Modified 10-Step CRS Process	FEMA Local Mitigation Planning Handbook Tasks
201.6(c)(2)(ii)	5) Assess the Risks	5: Conduct a risk assessment - 44 CFR 201.6 (C)(2)(i) 44 CFR 201.6(C)(2)(ii)&(iii)
3) Develop the Mitigation Plan		
201.6(c)(3)(i)	6) Set Goals	6: Develop a mitigation strategy - 44 CFR 201.6(c)(3)(i); 44 CFR 201(c)(3)(ii) and 44 CFR 201.6(c)(3)(iii)
201.6(c)(3)(ii)	7) Review Possible Activities	
201.6(c)(3)(iii)	8) Draft an Action Plan	
4) Implement the Plan and Monitor Progress		
201.6(c)(5)	9) Adopt the Plan	7: Review and adopt the plan
201.6(c)(4)	10) Implement, Evaluate, and Revise the Plan	8: Keep the plan current
		9: Create a safe and resilient community - 44 CFR 201.6(c)(4)

3.4.1 Phase 1: Organize Resources

Planning Step 1: Organize the Planning Effort

The 2021 planning process and update of the LHMP had its roots in the development of a grant application. The County Office OES wrote the grant and in the process solicited commitments from local government jurisdictions that were interested in participating. With an understanding of the number of jurisdictions and their commitment to participate, the grant application was approved and awarded to the County in 2019.

Wood worked with the County to get organized for the plan update. Organizational efforts were initiated with the County and participating jurisdictions in December 2020 to inform and educate the plan participants of the purpose and need for updating the countywide hazard mitigation plan. An initial meeting between Wood and County OEM was held to discuss the organizational aspects of this plan update process. Invitations to the kickoff meeting for this plan update were extended to key County departments, the six incorporated communities, and representatives from special districts for the County and municipalities, as well as to other federal, state, and local stakeholders that might have an interest in participating in the planning process. Representatives from participating jurisdictions and HMPT members to the 2014 plan were used as a starting point for the invite list, with additional invitations extended as appropriate throughout the planning process. The list of initial invitees is included in Appendix A.

Representatives from the following County and municipal departments participated on the HMPT and the development of the plan update. A list of specific HMPT representatives is included in Appendix A. Other local, state, federal, and private stakeholders invited to participate in the HMPT are discussed under Planning Step 3.

Merced County

- Office of Emergency Management
- GIS
- Office of Education
- Division of Environmental Health
- County Counsel
- Community and Economic Development
- Fire Department
- Executive Office

- IT Department
- Public Works Department
- Agriculture Commissioner
- Food Bank

City of Atwater

- City Manager
- Police Department
- Fire Department

City of Dos Palos

- Police Department

City of Gustine

- Police Department

City of Livingston

- Public Works

City of Los Banos

- Community and Economic Development
- Fire Department

City of Merced

- Fire Department

Planning Meetings

The planning process officially began with a kickoff meeting on December 16, 2020. The meeting covered the scope of work and an introduction to the DMA requirements. Participants were provided with a Local Hazard Mitigation Plan Update Workbook, which included worksheets to facilitate the collection of information necessary to support update of the plan. Using FEMA guidance, Wood designed these worksheets to capture information on past hazard events, identify hazards of concern to each of the participating jurisdictions, quantify values at risk to identified hazards, inventory existing capabilities, and record possible mitigation actions. A copy of Wood's Local Hazard Mitigation Plan Update Guide for this project is included in Appendix B. The County and each jurisdiction seeking FEMA approval of their plan completed and returned the worksheets in either the Local Hazard Mitigation Plan Update Workbook or shared their most recent Local Hazard Mitigation Plan for incorporation into the plan document.

During the planning process, the HMPT communicated through face-to-face meetings, email, and telephone conversations. A majority of the meetings (3 out of the 4) were held virtually due to social distancing requirements associated with the ongoing COVID-19 pandemic. Draft documents were posted on a Google Drive and in some cases emailed so that the HMPT members could easily access and review them. The HMPT formally met four times during the planning period (December 16, 2020 – June 29, 2021). The purposes of these meetings are described in Table 3-3. The planning consultant sent meeting handouts ahead of time to the participating jurisdictions to review and provide feedback before or at the meeting. In addition to these meetings some jurisdictions held meetings with subcommittees to discuss the needed input for the plan update. In a couple cases some municipalities were not able to attend the planning workshops due to scheduling conflicts or limited staff capacity. Fire Captain and Assistant Director of County OES and the planning consultant worked with the jurisdictions individually in those cases to obtain necessary information and input into the planning process. This was done through direct

emails from the planning consultant and follow-up phone conversations with the consultant and County OES where necessary.

Table 3-3 Summary of Planning Meetings

Meeting Number	Meeting Topic	Date	Location
1	Kickoff/Planning Team Roles and Expectations	December 16, 2020	Virtual/Webinar – Microsoft Teams
2	Hazard identification and Risk Assessment	March 24, 2021	Virtual/Webinar – Microsoft Teams
3	Mitigation Strategy and Goals Update	May 13, 2021	Virtual/Webinar – Microsoft Teams
4	Mitigation Strategy Refinement	June 29, 2021	County EOC – Atwater

Meeting #1 – Kickoff Meeting

On December 16, 2020, the Planning Team convened virtually to discuss the process for completing the update of this plan. The kickoff meeting was well attended with 23 individuals present. The audience was a mix of county departments, local governments, special districts and stakeholders. A complete list of those in attendance at the kickoff meeting can be found in the sign-in sheets in Appendix B.

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

During the kickoff meeting the Planning Team validated the identified hazards within the 2014 plan with minor revisions and collaboratively prioritized the hazards for the purpose of identifying which are “of most concern” to the County. More details are included in Section 4: Risk Assessment.

The group also discussed other agencies that should be part of this planning process, as well as related planning efforts to be coordinated with and recent studies to be incorporated. Part of this discussion was also related to creating a public outreach strategy to involve the public throughout the planning process. This outreach strategy is included in Appendix F.

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

Meeting #2 – Risk and Goals

On March 24, 2021, the HMPT convened virtually to discuss the results of the risk and vulnerability assessment. Forty-one (41) members of the HMPT were present for the discussion. Wood began the meeting with a presentation on the results the risk assessment for natural hazards, results for hazardous material incidents were presented at the next meeting. The group went through each hazard together and discussed the results as well as shared any local insight to inform the HIRA update. Refer to the meeting summary in Appendix B for notes related to each hazard discussed. Part of this discussion was also related to development trends.

Following the discussion on the results of the risk assessment, Wood explained this update process provides an opportunity to review the previous plan's goals to determine if they are still valid, comprehensive, and reflect current priorities and updated risk assessment. The group was also encouraged to share their jurisdiction's goal statements with their local planning teams prior to the next meeting to discuss if changes are necessary.

Wood shared with group that the online public survey had been opened and already received 30 responses at that time. A link was shared with the HMPT to easily distribute by email and for posting on each of the participating jurisdiction's websites and MJHMP webpages. The meeting ended with a review of the next steps and planning process schedule.

Meeting #3 – Mitigation Strategy and Goals Update

The HMPT convened virtually on May 13, 2021 with 28 people participating to update the plan's mitigation strategy. The group finalized the plan's goals and objectives (Step 6) and discussed the criteria for mitigation action selection and prioritization using a worksheet provided by Wood. The group reviewed each possible new mitigation action and additional details were provided by the Planning Team (Step 7). The meeting ended with a review of the next steps and planning process schedule. Wood provided the Planning Team with a link to an online form to submit new mitigation actions. During the Planning Team review of the full plan, each member was provided a handout on prioritizing new mitigation actions and asked to focus on prioritizing each new mitigation action for their jurisdiction.

Meeting #4 – Mitigation Strategy Refinement

On June 29, 2021, the HMPT convened in person to identify new mitigation actions to include in the updated plan. This encompassed a review of possible mitigation activities, alternatives, and related climate adaptation strategies. The group also discussed criteria for mitigation action selection and prioritization. This was followed by a brainstorming session to elicit the development of new mitigation actions. Entities responsible for new mitigation action implementation were identified. The HMPT completed a sticky dot exercise to prioritize the new mitigation actions. Mitigation action worksheets were also re-distributed to allow additional details to be added following the workshop.

Planning Step 2: Involve the Public

Involving the public assures support from the community at large and is a required part of the planning process per the DMA 2000. Early discussions with Merced County and input received in the first HMPT meeting established the initial plan for public involvement in the plan update. Public outreach began with the creation of an online public survey that was shared with each participating jurisdiction to post on their websites and disseminate via email to local stakeholders. The public outreach activities described here were conducted with participation from and on behalf of all jurisdictions participating in this plan.

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

At the kickoff meeting, the HMPT discussed additional options for public involvement and agreed to an approach using established public information mechanisms and resources within the community. Additional public involvement activities included press releases, website postings, flyer development and distribution, two public workshops, and the collection of public comments on the draft plan. Details on the outreach methods and approach are also summarized in the Community Outreach Strategy included in Appendix F.

Online Public Survey

During the plan update's initial drafting stage, an online public survey was used to gather public input to the Planning Team. The survey provided an opportunity for public input during the planning process, prior to finalization of the plan update. The survey gathered public feedback on concerns about hazards and input on mitigation strategies to reduce their impacts. The survey was released on May 3, 2021 and closed on June 2, 2021. The Planning Team provided links to the public survey by distributing it using social media, email, and posting the link on websites. A link to the survey was also posted on some of the participating jurisdictions' websites as well as through social media posts; screenshots from both can be found in Appendix B. A total of 290 people filled out the survey online. Results showed that the public perceives the most significant hazards to be drought, extreme temperatures, pandemic/epidemic, and climate change. Figure 3-1 shows the results of question 4 of the survey which asked the public's opinion on what mitigation actions that should have the highest priority in the updated hazard mitigation plan. Wildfire fuels treatment projects, forest health/watershed protection, water conservation, evacuation route development and public health incident preparedness were cited as the most popular mitigation actions. This information was shared with the HMPT during the update of the mitigation strategy to consider when evaluating hazard rankings and as a source of potential mitigation ideas. A summary of all the survey data and documentation of the public feedback can be found in Appendix B.

Figure 3-1 Results from Question 4: The following types of mitigation actions may be considered in Merced County. Please indicate the types of mitigation actions that you think should have the highest priority in the Merced County Multi-Jurisdictional Hazard Mitigation Plan.



Online Public Workshops

Two online public workshop was held during the planning process to inform the public, receive input to integrate into the plan update, and keep the public updated on the progress being made in the planning process. Both workshops were held virtually as webinars due to social distancing requirements associated with the ongoing COVID-19 pandemic.

The first workshop took place on May 12, 2021 through Facebook Live. The workshop introduced the public to the hazard mitigation planning process for the County's Plan Update and answered any questions and gather public input to be integrated into the plan update. In addition, it was an opportunity to help staff identify risks, hazards and vulnerabilities from the public's perspective. At the end of the first workshop over 300 individuals participated in the virtual workshop by either logging on and briefly viewing the live workshop. Members of the public were able to submit comments verbally or via the chat function. The HMPT received four comments from the meeting that helped to inform the group on the public initial thoughts on hazard mitigation and hazards in their community. The recording of the meeting was subsequently posted on the County's Facebook Webpage, where it has had an additional 1,985 views as of June 2, 2021, of which 1,020 views were 3-second video views of the workshop recording.

The second public workshop took place on September 22, 2021 while the draft plan was out for public review. The workshop was noticed with a press release and social media postings. The workshop was online using MS Teams and was simultaneously broadcasted as a Facebook Live event by the County. The second virtual public workshop was an opportunity to learn more about the updated draft MJHMP including the planning process, the hazards assessed, and the mitigation actions proposed in the MJHMP. Following the public workshop was an opportunity for the public to comment on the draft MJHMP. Nine persons attended the Teams session. There were no comments received during the workshop. The recording of the meeting was subsequently posted on the County's Facebook Webpage. The County encourages participation and feedback by attending the public workshop, visiting the County's Project Webpage, and/or commenting on the Public Review Draft MJHMP

Critical Facilities Database Website and Coordination

A unique aspect of the 2021 plan update process was the development of a web-based mapping application by the County in collaboration with Wood. This project webpage served multiple purposes: a planning process backgrounder for the HMPT and public with public survey links; a GIS/map based – interactive storyboard (i.e., Experience Builder Application) to communicate the highlights of the risk assessment, including interactive hazard maps; a web-based method for collecting, validating, updating and maintaining critical facilities for the plan; and finally a platform to make the Plan a "living document" moving forward, providing a basis for the plan maintenance and continuous updating of critical facility data. A screenshot of the project webpage is shown in Figure 3-2 below. The website and critical facilities database was completed with assistance from a professor and students at California State University, Stanislaus.

Figure 3-2 Merced County's MJHMP Webpage and Information Resource Portal



Source: Merced County 2021

Each participating jurisdiction's assistance was requested to validate the critical facility GIS data that has been collected. There were two primary aspects of this: data completeness/correctness and alignment/classification with FEMA Lifelines framework. Through a password protected interface built with the ArcGIS Online Experience Builder application jurisdictions were able to browse map based critical facility data, edit descriptive attributes, and add new point data. This process further engaged participating jurisdictions who saw the value of the MJHMP and long-term use and maintenance of the critical facility data moving forward.

Public Review Period

On September 15-October 6, 2021, a public review draft of this plan was released for comment and made available for download via the County OES website. The draft plan was advertised through social media, mass emailing, and an advertisement through the media mechanisms noted previously. An electronic comment form through Microsoft Forms was provided with the draft plan. Two comments were received, one from a member of the public expressing that the plan was well done, and the other from a representative of the Lower San Joaquin Levee District, who did not have any specific things to note. Comments received were shared with the HMPT but did not result in changes to the plan. Both comments are documented in Appendix B.

3.4.2 Planning Step 3: Coordinate with Other Departments and Agencies

Early in the planning process, state and local agencies and organizations were invited to participate as stakeholders in the process through email. Stakeholders include local and regional agencies involved in hazard mitigation activities or those beyond the County and local government that have the authority to regulate development. The Merced County Cooperator's List provided the basis for a contact list, which was maintained on a Google Drive by County OES and the planning consultant. Stakeholders could participate in various ways, either by contributing input at HMPT meetings, being aware of planning activities through an email group, providing information to support the effort, or reviewing and commenting on the draft plan. Based on their involvement in other hazard mitigation planning efforts, and status in the County, representatives from the following agencies and organizations were invited to participate as stakeholders in the process by email; an asterisk indicates they participated in HMPT

meetings. Involvement of local academic institutions include students with California State University, Stanislaus who were tasked to assist with the web-based GIS application for critical facility mapping noted previously. The University of California, Merced was also represented at HMPT meetings. More specific on stakeholder agency representatives can be found in Appendix A and documentation in Appendix B.

Neighboring Counties

- County of Fresno
- County of Kings
- County of Madera*
- County of Mariposa*

State and Federal Agencies

- California Office of Emergency Services Region V*
- California Department of Water Resources*
- California Department of Parks and Recreation*
- National Weather Service*

Businesses, Academia, and Private and Non-Profits

- American Red Cross*
- University of California, Merced*
- California State University, Stanislaus*
- Pacific Gas & Electric (PG&E) *
- Mercy Medical Center*
- Merced Irrigation District*
- Turlock Irrigation District*
- Merced County Food Bank*

Incorporation or Existing Plans and Other Information

The coordination and synchronization with other community planning mechanisms and efforts are vital to the success of this plan. To have a thorough evaluation of hazard mitigation practices already in place, appropriate planning procedures should also involve identifying and reviewing existing plans, policies, regulations, codes, tools, and other actions are designed to reduce a community's risk and vulnerability from natural hazards. Merced County uses a variety of mechanisms to guide growth and development. Integrating existing planning efforts, mitigation policies, and action strategies into this plan establishes a credible, comprehensive document that weaves the common threads of a community's values together. The development and update of this plan involved a comprehensive review of existing plans, studies, reports, and initiatives from Merced County and each participating municipality that relate to hazards or hazard mitigation. A high level summary of the key plans, studies and reports is summarized in the table below. Information on how they informed the update are noted and incorporated where applicable.

Table 3-4 Summary of Review of Key Plans, Studies and Reports

Plan, Study, Report Name	How Plan informed LHMP
Merced County General Plan	Provided background information on the county including some information related to jurisdictions. The elements were used to provide information on risk and vulnerabilities to hazards and the existing policies the County has in place related to hazards and mitigation.

Plan, Study, Report Name	How Plan informed LHMP
Municipal General Plans (including Safety Elements, Land Use Elements, and Housing Elements)	Informed the municipal annexes and in some cases the community service district annexes on past hazard events, mitigation policies, combining designations and existing and projected development
City of Merced 2015 Local Hazard Mitigation Plan	Informed the HIRA sections, mitigation action plans and capability assessments for the City of Merced
Merced County Flood Insurance Study	Reviewed for information on past floods and flood problems to inform risk assessment (Section 4) Utilized Digital Flood Insurance Rate Maps effective
2018 State of California Multi-Hazard Mitigation Plan	Reviewed information on climate change and hazard assessment data to ensure consistency with this plan update Reviewed list of hazards to inform risk assessment (Section 4) Reviewed goals for consistency
Turlock Irrigation District Local Hazard Mitigation Plan 2020	Reviewed risk assessment chapter in TLD plan to help inform the Merced County LHMP update
NOAA National Centers for Environmental Information- State Climate Summaries	Reviewed information on climate change to inform risk assessment (Section 4)
California Department of Finance/U.S. Census Bureau, American Community Survey, 2015-2019	Informed the background on the community including demographic trends
USDA Risk Management Agency Crop Indemnity Reports, 2007-2020	Informed the adverse weather section vulnerability assessment on how crops have been impacted by weather events in the past. Also informed the Drought and Agricultural Pests and Disease sections of the HIRA
California Climate Adaptation Strategy, 2018 and California OES Contingency Plan for Excessive Heat Emergencies (2014)	Informed the Extreme Heat profile and climate change considerations

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

- California Department of Forestry and Fire Protection
- California Department of Parks and Recreation Office of Historic Preservation
- California Department of Transportation
- California Department of Public Health
- California Natural Resources Agency
- California Department of Water Resources
- California Geological Survey
- Merced County Agricultural Department
- Merced Office of Emergency Services
- California Water Foundation
- National Oceanic and Atmospheric Administration National Climatic Data Center
- National Register of Historic Places
- Natural Resource Conservation Service

- National Weather Service
- U.S. Fish and Wildlife Service
- U.S. Geological Survey
- Western Regional Climate Center
- Center for Western Weather and Water Extremes

Integration of 2014 Plan into Other Plans and Planning Mechanisms

While the 2014 MJHMP including jurisdictional annexes for Atwater, Livingston, or Los Banos, or the City of Merced 2015 LHMP, were not specifically incorporated or referenced in county or municipal plans and planning mechanisms, a process to do so with the 2021-2026 plan is outlined in subsection 6.3.3. Specifically, there is a process noted in both subsection 6.3.3 and corresponding mitigation actions in subsection 5.3 that outline how the County and municipalities can achieve Assembly Bill (AB) 2140 compliance, which recommends adoption by reference or incorporation of the LHMP into the Safety Element of the General Plan. The County was actively coordinating an amendment of the General Plan Safety Element to accommodate this during the finalization of this LHMP in late 2021.

3.4.3 Phase 2: Assess Risks

Planning Step 4: Identify the Hazards

Wood led the HMPT in an effort to review the list of hazards identified in the 2014 plan and document all the hazards that have, or could, impact the planning area, including documenting recent drought, flood, wildfire and winter storm events. Data collection worksheets were used in this effort to aid in determining hazards and vulnerabilities and where risk varies across the planning area. The profile of each of these hazards was then updated in 2019 with information from the HMPT and additional sources. Web resources, existing reports and plans, and existing GIS layers were used to compile information about past hazard events and determine the location, previous occurrences, probability of future occurrences, and magnitude/severity of each hazard. GIS were used to display, analyze, and quantify hazards and vulnerabilities where data permitted. The potential for climate change to affect the frequency and intensity of the hazards was summarized based on latest available science, where applicable. A more detailed description of the HIRA process and the results are included in Section 4: Hazard Identification and Risk Assessment.

Planning Step 5: Assess the Risks

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

Vulnerability Assessment – Participating jurisdictions updated their assets at risk to natural hazards—overall and in identified hazard areas. These assets included total number and value of structures; critical facilities and infrastructure; natural, historic, and cultural assets; and economic assets. The HMPT also analyzed development trends in hazard areas. The latest DFIRM was used to refine the estimate flood losses during the update, where available for the NFIP participating communities.

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

Results of the risk assessment was presented, and comments discussed at the second HMPT meeting in March 2021. A more detailed description of the risk assessment process and the results are included in Section 4: Hazard Identification and Risk Assessment.

3.4.4 Phase 3: Develop the Mitigation Plan

Planning Step 6: Set Goals

Wood facilitated a discussion session with the HMPT to review the 2014 plan's goals and objectives. The HMPT discussed definitions and examples of goals, objectives, and actions and considered the goals of the state hazard mitigation plan and other relevant local plans when reviewing and revising the goals and objectives. The resulting updated goals and objectives are presented in Section 5: Mitigation Strategy.

Planning Step 7: Review Possible Activities

Wood facilitated a discussion at an HMPT meeting to review the alternatives for mitigating hazards. This included a brainstorming session with the HMPT to identify a comprehensive range of mitigation actions for each identified hazard, and a method of selecting and defending recommended mitigation actions using a series of selection criteria. More specifics on the process and the results of this collaborative process are captured in Section 5: Mitigation Strategy.

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

Planning Step 8: Draft an Action Plan

Based on input from the HMPT regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7, Wood produced a complete first draft of the plan. This complete was shared electronically with the HMPT for review and comment. Other agencies were invited to comment on this draft as well. HMPT and agency comments were integrated into the second draft, which was advertised and distributed to collect public input and comments. Neighboring county emergency managers and interested stakeholders identified under Step 3 were also solicited to provide comments on the draft plan; no comments were received. Wood integrated comments and issues from the public, as appropriate, along with additional internal review comments and produced a final draft for the California Office of Emergency Services and FEMA Region IX to review and approve, contingent upon final adoption by the governing boards of each participating jurisdiction.

3.4.5 Phase 4: Implement the Plan and Monitor Progress

Planning Step 9: Adopt the Plan

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

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

The true worth of any mitigation plan is in the effectiveness of its implementation. Up to this point in the plan update process, all of the HMPT's efforts have been directed at researching data, coordinating input

from participating entities, and updating and developing appropriate mitigation actions. Each recommended action includes key descriptors, such as hazard(s) addressed, lead manager and priority, to help initiate implementation. An overall implementation strategy is described in Section 6: Plan Adoption, Implementation, and Maintenance.

Finally, there are numerous organizations within the Merced County planning area whose goals and interests' interface with hazard mitigation. Coordination with these other planning efforts, as addressed in Planning Step 3, is paramount to the ongoing success of this plan and of mitigation in Merced County and is addressed further in Section 6. A plan update and maintenance schedule and a strategy for continued public involvement are also included in Section 6.

Implementation and Maintenance Process: 2014 Plan

The 2014 LHMP included a process for implementation and maintenance which was generally followed, with some variation. Implementation of the plan including the status of mitigation actions is captured in Section 5 and the jurisdictional annexes. In general, the County and participating jurisdictions have made progress in the implementation of the plan. Successes of note are detailed in the mitigation strategy in Section 5. An updated implementation and maintenance section can be referenced in Section 6..

4 HAZARD IDENTIFICATION AND RISK ASSESSMENT

Requirement §201.6(c)(2)(i):

[The risk assessment shall include a] description of the type, location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

§201.6(c)(2)(ii):

[The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. All plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:

§201.6(c)(2)(ii)(A):

The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;

§201.6(c)(2)(ii)(B):

An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.

§201.6(c)(2)(ii)(C):

Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Risk to natural hazards is a combination of hazard, vulnerability and capability. This section of the MHMP will look at both hazards and vulnerability. The risk assessment process identifies and profiles relevant hazards and assesses the exposure to lives, property and infrastructure to these hazards. The goal of the risk assessment is to estimate the potential losses in Merced County from a hazard event. This process also allows communities in Merced County to better understand their potential risk to natural hazards and provides a framework for developing and prioritizing mitigation actions to reduce the risks from future hazard events in Merced County.

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

This risk assessment builds upon the methodology described in the 2013 FEMA Local Mitigation Planning Handbook, which recommends a four-step process for conducting a risk assessment:

1. Describe Hazards
2. Identify Community Assets
3. Analyze Risks
4. Summarize Vulnerability

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

Subsection 4.1: Hazard Identification - identifies the hazards that threaten the Planning Area and describes why some hazards have been omitted from further consideration.

Subsection 4.2: Asset Summary - describes the methodology for inventorying assets as the basis for determining vulnerability of the planning area to the identified hazards.

Subsection 4.3: Hazard Analysis and Risk Assessment - discusses the threat to the Planning Area and describes previous occurrences of hazard events and the likelihood of future occurrences (2013 FEMA Local Mitigation Planning Handbook Risk Assessment Step 1). It also includes a vulnerability assessment considering assets at risk, critical facilities, and development trends (2013 FEMA Local Mitigation Planning Handbook Risk Assessment Steps 2, 3 and 4).

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

4.1 Hazard Identification

The San Joaquin Valley region and Merced County is susceptible to a number of hazards. This MHMP profiles the most significant of these hazards. In the early meetings with Merced County and the Planning Team, data was reviewed from the following sources on hazards affecting the county, those sources were: Federal and State Disaster Declaration History, the State of California Hazard Mitigation Plan (2018), the Health Safety Element of the Merced County 2035 General Plan (2012), and interviews of staff that live and work in Merced County.

Using existing natural hazards data and input gained through planning meetings during both the 2014 HMP and 2021 update, the HMPC agreed upon a list of hazards that could affect Merced County. The following table explains the changes in the hazards profiled in 2014 and the 2021 update.

Table 4-1 Updates to Hazards Profiled, 2014 Plan and 2021 Update

2014 Hazards	2021 Hazards	Comments
Earthquake	Earthquake	No Changes.
Floods (including dam failures)	Flooding and Levee Failure	Broke out dam failures as its own sections: "dam incidents". Added levee failure to section due to the large number of levees in the County.
Severe Weather (including Drought, Extreme Heat, Freeze)	Severe Weather: Dense Fog, Extreme Heat, Freeze, Heavy Rain and Wind	Broke out drought into its own section. Added dense fog, wind and heavy rain to severe weather.
Wildfire	Wildfire	No Changes.
	Agriculture Pest and Disease	New in 2021. Added due to significant agricultural industry in the County and the impacts to the local economy.
	Cyber Attacks	New in 2021. Added due to worldwide uptick in number and extent of attacks.

2014 Hazards	2021 Hazards	Comments
	Dam Incidents	Identified in General Plan Safety Element. Includes flooding from excess releases.
	Drought	Previously part of severe weather section. Profiled separately due to the unique nature of the hazard and different consequences.
	Hazardous Materials	New in 2021. Added due to potential for fixed facility and transportation incidents.
	Landslide	New in 2021. Added due to presence of landslide susceptible terrain in the western county.
	Pandemic/Epidemic	New in 2021. Included due to extent of impacts associated with 2020 COVID 19 Pandemic.
	Subsidence	New in 2021. Included due to history of subsidence related to groundwater withdrawals and impacts to canal and levee infrastructure.

The 2021 HMP update included a significant re-evaluation of the hazards with the latest, best available data. Hazards data from Merced County, California Governor's OES, FEMA, the National Oceanic and Atmospheric Administration, and many other sources were examined to assess the significance of these hazards to the planning area. The update process included a comprehensive, parcel-level risk analysis with GIS where available data permitted. Many new maps and tables were added that capture the potential losses.

4.1.1 Overall Hazard Significance Summary

Overall hazard significance was based on a combination of Geographic Area, Probability of Future Occurrence and Potential Magnitude/Severity as defined below. The individual ratings are based on or interpolated from the analysis of the hazards in the sections that follow. During the 2021 Merced County HMP update the individual ratings and significance of the hazards was revisited and updated. Public concern was also considered via input at public webinars and an online survey.

Table 4-2 Merced County Hazard Significance

Hazard	Geographic Area	Probability of Future Occurrence	Magnitude/Severity (Extent)	Overall Significance
Agriculture Pest and Disease	Extensive	Likely	Critical	Medium
Cyber Attack	Significant	Likely	Critical	Medium
Dam Incidents	Significant	Occasional	Catastrophic	Medium
Drought	Extensive	Likely	Critical	High
Earthquake	Significant	Unlikely	Critical	Medium
Flood and Levee Failure	Extensive	Likely	Catastrophic	High
Hazardous Materials	Limited	Highly Likely	Negligible	Low
Landslide	Limited	Occasional	Limited	Low
Pandemic/Epidemic	Extensive	Occasional	Catastrophic	High

Hazard	Geographic Area	Probability of Future Occurrence	Magnitude/Severity (Extent)	Overall Significance
Severe Weather: Dense Fog	Extensive	Highly Likely	Critical	High
Severe Weather: Freeze	Extensive	Highly Likely	Critical	High
Severe Weather: Heat	Extensive	Highly Likely	Critical	High
Severe Weather: Heavy Rain	Extensive	Highly Likely	Critical	High
Severe Weather: High Wind/Tornado	Extensive	Highly Likely	Critical	High
Subsidence	Extensive	Likely	Negligible	Low
Wildfire	Significant	Likely	Limited	Medium
Geographic Area Limited: Less than 10% of planning area Significant: 10-50% of planning area Extensive: 50-100% of planning area Probability of Future Occurrences Highly Likely: Near 100% chance of occurrence in next year or happens every year. Likely: Between 10 and 100% chance of occurrence in next year or has a recurrence interval of 10 years or less. Occasional: Between 1 and 10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years. Unlikely: Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.		Magnitude/Severity (Extent) Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid Significance Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact		

4.1.2 Non-Profiled Hazards

The Planning Team reviewed data and discussed several other hazards, which were eliminated from further discussion because they occur rarely and/or their impacts are not significant. The list below details these hazards and provides a brief explanation for their omission from further profiling.

- Avalanche - Snowfall is extremely rare to nonexistent across the planning area.
- Coastal Erosion/Storm - Hazard does not occur due to distance from coasts and ocean.
- Hailstorm - Severe thunderstorms during which hail normally occurs are rare.
- Hurricane - Hazard does not occur due to distance from ocean.
- Tsunami - Hazard does not occur due to distance from ocean.
- Volcano - The U.S. Geological Survey does not include Merced County in their map of areas identified as subject to hazards from potential eruptions in California.

The Planning Team acknowledges there are other human caused hazards that can affect the County. They are recognized here, with notes below how they are considered as consequences of other hazards or addressed in other planning mechanisms:

- Civil Unrest and Terrorism – More commonly addressed in the local emergency operations plans; an uptick in social equity-related incidents and far-right extremism has been noted in recent years.
- Power outages/Utility Failure – This is addressed as a consequence of other hazards such as severe weather, earthquakes, and wildfires.

- **Transportation Hazards** – Transportation safety is typically addressed in other planning mechanisms. Noted as a consequence of other hazards where applicable, e.g. Severe Weather: Fog, earthquakes, floods.

4.1.3 Disaster Declaration History

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

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), or the Small Business Administration. FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations (Farm Service Agency 2018). The quantity and types of damage are the determining factors. This section focuses on state and federal disaster and emergency declarations.

The communities throughout Merced are among the many in California that are susceptible to disaster. Details on federal and state disaster declarations were obtained by the HMPC, FEMA, and the California OES and compiled in chronological order in Table 4-3. A review of state and federal declared disasters indicates that Merced County received 18 proclamations between 1950 and March 2020. Of the 18 state declarations, seven were associated with flooding; two were for drought (not including declaration issued by the USDA); three were for freeze; and two were for the COVID-19 pandemic.

This disaster history (combined federal and state) suggests that Merced County experiences a major event worthy of a disaster declaration about every 4 years. The County has a 26 percent chance of receiving a disaster declaration in any given year. With the exception of the declarations for drought and the COVID-19 pandemic, every declaration resulted directly or indirectly from severe weather. Further, a review of these events helps Merced County, and its jurisdictions identify risk reduction targets and ways to improve capabilities to avoid large-scale hazard events in the future.

The following table lists the declarations where Merced County was included in federal and/or state disaster declarations from 1950 to the present.

Table 4-3 Merced County Disaster Declaration History 1950-present

Hazard Type	Disaster Name	Disaster Number
Flood	1950 Floods (Statewide)	OCD50-01
Flood	1955 Floods (Statewide)	DR-47
Flood	1969 Storms, Flooding	DR-253
Freeze	1972 Freeze	
Drought	California Drought January 1976-77	3023
Severe Storms	1983 Coastal Storms, Floods, Slides, & Tornadoes	DR-677
Freeze	1990 Freeze	DR-894
Flood	1995 Late Winter Storms	DR-1046
Flood	1997 January Floods	DR-1155
Flood	1998 El Niño Floods	DR-1203

Hazard Type	Disaster Name	Disaster Number
Freeze	1998 Freeze	DR-1267
Hurricane Katrina Evacuation	California Hurricane Katrina Evacuees September 2005	EM-3248
Flood	2006 June Storms	DR-1646
Freeze	2007 Severe Freeze	DR-1689
Drought	Central Valley Drought 2008	GP 2008-03
Drought	Drought State of Emergency Statewide 2014	B-17-2014
Flooding and Mudslides	January 2017 Storms	DR-4301
Pandemic	California COVID-19	EM-3428
Pandemic	California COVID-19 Pandemic	DR-4482

Source: Merced OES, Cal OES and FEMA

Since 2012, there have been 18 disaster designations issued by the Secretary of Agriculture in Merced County, 15 of which were for drought and three were for hail, excess rain, cold temperatures, and high winds. Of the drought designations, 11 are classified as “Drought-Fast Track” Secretarial disaster designations. According to the Secretary of Agriculture, a Fast Track designation is for a severe drought and provides an automatic designation when during the growing season any portion of the county meets the severe drought intensity value for eight consecutive weeks. Refer to the drought hazard profile for more information of disaster declarations from the Secretary of Agriculture related to drought events.

Table 4-4 USDA Agricultural Declarations in Merced County, 2012-2020

Year	Hazard	Designation Number	Approval Date
2012	Drought-Fast Track	S3268	7/12/2012
	Hail, rain, cold temperatures	S3320	8/3/2012
	Drought	S3379	9/5/2012
	Drought	S3452	12/19/2012
2013	Drought-Fast Track	S3491	2/27/2013
	Drought-Fast Track	S3511	4/24/2013
	Drought-Fast Track	S3547	7/3/2013
	Drought-Fast Track	S3558	7/31/2013
2014	Drought-Fast Track	S3626	1/15/2014
	Drought	S3743	9/17/2014
2015	Drought-Fast Track	S3784	2/4/2015
	Drought	S3943	12/23/2015
2016	Drought-Fast Track	S3952	2/17/2016
	Severe weather including excessive rainfall and high winds	S4164	3/31/2017
2017	Drought-Fast Track	S4144	2/23/2017
2019	Excessive rain and hail	S4657	3/11/2020
2020	Drought-Fast Track	S4697	6/16/2020

Source: USDA Secretary of Agriculture

4.1.4 Climate Change Considerations Summary

Merced County is part of the San Joaquin Valley part of California’s Central Valley. The region is known as one of the world’s most productive agricultural regions and is also vulnerable to the impacts on climate change. The following are highlights from California’s Fourth Climate Change Assessment, San Joaquin Valley Region Report (Preview), of projected impacts to the State of California and the Central Valley due to climate change:

- Acceleration of higher temperatures across California.

- More intense and frequent heat waves.
- Increasing evapotranspiration.
- More intense and frequent droughts.
- More intense rainstorms.
- Higher frequency of catastrophic floods.
- More severe and frequent wildfires.
- Declining and change in timing of snowmelt.
- Increased susceptibility to rain-on-snow events from atmospheric rivers.
- Increased stream temperatures resulting in decreased water quality.

The important consideration for hazard mitigation is that climate change is exacerbating the hazards which are already identified and profiled. Additional specifics associated with the hazards are discussed in the Climate Change Considerations portion of each hazard profile.

4.1.5 Overview of Hazard Identification and Risk Assessment

Subsection 4.3 contains detailed hazard profiles for the identified hazards. Each hazard profile includes the following subsections:

- **Hazard/Problem Definition**—This section gives a description of the hazard and associated issues followed by details on the hazard specific to the Merced County planning area.
- **Geographic Area** – This section gives a spatial description of the potential location or areas of Merced County where the hazard expected to impact.
- **Extent (Magnitude/Severity)**– This section gives a description of the potential strength or magnitude of the hazard as it pertains to Merced County.
- **Previous Occurrences**—This section contains information on historical incidents, including impacts where known. Historical incident worksheets were used to capture information from participating jurisdictions on past occurrences.
- **Probability of Future Occurrence**—The frequency of past events is used in this section to gauge the likelihood of future occurrences. Where possible, frequency was calculated based on existing data. It was determined by dividing the number of events observed by the number of years on record and multiplying by 100. This gives the percent chance of an event happening in any given year (e.g., three droughts over a 30-year period equates to a 10 percent chance of a drought in any given year). The likelihood of future occurrences is categorized into one of the following classifications:
 - **Highly Likely** — Near 100 percent chance of occurrence in next year or happens every year.
 - **Likely** — Between 10 and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less.
 - **Occasional** — Between 1 and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.
 - **Unlikely** — Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.
- **Climate Change Considerations** - This describes the potential for climate change to affect the frequency and intensity of the hazard in the future.
- **Vulnerability** - Following the hazard profiles is a vulnerability assessment for each identified hazard. The assessment was conducted through the study of potential impacts to the following specific sectors:
 - General Property
 - People
 - Critical Facilities and Infrastructure

- Economy
- Historic, Cultural, and Natural Resources
- Future Development
- Risk Summary - Each vulnerability assessment includes a risk summary of the key issues/problems based on threat, vulnerability and consequence to the planning area and jurisdictions from the specific hazard.

Data used to support this assessment included the following:

- County GIS data (hazards, base layers, and assessor's data);
- Statewide GIS datasets to support mitigation planning;
- State of California Hazard Mitigation Plan 2018;
- Merced County Hazard Mitigation 2014;
- Jurisdictional Hazard Mitigation Plans;
- CAL FIRE datasets;
- California's Fourth Climate Change Assessment
- Written descriptions of inventory and risks provided by the jurisdictions;
- Online data sources (cited where applicable);
- Data and information from existing plans and studies; and
- Input from planning team members and staff from the County and local, state, and federal agencies.

Asset Summary

4.1.6 Assets Exposure

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

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

Total Assets at Risk

Building value assessments in this plan are based on data from the Merced County's Assessor's Office.

This data provided the baseline for an inventory of the total exposure of developed properties within the county and helps to ensure that the updated HMP reflects changes in development. It is important to note that depending on the nature and type of hazard event or disaster, it is generally the value of the infrastructure or improvements to the parcels that are of concern or at risk. Generally, the land itself is not a total loss, but may see a reduction in value. Thus, the parcel analysis excludes land value.

Parcel Exposure and Preparations for Analysis

Merced County Assessor data was used to inventory the total number and types of parcels with improvements, defined as parcels with an improvement value greater than zero, in the County. Building content values were estimated based on the following formulas based on FEMA/Hazus methods: a) Residential properties received content values worth 50% of the improved values; b) Agricultural, Commercial, Exempt, and Mixed Use related properties received content values worth 100% of the improved values; and c) Industrial properties received content values worth 150% of the improved values.

Adding up these content and original improved values yields the Total Value of Improved Parcels, which is an estimation of the total property exposure within the County. Building counts were based on an address point database to further refine the number of structures, as one parcel may have multiple buildings. Table 4-6 summarizes the property inventory for the County and each participating jurisdiction with detail by property type. Table 4-5 shows the total property inventory from the Assessor's Office.

Table 4-5 Total Exposure Summary by Jurisdiction

Jurisdiction	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value
Atwater	7,634	9,654	\$1,391,376,798	\$826,122,017	\$2,217,498,815
Dos Palos	1,774	2,001	\$202,169,557	\$111,638,513	\$313,808,070
Gustine	1,874	2,109	\$290,346,103	\$174,766,468	\$465,112,571
Livingston	3,344	4,007	\$708,187,135	\$500,444,666	\$1,208,631,801
Los Banos	12,253	13,111	\$2,492,207,313	\$1,427,441,289	\$3,919,648,602
Merced	22,362	31,744	\$4,753,631,582	\$3,092,973,003	\$7,846,604,585
Unincorporated	28,343	35,327	\$5,628,897,061	\$4,421,594,611	\$10,050,491,672
Total	77,584	97,953	\$15,466,815,549	\$10,554,980,566	\$26,021,796,115

Source: Merced County Assessor's Office, Wood Analysis

Table 4-6 Total Exposure by Jurisdiction and Property Type

Jurisdiction	Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value
Atwater	Agricultural	4	4	\$294,019	\$294,019	\$588,038
	Commercial	254	941	\$187,232,236	\$187,232,236	\$374,464,472
	Exempt	77	150	\$14,001,651	\$14,001,651	\$28,003,302
	Industrial	48	48	\$28,819,757	\$43,229,636	\$72,049,393
	Mixed Use	6	6	\$236,330	\$236,330	\$472,660
	Residential	7,229	8,489	\$1,159,329,319	\$579,664,660	\$1,738,993,979
	Vacant Land	16	16	\$1,463,486	\$1,463,486	\$2,926,972
	Total	7,634	9,654	\$1,391,376,798	\$826,122,017	\$2,217,498,815
Dos Palos	Commercial	104	154	\$16,913,918	\$16,913,918	\$33,827,836
	Exempt	39	94	\$1,962,673	\$1,962,673	\$3,925,346
	Industrial	9	9	\$1,043,139	\$1,564,709	\$2,607,848
	Mixed Use	5	5	\$104,170	\$104,170	\$208,340
	Residential	1,611	1,733	\$182,105,228	\$91,052,614	\$273,157,842
	Vacant Land	6	6	\$40,429	\$40,429	\$80,858
	Total	1,774	2,001	\$202,169,557	\$111,638,513	\$313,808,070
Gustine	Agricultural	3	3	\$249,806	\$249,806	\$499,612
	Commercial	86	212	\$13,841,697	\$13,841,697	\$27,683,394
	Exempt	21	22	\$1,947,230	\$1,947,230	\$3,894,460
	Industrial	8	8	\$21,456,333	\$32,184,500	\$53,640,833
	Mixed Use	3	3	\$55,055	\$55,055	\$110,110
	Residential	1,749	1,857	\$252,615,603	\$126,307,802	\$378,923,405
	Vacant Land	4	4	\$180,379	\$180,379	\$360,758
	Total	1,874	2,109	\$290,346,103	\$174,766,468	\$465,112,571

Jurisdiction	Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value
Livingston	Agricultural	8	9	\$713,550	\$713,550	\$1,427,100
	Commercial	82	235	\$75,954,862	\$75,954,862	\$151,909,724
	Exempt	48	114	\$8,331,817	\$8,331,817	\$16,663,634
	Industrial	19	33	\$103,753,191	\$155,629,787	\$259,382,978
	Mixed Use	3	4	\$53,004	\$53,004	\$106,008
	Residential	3,177	3,605	\$519,238,129	\$259,619,065	\$778,857,194
	Vacant Land	7	7	\$142,582	\$142,582	\$285,164
	Total	3,344	4,007	\$708,187,135	\$500,444,666	\$1,208,631,801
Los Banos	Agricultural	6	8	\$519,029	\$519,029	\$1,038,058
	Commercial	441	889	\$287,223,390	\$287,223,390	\$574,446,780
	Exempt	189	270	\$15,571,378	\$15,571,378	\$31,142,756
	Industrial	23	43	\$29,327,893	\$43,991,840	\$73,319,733
	Mixed Use	9	9	\$175,156	\$175,156	\$350,312
	Residential	11,554	11,861	\$2,158,859,942	\$1,079,429,971	\$3,238,289,913
	Vacant Land	31	31	\$530,525	\$530,525	\$1,061,050
	Total	12,253	13,111	\$2,492,207,313	\$1,427,441,289	\$3,919,648,602
Merced	Agricultural	23	26	\$1,112,724	\$1,112,724	\$2,225,448
	Commercial	911	2,819	\$1,045,871,699	\$1,045,871,699	\$2,091,743,398
	Exempt	632	1,313	\$48,779,381	\$48,779,381	\$97,558,762
	Industrial	120	220	\$167,440,322	\$251,160,483	\$418,600,805
	Mixed Use	16	17	\$259,279	\$259,279	\$518,558
	Residential	20,611	27,288	\$3,488,757,480	\$1,744,378,740	\$5,233,136,220
	Vacant Land	49	61	\$1,410,697	\$1,410,697	\$2,821,394
	Total	22,362	31,744	\$4,753,631,582	\$3,092,973,003	\$7,846,604,585
Unincorporated	Agricultural	9,875	13,314	\$2,230,504,412	\$2,230,504,412	\$4,461,008,824
	Commercial	689	1,703	\$277,981,955	\$277,981,955	\$555,963,910
	Exempt	427	769	\$56,580,563	\$56,580,563	\$113,161,126
	Industrial	158	250	\$322,872,531	\$484,308,797	\$807,181,328
	Mixed Use	70	81	\$2,168,754	\$2,168,754	\$4,337,508
	Residential	17,020	19,083	\$2,737,477,431	\$1,368,738,716	\$4,106,216,147
	Vacant Land	104	127	\$1,311,415	\$1,311,415	\$2,622,830
	Total	28,343	35,327	\$5,628,897,061	\$4,421,594,611	\$10,050,491,672
Grand Total		77,584	97,953	\$15,466,815,549	\$10,554,980,566	\$26,021,796,115

Source: Merced County Assessor's Office, Wood Analysis

Critical Facility/Lifeline Inventory

A significant aspect of the 2021 HIRA update was the update of critical facilities and an alignment/classification with the FEMA Lifelines framework. The critical facilities/lifelines GIS database was based on a combination of county-provided data, Homeland Infrastructure Foundation Level Data (HIFLD), and local input. Jurisdictions were able to browse map based critical facility data, edit descriptive attributes, and add new point data through a password protected interface built with the ArcGIS Online Experience Builder application setup by the County GIS coordinator. The results are summarized here and provided the basis for GIS based vulnerability analyses, where data permitted.

For the purposes of this plan, a critical facility is defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA sorts critical facilities into seven lifeline categories as shown in Figure 4-1.

Figure 4-1 Lifeline Categories



These lifeline categories standardize the classification of critical facilities and infrastructure that provide indispensable service, operation, or function to a community. A lifeline is defined as providing indispensable service that enables the continuous operation of critical business and government functions, and is critical to human health and safety, or economic security. These categorizations are particularly useful as they:

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

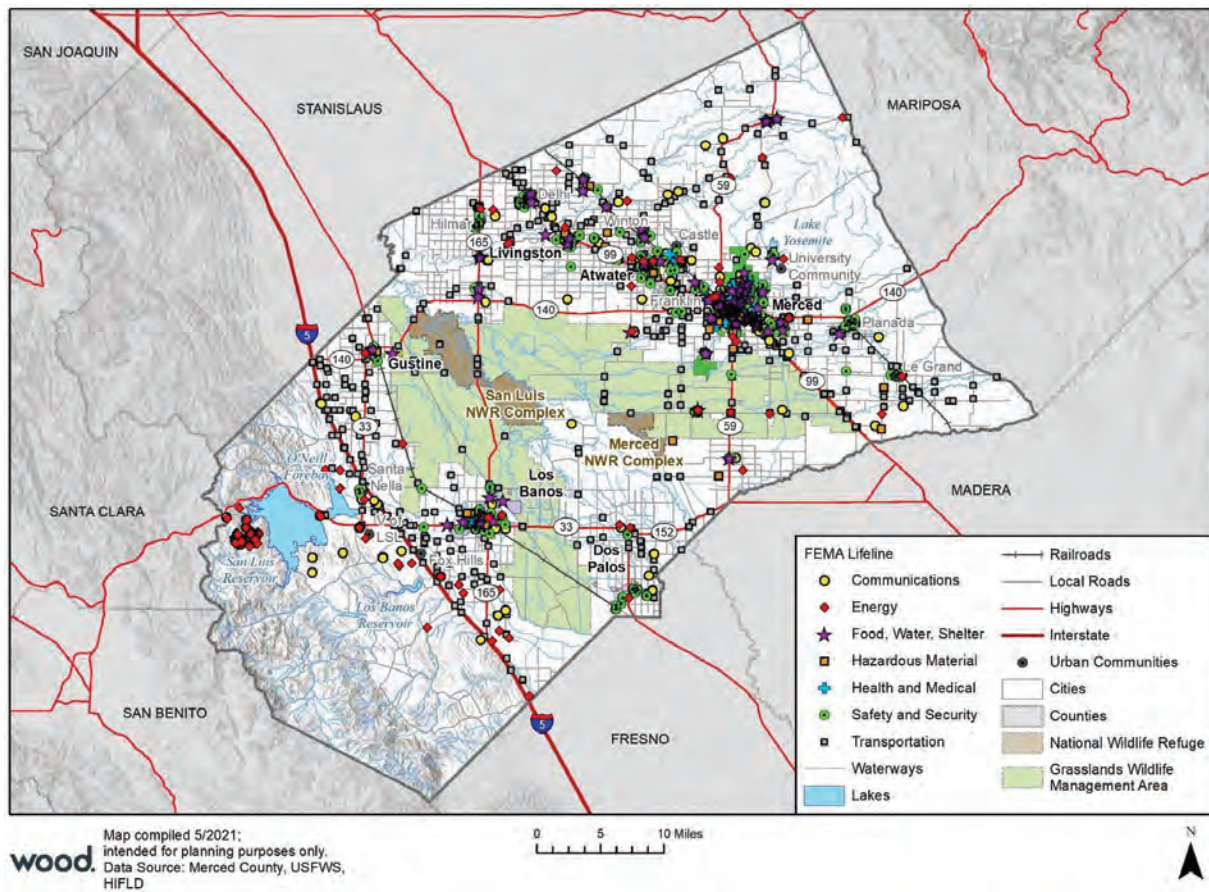
Table 4-7 shows a summary of the critical facilities analysis. Figure 4-2 illustrates the location of critical facilities in Merced County.

Table 4-7 Summary of Critical Facilities by Jurisdiction and Lifeline

Jurisdiction	Communications	Energy	Food, Water, Shelter	Hazardous Material	Health and Medical	Safety and Security	Transportation	Total
Atwater	7	5	3	1	1	34	11	62
Dos Palos	1	-	-	-	-	7	-	8
Gustine	6	-	2	1	-	8	3	20
Livingston	6	1	3	3	-	14	5	32
Los Banos	15	2	20	6	3	53	6	105
Merced	36	3	52	17	22	87	53	270
Unincorporated	113	216	31	24	1	164	467	1,016
Total	184	227	111	52	27	367	545	1,513

Source: HIFLD, Merced County, City of Atwater, City of Dos Palos, City of Gustine, City of Livingston, City of Los Banos, City of Merced

Figure 4-2 Merced County Critical Facilities



Other critical facilities unique to the county are the California Aqueduct, the Castle Air Museum, and the Federal Bureau of Prisons located in Atwater. These facilities are better addressed in the emergency operations plans for the county, the two municipalities, and federal emergency plans.

The California Aqueduct, part of the California State Water Project, runs through the western part of Merced County. The State Water Project is a water storage and delivery system of reservoirs, aqueducts, power plants, and pumping plants. Its main purpose is to store water and distribute it to 29 urban and agricultural water suppliers in Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California. Seventy percent of the contracted water supply goes to urban users and 30 percent goes to agricultural users. The State Water Project makes deliveries to two-thirds of California's population. Earthquakes, landslides, flooding, or other hazard events that disrupt the aqueduct's ability to deliver water could have serious impacts to agriculture in the county and water users in many areas of California.

The Castle Air Museum is one of Merced County's treasures drawing visitors from across the country. Located on the site of the former Castle Air Force Base (known as Merced Army Airfield during WWII), the museum has a collection of 53 World War II, Korean War, and Vietnam Era aircraft. The indoor museum contains many additional Air Force and Army Air Corps artifacts and a B-52 simulator.

The Federal Bureau of Prisons in Atwater is one of the larger employers in the city with over 100 employees and approximately 1,600 prisoners. Although this plan recognizes the critical assets of this facility and its role in the county's economy, as federally owned property, the prison develops its separate emergency management plans.

Cultural, Historical and Natural Resources

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

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

Historic and Cultural Resources

Historical resources are buildings, structures, objects, places, and areas that are eligible for listing in the National Register of Historic Places (NRHP), the California Register of Historic Resources, or the County's List of Historic Resources, have an association with important persons, events in history, or cultural heritage, or have distinctive design or construction method.

For purpose of federal actions, a qualified historic resource is defined as a property listed in or formally determined eligible for listing in the NRHP before a disaster occurs. The NRHP is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. Properties listed include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the U.S. Department of the Interior National Park Service. Local and state

agencies may consider a broader definition of qualified historic properties in the review, evaluation, and treatment of properties damaged during a disaster.

The State of California Office of Historic Preservation can provide technical rehabilitation and preservation services for historic properties affected by a natural disaster. Depending on the hazard, protection could range from emergency preparedness, developing a fire safe zone around sites susceptible to wildfires, or seismically strengthening or structurally reinforcing structures.

State and local registers of historic resources provide designated Historical Landmarks, Points of Historical Interest, and Historic Buildings. These resources include, but are not limited to:

- The California Register of Historical Resources
- The California Historical Landmarks
- The California Inventory of Historical Resources
- The California Points of Historical Interest

Historical Resources designated on a federal, state or local level are listed in Table 4-8.

Table 4-8 Merced County Historical Resources

Property Name	Register	Jurisdiction	Date Listed
Bank of Italy	National	Merced	10/12/2004
Bank of Los Banos Building	National	Los Banos	8/24/1979
Bloss Mansion	National	Atwater	9/3/1981
Buhach Grammar School	National	Merced	4/7/1983
Canal Farm Inn	State Landmark	Los Banos	1/27/1956
Church of St. Joseph	National	Los Banos	7/8/2004
Cook, Maj. George Beecher, House	National	Merced	9/15/1983
G.B. Neighbors Home	Point of Interest	Snelling	6/2/1967
George S. Bloss Mansion	Point of Interest	Atwater	3/15/1974
Gwin Post Office, Paddy Bennett Place	Point of Interest	Le Grand	1/19/1972
Kaehler-Rector House	National	Merced	1/4/192
Lake Yosemite Water Tower	Point of Interest	Merced	1/19/1972
Leggett House	National	Merced	10/25/1979
Leggett, Thomas H. House	National	Merced	7/8/1982
Los Banos	State Landmark	Los Banos	3/1/1956
Los Banos Creek	Point of Interest	Los Banos	6/2/1967
Merced County Courthouse	Point of Interest/National	Merced	6/2/1967/ 10/29/1975
Merced County High School	National	Merced	5/31/1984
Merced County Justice Courthouse Building	Point of Interest	Gustine	8/25/1995
Merced Masonic Temple/Welch & Griffith	State	Merced	11/3/2000
Merced Theatre	National	Merced	5/1/2009
Pacheco Pass	State Landmark	Los Banos	5/29/1969
San Luis Gonzaga Archeological District	National	Los Banos	5/7/1973

Property Name	Register	Jurisdiction	Date Listed
Snelling Community Recreational Hall	Point of Interest	Snelling	6/2/1967
Snelling Courthouse	State Landmark	Snelling	11/15/1948
Temporary Detention Camps for Japanese Americans-Merced Assembly Center	State Landmark	Merced	5/13/1980
Tioga Hotel	National	Merced	10/3/1980
U.S. Post Office	National	Merced	2/10/1983

Source: California Office of Historic Preservation

Other historic sites of local importance also exist. These include several cemeteries and churches located in the larger cities and other rural areas in the county. The five additional sites designated as California Historical Landmarks include the Canal Farm Inn, Los Banos Park, Merced Assembly Center at Merced County Fairgrounds, Pacheco Pass at Romero Outlook, and Snelling Courthouse. Other notable sites include Applegate Park; one of Merced's central parks located along the Bear Creek Bikeway. The park is an excellent destination on bike or foot. It offers 32 acres of recreation with a zoo, outdoor theater, picnic tables, barbeque grills, volleyball nets, tennis/basketball courts, a skate park, rental facilities, a large playground, a rose garden and fountain, and the Kiwanas-sponsored Kiddieland amusement park. Applegate Park is located along Bear Creek and the Bear Creek bikeway, between M and R Streets. The southern edge of the park follows 25th Street, P Street, and 26th Street.

Lists of designated historical resources change periodically, and they may not include those currently in the nomination process and not yet listed. Additionally, as defined by the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

Cultural resources defined in California Environmental Quality Act Section 15064.5 as include prehistoric and historic archeological resources; historic-period resources (buildings, structures, area, place, or objects). Archeological resources reflect past human activity extending from Native American prehistoric cultures throughout the early 20th century. The artifacts left by previous occupants may be encountered in small to large residential sites, or special use areas.

Many cultural and historical resources in the County are vulnerable to several hazards due to location and the nature of their construction. Some of these risks include earthquakes, wildfires, coastal storms, or adverse weather.

Natural Resources

Natural resources are important to include in benefit/cost analyses for future projects and may be used to leverage additional funding for mitigation projects that also contribute to community goals for protecting sensitive natural resources. Inventory and awareness of natural resource assets is vital to meeting conservation objectives. For example, protecting wetland areas provides sensitive habitat protection as well as floodwater conveyance and storage, which further enhances public safety.

The Merced National Wildlife Refuge which encompasses 10,258 acres of wetlands, native grasslands, vernal pools, and riparian areas. It was established in 1951 under the Lea Act to attract wintering waterfowl away from adjacent farmland where foraging ducks and geese were causing extensive damage

to crops. Much of the Refuge is located in flood hazard areas and benefits the surrounding area by absorbing floodwaters and recharging aquifers.

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

Table 4-9 summarizes Merced County's special status animal species as indicated in the Fish and Wildlife Service database, within the Environmental Conservation Online System.

Table 4-9 Threatened and Endangered Species in Merced County

Group	Common Name	Scientific Name	Status
Amphibians	California tiger Salamander	<i>Ambystoma californiense</i>	Threatened
	California red-legged frog	<i>Rana draytonii</i>	Threatened
Birds	California condor	<i>Gymnogyps californianus</i>	Endangered
Crustaceans	Conservancy fairy shrimp	<i>Branchinecta conservatio</i>	Endangered
	Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	Threatened
	Vernal pool tadpole shrimp	<i>Lepidurus packardii</i>	Endangered
Fishes	Delta smelt	<i>Hypomesus transpacificus</i>	Threatened
Flowering Plants	Greene's tuctoria	<i>Tuctoria greenei</i>	Endangered
	Keck's Checker-mallow	<i>Sidalcea keckii</i>	Endangered
	Colusa grass	<i>Neostapfia colusana</i>	Threatened
	Hartweg's golden sunburst	<i>Pseudobahia bahiifolia</i>	Endangered
	Fleshy owl's-clover	<i>Castilleja campestris ssp. succulenta</i>	Threatened
	Hoover's spurge	<i>Chamaesyce hooveri</i>	Threatened
	Hairy Orcutt grass	<i>Orcuttia pilosa</i>	Endangered
	San Joaquin Orcutt grass	<i>Orcuttia inaequalis</i>	Threatened
Insects	Monarch Butterfly	<i>Danaus plexippus</i>	Candidate
	Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	Threatened
Mammals	Giant kangaroo rat	<i>Dipodomys ingens</i>	Endangered
	San Joaquin kit fox	<i>Vulpes macrotis mutica</i>	Endangered
	Fresno kangaroo rat	<i>Dipodomys nitratoideis exilis</i>	Endangered
Reptiles	Blunt-nosed leopard lizard	<i>Gambelia silus</i>	Endangered
	Giant garter snake	<i>Thamnophis qigas</i>	Threatened

Source: USFW – Environmental Conservation Online System

Growth and Development Trends

Population and Projected Growth

Merced County is the fastest growing county in the state, and the region as a whole is projected to grow significantly through 2060 (CA 4th CC Assessment). According to the Department of Finance (DOF) the 2020 population of Merced County as a whole was 283,521. DOF projects the total population will

increase by 86% to 329,635 by 2030. While total households in the County is also projected to increase from 89,454 in 2020 to 97,063, people per households is project to slightly decrease from 3.43 to 3.31 person per household.

All of the incorporated communities expect Dos Palos (slight decrease -0.1) experienced an increase or no change in population between 2019 and 2020. The City of Merced is listed by the California DOF as one of the top ten cities under 300,000 with the largest numeric change (+2,209) in population between 2019 and 2020 (88,120).

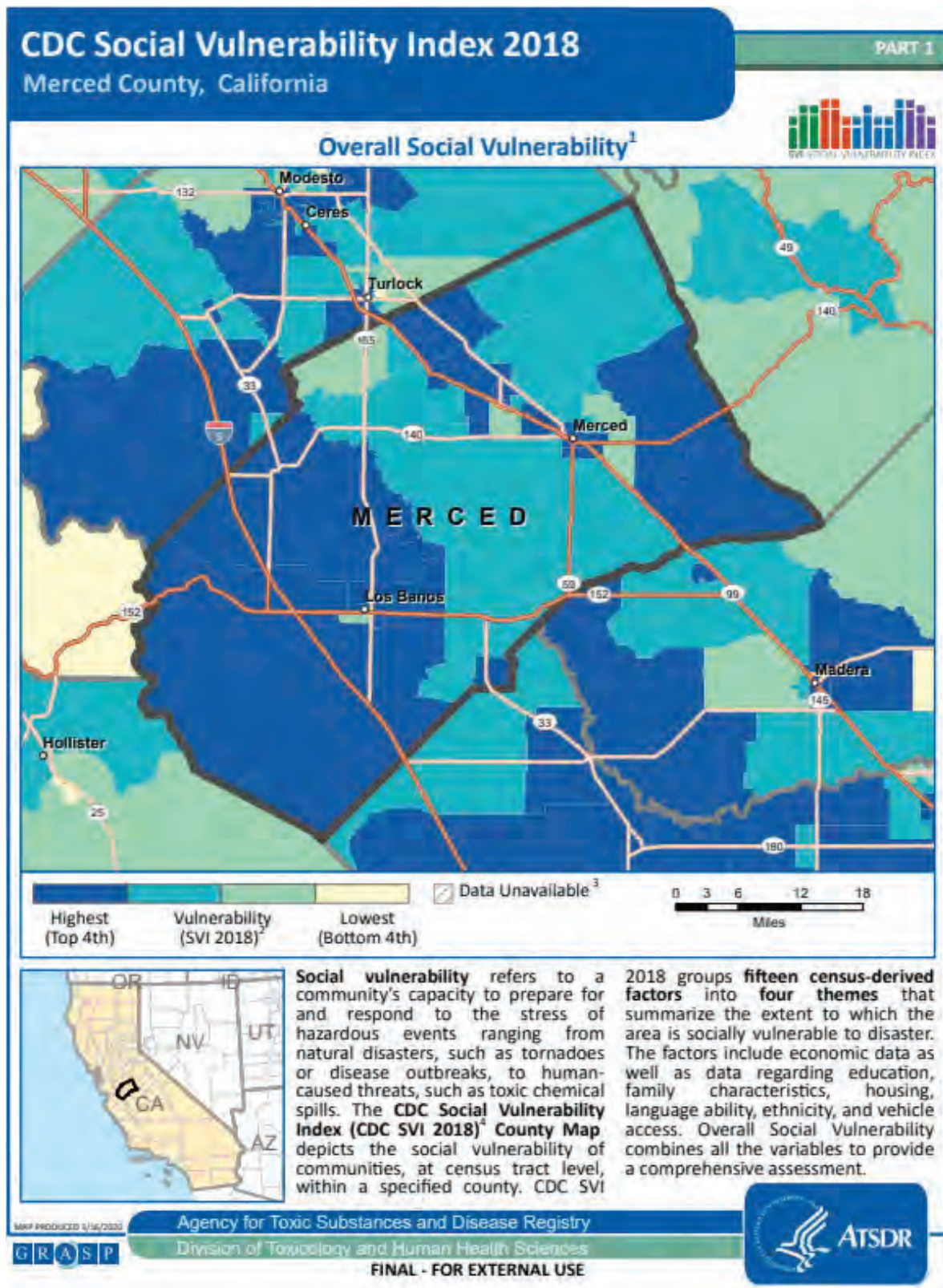
Increases in population growth also increase exposure to severe weather-related hazards, pandemic/epidemics as well as earthquakes. This increase in growth also puts more demand on water resources and can increase vulnerability to drought.

Social Vulnerability

Social vulnerability considerations were included in the update of this plan in 2021 to identify areas across the County that might be more vulnerable to hazard impacts based on a number of factors. A social vulnerability index (SoVI) was developed by the Center for Disease Control's (CDC) Agency for Toxic Substances and Disease Registry and their Geospatial Research, Analysis & Services Program teams, as a way to portray communities' capacities to prepare for and respond to natural and manmade disasters. The SoVI does so by providing insight into particularly vulnerable populations to in turn assist emergency response planners and even public health officials identify communities more likely to require additional support before, during, and after a hazardous event. The CDC's SoVI create county- and state level maps to show relative vulnerability and hence provide key socially and spatially relevant information on communities' populations, and these maps compare the SoVI based on Census Tracts. The overall social vulnerability based on the SoVI data is shown for Merced County by Census Tracts in Figure 4-5 below, based on statewide ranking. This overall index combines four main themes of vulnerability, namely: socioeconomic status; household composition and disability; minority status and language; and housing and transportation, which in turn are comprised of subcategories for a total of 15 variables accounting for various vulnerability factors. For additional information on the CDC's SoVI, refer to their documentation and materials online at <https://svi.cdc.gov/>.

Based on this data, the areas with the highest level of social vulnerability in the County are in the western and southeastern portion of the County, as well as some of the incorporated jurisdictions including Merced and Los Banos.

Figure 4-3 Overall Social Vulnerability in Merced County based on the SoVI, by Census Tracts



Development Trends

As noted, the County has experienced population growth in the last decade and since the last plan update. There has been an increase in housing unit development, primarily in the cities of Merced, Gustine, Livingston and the unincorporated county. This new development built to modern codes should be less vulnerable to severe weather and earthquakes. Development in flood hazard areas should be mitigated to withstand the 1% annual chance flood; however, development in the 0.2% flood hazard zone is not regulated at this time. Although most development in the City of Merced and around the UC Merced campus has occurred in downtown Merced and in areas outside the floodplain.

Refer to Table 4-10 for comparison of housing units from the 2010 census to the ACS 5-Year estimates for 2015-2019 in the incorporated and unincorporated areas of Merced County. This comparison provides additional information on changes in development trends since the 2015 MJHMP was approved, for both the municipalities and the Census Designated Places (CDP) in the unincorporated areas.

Table 4-10 Housing Unit Development, 2010-2019

Jurisdiction	2010	2019	% Change
Merced County	83,698	85,251	2%
City of Atwater	9,771	9,577	-2%
Ballico CDP	132	182	38%
Bear Creek CDP	90	61	-32%
Cressey CDP	123	113	-8%
Delhi CDP	2,854	3,030	6%
City of Dos Palos	1,700	1,545	-9%
Dos Palos Y CDP	123	94	-24%
El Nido CDP	105	97	-8%
Franklin CDP	1,907	1,976	4%
City of Gustine	2,087	2,249	8%
Hilmar-Irwin CDP	1,841	2,001	9%
Le Grand CDP	503	554	10%
City of Livingston	3,320	3,699	11%
City of Los Banos	11,375	11,293	-1%
McSwain CDP	1,409	1,590	13%
City of Merced	27,446	26,873	-2%
Planada CDP	1,207	1,338	11%
Santa Nella CDP	493	614	25%
Snelling CDP	112	69	-38%
South Dos Palos CDP	488	629	29%
Stevinson CDP	101	154	52%
Tuttle CDP	39	48	23%
University of California Merced CDP	0	0	0%
Volta CDP	106	69	-35%
Winton CDP	3,056	3,305	8%

Source: California Dept. of Finance

The areas located in the Sphere of Influence (SOI) for each incorporated jurisdiction are areas each City plans to grow into and potentially slated for future development. Understanding the potential hazard exposure in each area can help to mitigate the impacts of events before development occurs in those areas. During this plan update process parcel analysis was conducted using the SOI areas for each incorporated jurisdiction and overlaid with available hazard risk layers to determine where future development may be at risk of natural hazard events. The results of the analysis have been integrated into

the applicable hazard sections: dam, flood, wildfire and landslide. Table 4-10 is the summary of the SOI total exposure by jurisdiction.

Table 4-11 Total Exposure Summary by Jurisdiction Sphere of Influence Areas

Jurisdiction	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value
Atwater	675	837	\$150,375,296	\$124,680,732	\$275,056,028
Dos Palos	545	688	\$53,185,264	\$32,248,327	\$85,433,591
Gustine	97	126	\$17,005,380	\$15,800,283	\$32,805,663
Livingston	60	85	\$13,899,670	\$12,073,468	\$25,973,138
Los Banos	194	253	\$28,473,256	\$23,323,506	\$51,796,762
Merced	2,528	2,896	\$554,502,737	\$328,069,420	\$882,572,157
Total	4,099	4,885	\$817,441,603	\$536,195,735	\$1,353,637,338

- City of Dos Palos - Received approval for a grant that will fund the construction of a new Water Treatment facility. Once the new facility is completed and operational, development can begin on new residential and commercial projects.
- City of Merced - City Council voted in February of 2021 to move forward the annexation of UC Merced. This would allow for additional annexations to potentially occur and would include up to 7,800 acres of land. Currently, much of this land is rolling grass land or grazing land. Much of this property will likely be developed into commercial, retail and high-density housing to support the demands of UC Merced.
- Merced County – The HMPT noted the growth and development trends associated with UC Merced, high-speed rail and related transit-oriented growth and growth at Castle Air Force Base associated with autonomous vehicle testing.

4.2 Hazard Analysis and Risk Summary

Requirement §201.6(c)(2)(i):

[The risk assessment shall include a] description of the type, location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

4.2.1 Dam Incidents

Hazard/Problem Description

Dams are manmade structures built for a variety of uses, including flood protection, power generation, agriculture, water supply, and recreation. When dams are constructed for flood protection, they usually are engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If prolonged periods of rainfall and flooding occur that exceed the design requirements, that structure may be overtopped and fail. Overtopping is the primary cause of earthen dam failure in the United States. Dam failures can also result from any one or a combination of the following causes:

- Earthquake
- Inadequate spillway capacity resulting in excess overtopping flows
- Internal erosion caused by embankment or foundation leakage or piping or rodent activity
- Improper design
- Improper maintenance

- Negligent operation
- Failure of upstream dams on the same waterway

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result as well as potentially catastrophic effects to roads, bridges, and homes. Associated water quality and health concerns could also be issues. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

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

According to the California Department of Water Resources' Jurisdictional Dams and the National Inventory of Dams (NID) databases there are 44 dams of concern to Merced County; ten of which are in the County and 34 upstream of the County. Table 4-11 lists the high and significant hazard dams within and upstream of Merced County.

Figure 4-4 shows where the high and significant hazard dams are located, and the potential inundation areas based on the best available data at the time of this plan update. 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 area in the County is free from flooding in the event of dam failure. Potential impacts are greatest for Merced, Livingston and the central areas of the unincorporated Merced County.

Table 4-12 Dams of Concern Within and Upstream of Merced County

County	Dam Name	River	Downstream City	Normal Storage Capacity (Acre Feet)	Emergency Action Plan (EAP)?	NID Hazard Rating	CA DSOD Hazard Rating*
Merced	Lake Yosemite	Merced		10,323	No	High	Extremely High
	Castle	Canal Creek		7,510	No	High	Extremely High
	Merced Falls	Merced	Snelling	603	Yes	High	Low
	Burns	Burns Creek	Planada	6,800	Yes	High	-
	Los Banos Creek Detention	Los Banos Creek	Los Banos	34,500	Yes	High	-

County	Dam Name	River	Downstream City	Normal Storage Capacity (Acre Feet)	Emergency Action Plan (EAP)?	NID Hazard Rating	CA DSOD Hazard Rating*
	O'Neill Forebay	San Luis Creek	Volta	56,430	Yes	High	-
	B.F. Sisk Dike	San Luis Creek		-	Yes	High	-
	B.F. Sisk	San Luis Creek		2,094,900	Yes	High	-
	Mustang Creek	Mustang Creek		700	No	Significant	Significant
	Kelsey	S. Fork Dry		1,000	No	Significant	Significant
Fresno	Alluvial Drain Detention	Big Dry Creek		833	No	High	
	Big Dry Creek	Big Dry Creek & Dog Creek		30,200	No	High	
	Fancher Creek	Fancher Creek and Hog Creek		9,600	No	High	
	Fancher Creek Detention	Fancher Creek		1,891	No	High	
	Friant Dike 3			520,500	Yes	High	
	Friant Millerton Road Embankment A	San Joaquin River	Fresno	520,500	Yes	High	
	Griffen Reservoir	Holland Creek		900	Yes	High	
	Little Panoche Detention	Little Panoche Creek	Oro Loma	5,580	Yes	High	
	Pine Flat Dam	Kings	Sanger	1,000,000	Yes	High	
	Redbank	Redbank Creek		1,100	No	High	
	Redbank Creek Detention Basin	Redbank Creek		940	No	High	
Madera	Buchanan Dam	Chowchilla River	Chowchilla	105,000	Yes	High	
	Friant	San Joaquin River	Fresno	520,500	Yes	High	
	Hidden Dam	Fresno River	Madera	90,000	Yes	High	
	Madera Lake	Fresno River		2,300	No	High	
	Berenda Slough	Berenda Slough		2,450	No	Significant	
	Black Hawk	Coarse Gold Cr		740	No	Significant	
	Mendota Diversion	San Joaquin River		3,000	No	Significant	
	Oakhurst Wastewater Treatment	Tr Fresno River		110	No	Significant	

County	Dam Name	River	Downstream City	Normal Storage Capacity (Acre Feet)	Emergency Action Plan (EAP)?	NID Hazard Rating	CA DSOD Hazard Rating*
	Spring	Longhollow Creek		152	Yes	Significant	
	Upper Wilcox	Unnamed Tributary to Picayunne Creek		200	No	Significant	
Mariposa	Bear Dam	Bear Creek	Planada	7,700	Yes	High	
	Exchequer Dike	Merced River	Snelling	1,024,600	Yes	High	
	Exchequer Main	Merced River	Snelling	1,024,600	Yes	High	
	Mariposa Dam	Mariposa Creek	Le Grand	15,000	Yes	High	
	Mcswain	Merced River	Snelling	8,255	Yes	High	
	Owens Dam	Owens Creek	Planada	3,600	Yes	High	
	Stockton Creek	Stockton Creek		368	No	High	
Stanislaus	Turlock Lake	Tuolumne River		63,406	Yes	High	
Tuolumne	Don Pedro Dike B	Tuolumne River	La Grange	2,030,000	Yes	High	
	Don Pedro Main	Tuolumne River	La Grange	2,030,000	Yes	High	
	Gasburg Creek Dike	Tuolumne River	La Grange	1	Yes	High	
	Don Pedro Dike A	Tuolumne River	La Grange	2,030,000	Yes	Significant	
	Don Pedro Dike C	Tuolumne River	La Grange	2,030,000	Yes	Significant	

Source: California Department of Water Resources Division of Safety of Dams (DSOD) and the NID

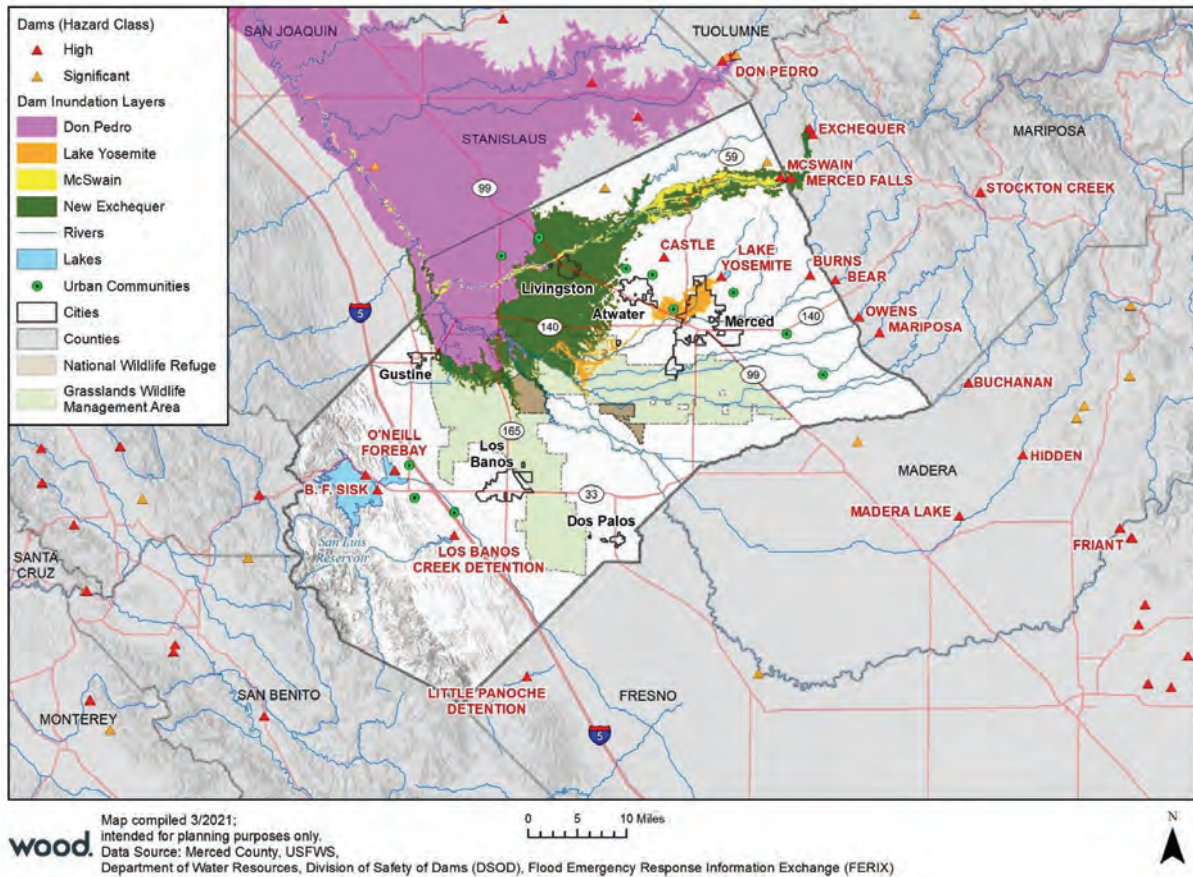
* DSOD added a fourth category ("Extremely High") to the NID categories for downstream hazard potential. Extremely High is defined as expected to cause considerable loss of human life or would result in an inundation area with a population of 1,000 or more.

Analysis using inundation data and mapping associated with the O'Neil Forebay, Los Banos, and San Luis dams was not possible for the plan due to information being considered sensitive and restricted, per communication with OES and the dam owners. The following is a summary of the downstream communities that would be affected by each dam in a dam failure or incident based on information in dam emergency action plans, including depth of inundation and time to inundation.

- O'Neil Forebay Dam
 - Santa Nella: 4-10 feet within 5 hours of failure
 - Ingoma: 0-2 feet within 10 hours
 - Volta: 2-4 feet within 5 hours
- Los Banos Dam
 - Los Banos: 5-6 feet within 2.5 hours
 - Volta: 5-6 feet within 2.5 hours
 - Trent: 5-6 feet within 2.5 hours

- San Luis Dam
 - Santa Nella: 10-20 ft within 2 hours
 - Volta: 10-20 ft in less than 10 hours
 - Ingomar: 10-20 ft in less than 10 hours
 - Trent: 2-4 ft in 5 hours
 - Gustine: 2-10 ft in less than 10 hours
 - Stevenson: 2-10 in 15 hours

Figure 4-4 Dams of Concern to Merced County and Best Available Inundation Mapping



Extent (Magnitude/Severity)

Standard practice among federal and state dam safety offices is to classify a dam according to the potential impact a dam failure (breach) or mis-operation (unscheduled release) would have on downstream areas. The hazard potential classification system categorizes dams based on the probable loss of human life and the impacts on economic, environmental and lifeline facilities. The US Army Corp of Engineers uses three categories to classify dams' potential hazard to life and property:

- High hazard indicates that a failure would most probably result in the loss of life;
- Significant hazard indicates that a failure could result in appreciable property damage;
- Low hazard indicates that failure would result in only minimal property damage and loss of life is unlikely.
- Undetermined hazard dams have not been rated or their hazard rating is not known

In addition to these, high, significant, and low hazard classifications the California Division of Dam Safety (DSOD) adds the fourth category of "Extremely High". The DSOD defines this fourth category as "expected to cause considerable loss of human life or would result in an inundation area with a population of 1,000 or more" (DSOD 2020). As shown in Table 4-11 two dams in Merced County, Lake Yosemite and Castle dams are classified as "Extremely High".

In 2017 the State of California established the Spillway Re-evaluation Program after the Orville Dam incident, to assess spillways to confirm they meet minimum safety standards. The Don Pedro dam located in Tuolumne County was listed as being part of this program and poses a risk to central portions of Merced County.

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 in Merced County. The extent of impacts depends on the nature of failure and location of the dam. The largest populations potentially at risk would be in Merced, Livingston, and Atwater. The central portions of the unincorporated areas county would also be impacted were a dam to fail and flood downstream.

Past Occurrences

There is no history of dam failure affecting the county, but according to the HMPT there have been recurring issues with flooding due to high flows released below dams in the area.

Probability of Future Occurrences

Occasional—The County remains at risk to dam failures from numerous dams under a variety of ownership and control and of varying ages and conditions. However, based on historical experience dam failure is unlikely in the area. Nevertheless, given the number of dams of concern in the County the potential exists for future dam failures in Merced County, but the likelihood of this is low. Uncontrolled or controlled release flooding as well as spillway flooding below dams due to excessive rain or runoff are more likely to occur than failures.

Climate Change Considerations

The potential for climate change to affect the likelihood of dam failure is not fully understood at this point in time. With a potential for more extreme precipitation events a result of climate change, this could result in large inflows to reservoirs. However, this could be offset by generally lower reservoir levels if storage

water resources become more limited or stretched in the future due to climate change, drought and/or population growth.

Vulnerability Assessment

A dam incident can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to dam failures is confined to the areas and populations subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the dam itself and associated revenues that accompany those functions.

General Property

In general, communities located below a high or significant hazard dam and along a waterway are potentially exposed to the impacts of a dam failure. Inundation maps that identify anticipated flooded areas (which may not coincide with known floodplains) are typically produced for all high hazard dams and included in the Emergency Action Plan (EAP) required for each dam. A GIS layer that contained inundation maps for four of the 34 high hazard dams that affect the County was analyzed to quantify risk across the planning area. Table 4-13 through Table 4-16 summarize the estimated building exposure (more details on the parcel analysis methodology under the Asset Summary section). Table 4-12 summarizes the results of the GIS analysis, and includes a population estimate based on the number of residential parcels exposed, multiplied by an average household size estimate from the census. Exposure estimates from failure of other high hazard dams were not possible due to data restrictions and/or limitations.

Table 4-13 Summary of Dam Inundation by Dam and Jurisdiction

Dam	Jurisdiction	Improved Parcel Count	Building Count	Population
Don Pedro Dam	Livingston	1	1	-
	Unincorporated	3,888	4,909	8,353
	Total	3,889	4,910	8,353
McSwain Dam	Livingston	1	1	-
	Unincorporated	160	180	309
	Total	161	181	309
New Exchequer Dam	Atwater	37	37	-
	Livingston	3,340	4,001	14,216
	Unincorporated	8,869	11,138	19,505
	Total	12,246	15,176	33,721
Yosemite Dam	Atwater	21	23	67
	Merced	4,768	6,080	18,784
	Unincorporated	1,024	1,359	3,214
	Total	5,813	7,462	22,065
Grand Total		22,109	27,729	64,447

Source: California DSOS, NID, Merced County Assessor's Office

Table 4-14 Don Pedro Dam Inundation

Jurisdiction	Property Type	Improved Parcel Count	Building Count
Livingston	Agricultural	1	1
	Total	1	1
Unincorporated	Agricultural	1,352	1,968
	Commercial	97	333

Jurisdiction	Property Type	Improved Parcel Count	Building Count
	Exempt	40	56
	Industrial	15	19
	Mixed Use	2	2
	Residential	2,365	2,514
	Vacant Land	17	17
	Total	3,888	4,909
Grand Total		3,889	4,910

Source: California DSOS, NID, Merced County Assessor's Office

Table 4-15 McSwain Dam Inundation

Jurisdiction	Property Type	Improved Parcel Count	Building Count
Livingston	Agricultural	1	1
	Total	1	1
Unincorporated	Agricultural	48	59
	Commercial	13	18
	Exempt	7	8
	Industrial	1	1
	Residential	90	93
	Vacant Land	1	1
	Total	160	180
Grand Total		161	181

Source: California DSOS, NID, Merced County Assessor's Office

Table 4-16 New Exchequer Dam Inundation

Jurisdiction	Property Type	Improved Parcel Count	Building Count
Atwater	Residential	37	37
	Total	37	37
Livingston	Agricultural	8	9
	Commercial	79	231
	Exempt	48	113
	Industrial	19	33
	Mixed Use	3	4
	Residential	3,176	3,604
	Vacant Land	7	7
	Total	3,340	4,001
Unincorporated	Agricultural	3,183	4,415
	Commercial	223	603
	Exempt	101	144
	Industrial	41	64
	Mixed Use	12	15
	Residential	5,273	5,860
	Vacant Land	36	37
	Total	8,869	11,138
Grand Total		12,246	15,176

Source: California DSOS, NID, Merced County Assessor's Office

Table 4-17 Lake Yosemite Dam Inundation

Jurisdiction	Property Type	Improved Parcel Count	Building Count
Atwater	Commercial	1	2
	Residential	20	21
	Total	21	23
Merced	Agricultural	5	5
	Commercial	24	30
	Exempt	110	134
	Industrial	22	38
	Mixed Use	1	1
	Residential	4,603	5,869
	Vacant Land	3	3
	Total	4,768	6,080
Unincorporated	Agricultural	36	46
	Commercial	34	305
	Exempt	10	12
	Industrial	18	22
	Mixed Use	3	3
	Residential	917	965
	Vacant Land	6	6
	Total	1,024	1,359
Grand Total		5,813	7,462

Source: California DSOS, NID, Merced County Assessor's Office

People

Persons located underneath or downstream of a dam are at risk of a dam failure, though the level of risk can be tempered by topography (specifically where populations are located within the inundation path of a dam), amount of water in the reservoir and time of day of the breach. Injuries and fatalities can occur from debris, bodily injury and drowning. Once a dam has breached, standing water presents all the same hazards to people as floodwater from other sources. People in the inundation area may need to be evacuated, cared for, and possibly permanently relocated. Impacts could include thousands of evacuations and likely hundreds of casualties, depending on the dam involved. Specific population impacts are noted in Table 4-12, and total people at risk were calculated by multiplying the average number of persons per household in Merced County (3.32) and each applicable incorporated jurisdiction (Atwater 3.18, Livingston 3.94, and Merced 3.20) times the number of residential parcels where dam inundation occurs. Based on the best available data accessible to the planning team at this time of this analysis, an incident at the New Exchequer Dam would potentially put the most people at risk (33,721), followed by Lake Yosemite dam (22,064) and Don Pedro dam (8,353). The unincorporated areas of Merced County have the most people (31,381) potentially exposed to a dam inundation event followed by City of Merced with potentially 18,784 exposed to the Lake Yosemite dam inundation. Population impacts from other high hazard dams were not possible due to data restrictions and/or limitations.

Critical Facilities

A total dam failure can cause catastrophic impacts to areas downstream of the water body, including critical infrastructure. Any critical asset located under the dam in an inundation area would be susceptible to the impacts of a dam failure. Of particular risk would be roads and bridges that could be vulnerable to washouts, further complicating response and recovery by cutting off impacted areas. Based on the critical facility inventory considered in the updating of this plan and intersected with the dam inundation extents

available, 272 critical facilities were found to be at risk. Unincorporated County has the greatest number of facilities at risk followed by City of Merced and City of Livingston. These at risk facilities are listed in the tables below by jurisdiction and critical facility classification as based on the FEMA Lifeline categories.

Table 4-18 Dam Inundation Effects on Critical Facilities – Estimates by Jurisdiction and FEMA Lifeline

Jurisdiction	Communications	Energy	Food, Water, Shelter	Hazardous Material	Health and Medical	Safety and Security	Transportation	Total
Atwater	-	-	-	-	-	-	1	1
Dos Palos	-	-	-	-	-	-	-	0
Gustine	-	-	-	-	-	-	-	0
Livingston	6	1	3	3	-	13	5	31
Los Banos	-	-	-	-	-	-	-	0
Merced	4	2	6	3	3	4	13	35
Unincorporated	21	8	16	8	-	64	88	205
Total	31	11	25	14	3	81	107	272

Source: HFILD, Merced County, Cities of Atwater, Dos Palos, Gustine, Livingston, Los Banos, Merced

As noted under the Geographic Area section, inundation data is not available for the O'Neil Forebay, Los Banos or San Luis Dams due to being restricted and sensitive information. The following is a summary of the potential impacts on critical facilities from a dam failure or inundation event.

- O'Neil Forebay Dam
 - Potential Impacts to Transportation infrastructure:
 - o Interstate 5
 - o Highway 33
 - o Highway 140
 - Potential Impacts to Water Systems infrastructure:
 - o Delta Mendota
 - o The California Aqueduct
- Los Banos Dam
 - Potential impacts to Transportation infrastructure:
 - o Interstate 5
 - o Highway 152
 - o Highway 165
 - Potential impacts to Water Systems infrastructure:
 - o Delta Mendota
 - o The California Aqueduct
- San Luis Dam
 - Potential impacts to Transportation infrastructure:
 - o Interstate 5
 - o Highway 152

- o Interstate 165
- o Highway 33
- o Highway 140
- Potential impacts to Water Systems infrastructure:
 - o Delta Mendota
 - o The California Aqueduct
- Potential impacts to Power/Energy infrastructure:
 - o PG&E substations
 - o Solar fields

Economy

Extensive and long-lasting economic impacts could result from a major dam failure including the long-term loss of water in a reservoir after a failure event. Based on the analysis there is 6,504 buildings, at a minimum, that are designated as agricultural properties potentially exposed to dam inundation event. A major dam incident and loss of water from the associated reservoir could include direct business and specifically impacts to the agricultural industry, resulting in damages and indirect disruption of the local economy.

Historic, Cultural and Natural Resources

Dam failure effects on the environment would be similar to those caused by flooding from other causes. Water could erode stream channels and topsoil and cover the environment with debris. For the most part the environment is resilient and would be able to rebound from whatever damages occurred, though this process could take years. However, historic and cultural resources could be affected just as housing or critical infrastructures would, were a dam to fail and cause downstream inundation that could further erode surfaces or cause scouring of structural foundations.

Future Development

GIS was used to analyze parcels exposed to dam inundation areas that are located within each city's SOI. The results shown in Table 4-18 show that there is a total of 6,917 buildings and 18,247 currently exposed to dam inundation within the SOI areas.

Table 4-19 Total Dam Inundation Summary by Dam within Sphere of Influence Areas

Dam Inundation	Sphere of Influence	Improved Parcel Count	Building Count	Population
Don Pedro Dam	Delhi	55	55	183
	Hilmar	1,450	1,778	4,731
	Livingston	1	3	0
	Total	1,506	1,836	4,914
McSwain Dam	Cressey	1	1	3
	Livingston	1	1	0
	Snelling	104	111	286
	Total	106	113	289
New Exchequer Dam	Atwater	10	12	7
	Ballico	59	65	166
	Cressey	78	92	262
	Delhi	1,021	1,319	3,788
	Hilmar	1,450	1,778	4,731
	Livingston	59	83	149
	Snelling	145	170	412

Dam Inundation	Sphere of Influence	Improved Parcel Count	Building Count	Population
	Stevinson	53	65	149
	Winton	98	113	375
	Total	2,973	3,697	10,040
Yosemite Dam	Atwater	42	44	120
	Franklin	774	1,080	2,520
	Merced	128	147	365
	Total	944	1,271	3,005
Grand Total		5,529	6,917	18,247

Source: California DSOS, NID, Merced County Assessor's Office

The areas located in the SOI for each incorporated jurisdiction are areas each City plans to grow into and potentially slated for future development. In addition to the SOI areas there are also 71 vacant parcels countywide that are within dam inundation areas. These areas should take into consideration potential impacts from dam failure risk upstream and should attempt to overlay the existing dam inundation maps with proposed future development. In the case of a dam failure, inundation would likely follow some existing FEMA mapped floodplains, which contains development restrictions for areas in the 1% annual chance floodplain, but it could exceed those floodplains and affect areas that are not regulated for flood hazards. Also, of note is that development below a low or undetermined hazard dam could increase its hazard rating, though there is only one low hazard and one undetermined hazard dam in the County (while the majority are high or significant hazard dams). Finally, added development could compromise dams and reservoir resources if populations depend on them for critical needs such as potable water during or after a dam failure event.

Risk Summary

- There are 44 dams of concern for Merced County. 10 are within the county (8 High Hazard Potential and two Significant) and 34 dams are upstream of the county (26 High Hazard and eight Significant).
- Of the eight high hazard potential rated dams in the County, 2 (Castle and Yosemite dams) are rated as "Extremely High" by the State of California DSOD.
- Countywide there are a minimum of 27,729 parcels at risk based on limited available inundation mapping, with greatest number of buildings exposed in unincorporated areas (17,586) followed by the City of Merced (6,080), City of Livingston (4,003) and City of Atwater (60).
- Residential property types make up the most buildings (18,963) at risk of flooding from dam failures, agricultural (6,504), and commercial (1,522).
- Based on limited available mapping, the New Exchequer Dam puts the most parcels at risk of dam inundation (33,721) countywide (most in Unincorporated and Livingston), followed by the Yosemite dam (22,065).
- An estimated 64,447 people countywide might be displaced from their homes based the location of their residences along the inundation areas; actual amounts would vary.
- A total of 272 critical facilities are within dam inundation areas. The greatest number in unincorporated Merced County (205) and Transportation lifeline is most at risk countywide.
- **Related Hazards:** drought, flooding, earthquake/liquefaction, landslide, and severe weather.

Table 4-20 Hazard Risk Summary by Jurisdiction - Dam Incidents

Jurisdiction	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Significant	Occasional	Catastrophic	Medium
City of Atwater	Extensive	Occasional	Limited	Medium
City of Dos Palos	Limited	Occasional	Limited	Medium
City of Gustine	Extensive	Occasional	Limited	Low
City of Livingston	Limited	Occasional	Limited	Medium
City of Los Banos	Extensive	Occasional	Catastrophic	Medium
City of Merced	Extensive	Occasional	Catastrophic	High

4.2.2 Drought

Hazard/Problem Description

Drought is a gradual phenomenon. Normally, one dry year does not constitute a drought in California, but rather serves as a reminder of the need to plan for droughts. California's extensive system of water supply infrastructure (reservoirs, groundwater basins, and interregional conveyance facilities) generally mitigates the effects of short-term dry periods for most water users.

Drought can have secondary impacts. For example, drought is a major determinant of wildfire hazard, in that it creates greater propensity for fire starts and larger, more prolonged conflagrations fueled by excessively dry vegetation, along with reduced water supply for firefighting purposes. Drought is also an economic hazard. Significant economic impacts on California's agriculture industry can occur as a result of short- and long-term drought conditions; these include hardships to farmers, farm workers, packers, and shippers of agricultural products. In some cases, droughts can also cause significant increases in food prices to the consumer due to shortages.

Drought is a complex issue involving many factors—it occurs when a normal amount of moisture is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects:

- **Meteorological** drought is defined by a period of substantially diminished precipitation duration and/or intensity. The commonly used definition of meteorological drought is an interval of time, generally on the order of months or years, during which the actual moisture supply at a given place consistently falls below the climatically appropriate moisture supply.
- **Agricultural** drought occurs when there is inadequate soil moisture to meet the needs of a particular crop at a particular time. Agricultural drought usually occurs after or during meteorological drought, but before hydrological drought and can affect livestock and other dry-land agricultural operations.
- **Hydrological** drought refers to deficiencies in surface and subsurface water supplies. It is measured as stream flow, snowpack, and as lake, reservoir, and groundwater levels. There is usually a delay between lack of rain or snow and less measurable water in streams, lakes, and reservoirs. Therefore, hydrological measurements tend to lag other drought indicators.
- **Socioeconomic** drought occurs when physical water shortages start to affect the health, well-being, and quality of life of the people, or when the drought starts to affect the supply and demand of an economic product.

The California Department of Water Resources (DWR) says the following about drought:

"One dry year does not normally constitute a drought in California. California's extensive system of water supply infrastructure—its reservoirs, groundwater basins, and interregional conveyance facilities—mitigates the effect of short-term dry periods for most water users. Defining when a drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users having a different water supply. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, or expected supply from a water wholesaler to define their water supply conditions."

The drought issue in California is further compounded by water rights. Water is a commodity possessed under a variety of legal doctrines. The prioritization of water rights between farming and federally protected fish habitats in California is part of this issue.

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. The most significant impacts associated with drought in the planning area are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and

wildlife preservation. Also, during a drought, allocations go down, which results in reduced water availability. Voluntary water conservation measures are typically implemented during extended droughts. A reduction of electric power generation and water quality deterioration are also potential problems that can occur as a result of drought conditions. The reduced demand for electrical power generation is commonly linked to higher electricity costs due to the loss of hydropower supplies. Water quality deterioration is due to lower levels of precipitation and limited water storage supply. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding.

Geographic Area

Drought is a regional hazard, and at its worst can affect the entire state of California with varying levels of dryness and drought activity (as will be covered in more detail under the sections to follow). It is safe to assume that unless the drought event is at its very beginning or very end, if any area of the Merced County is affected by any level of drought, the other areas of the county are experiencing varying effects as well.

Sustainable Groundwater Management Act (SGMA) of 2014

In January 2014, Governor Brown declared an emergency proclamation due to multiple years of drought. The proclamation called on citizens to reduce water use by 20 percent; with a subsequent executive order in April 2015 that directed urban water agencies to reduce water use by 25 percent (Ken Topping, 2016). In September 2014, the Governor signed a three-bill package (California Senate Bills 1168 and 1319, and Assembly Bill 1739), known as the SGMA. The SGMA provides for the establishment of local GSAs to manage groundwater sustainability within the groundwater subbasins defined by the California DWR. Within Merced County there are portions of four groundwater subbasins, Merced, Turlock, Delta Mendota, and Chowchilla, that are required under SGMA to conduct sustainable groundwater planning and management. Each of the four subbasins are required to develop and implement a GSP by 2020 or 2022. As of April 2021, all four subbasins have formed 14 GSAs as shown in Table 4-20.

Table 4-21 Groundwater Sustainability Agencies in Merced County

Subbasin	Groundwater Sustainability Agency (GSA)
Merced	Merced-Irrigation-Urban GSA
	Merced Subbasin GSA
	Turner Island Water District GSA #1
Turlock	West Turlock GSA
	East Turlock GSA
Delta Mendota	City of Dos Palos GSA
	City of Gustine GSA
	City of Los Banos GSA
	Central Delta Mendota GSA
	Turner Island Delta Mendota GSA
	Northwestern Delta Mendota GSA
	Grassland Water District GSA
	San Joaquin River Exchange Contractors GSA
Chowchilla	Chowchilla Water District GSA
	County of Merced Chowchilla GSA

Source: Merced County Water Resources <https://www.co.merced.ca.us/3140/Sustainable-Groundwater---SGMA>

Extent (Magnitude/Severity)

The magnitude of a drought's impact is directly related to the severity and length. The severity of a drought depends on water availability and moisture deficiency, the time period, and the size and location of the affected area. The longer the drought persists and the larger the area impacted, the more severe the potential impacts. Droughts can be a short-term event over several months or a long-term event that lasts for years or even decades. In Merced County, the onset of drought is often signaled by a lack of significant winter precipitation and snowfall (moisture deficiency) in the Sierra Nevada Mountains. Droughts typically do not result in direct impacts on people or property, but they can have significant impacts on agriculture, which can indirectly impact people and property. Hot and dry conditions that persist into spring, summer, and fall can aggravate drought conditions, making the effects of drought more pronounced as water demands increase during the growing season and summer months. Impacts increase with the length of a drought, as carry over supplies in reservoirs are depleted and water levels in groundwater basins decline (California DWR 2012).

The U.S. Drought Monitor is an accepted and widely used site for obtaining and summarizing drought information, as it integrates data from several other sources including the Palmer Drought Index, Soil Moisture Models, U.S. Geological Survey Weekly Stream Flows, Standardized Precipitation Index, and the Satellite Vegetation Health Index. It includes drought intensity categories for measuring dry conditions across counties, states, and regions of the U.S., so that drought can be quantified. These categories range from "abnormally dry" to "exceptional drought." The following figures provide "snapshots in time" of the drought conditions in California as of August 2015 (during the period of the last multi-year drought in Merced County and the state, from 2012- 2017) and March 30, 2021. The snapshots selected are instrumental in depicting both the historic and potential change in drought's geographic range and severity in the County (circled in blue).

Note: The Drought Monitor maps integrate data from several sources including the Palmer Drought Index, Soil Moisture Models, U.S. Geological Survey Weekly Stream flows, Standardized Precipitation Index, and Satellite Vegetation Health Index. The drought status in California is noted on the following graphic from the National Drought Mitigation Center.

Figure 4-5 U.S. Drought Monitor for California: August 4, 2015

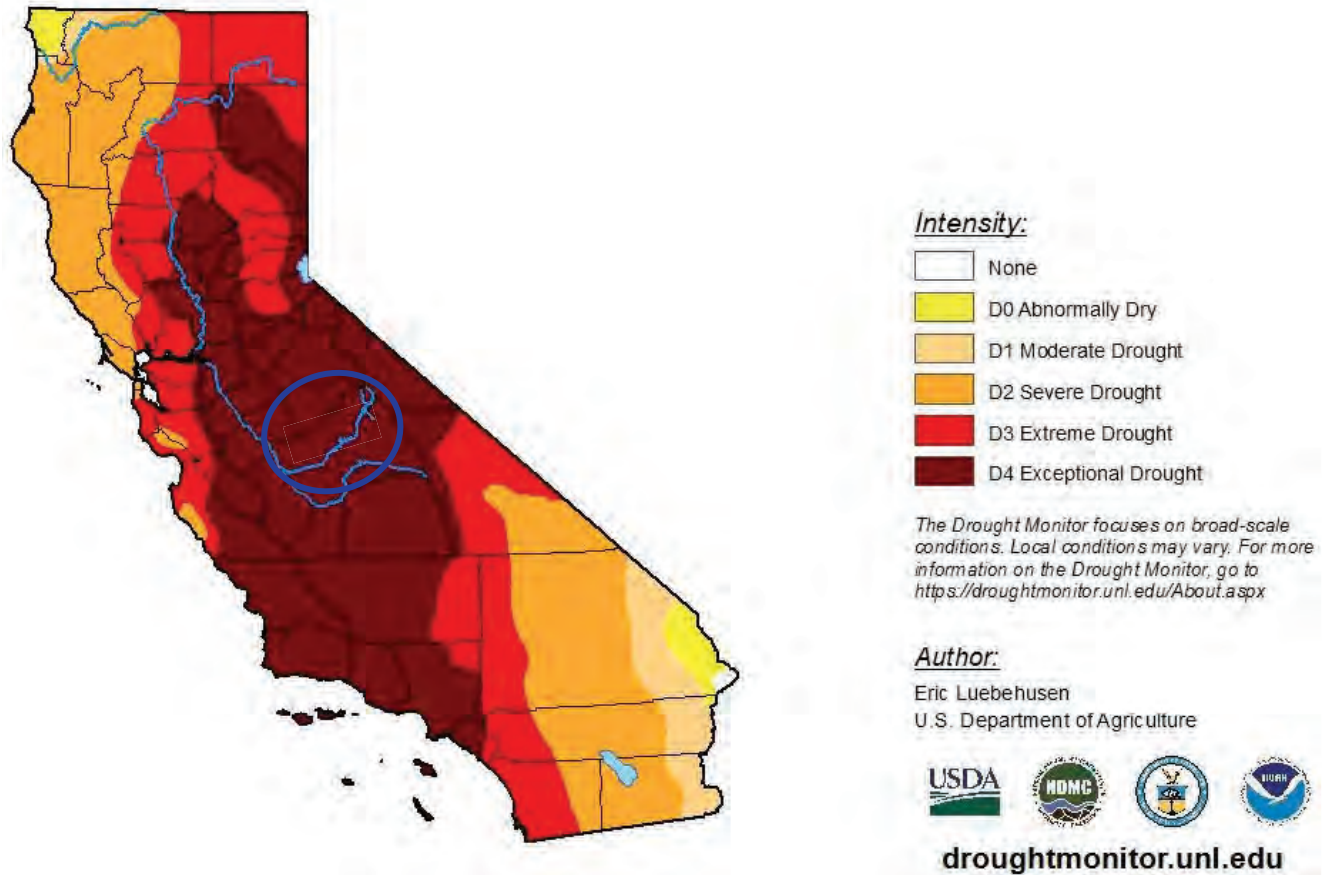
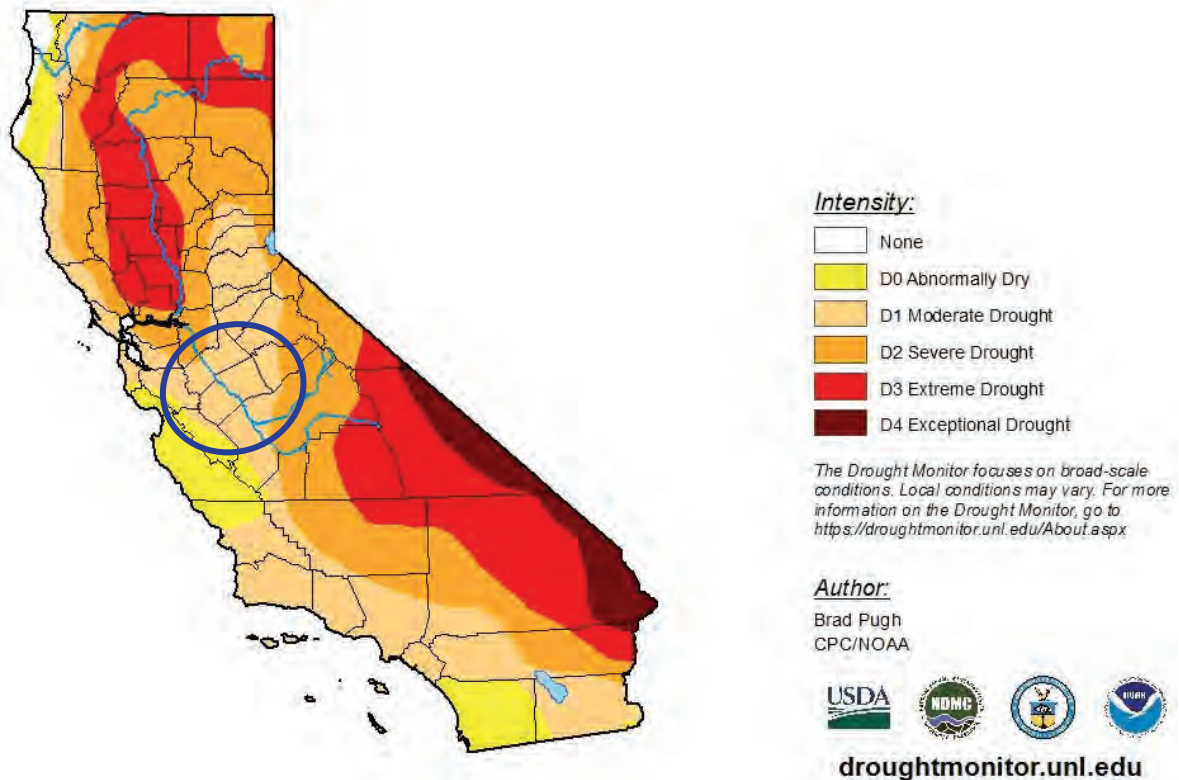


Figure 4-6 U.S. Drought Monitor for California: March 30, 2021



Past Occurrences

Historically, California has experienced severe drought conditions. The state's available record for determining hydrologic risks is short, only going back about 100 years. Recent droughts affecting Merced County are summarized below using data from Cal OES and from the County Agricultural Commissioner's Office.

- **1928-1937**—This drought affected the entire state and is the longest, most severe drought on record with a recurrence interval of greater than 100 years.
- **1947-1950**—Drought affected the entire state but was most extreme in Southern California. The drought in winter of 1950 affected the area from the Kern River basin north to the American River basin. The drought caused two deaths and \$33 million in damages.
- **1976-1977**—The drought of 1976-1977 was most severe in the northern three-quarters of California, but the impact was experienced statewide because of the dependence of Southern California on water transfers from the north. The water year 1977 was the driest year of record at almost all gauging stations in the affected area in California, and the water year 1976 was among the five driest in the central and northern Sierra Nevada. The two-year deficiency in runoff accumulated during the drought is unequalled at gauging stations in the affected area; and this deficiency has a recurrence interval that exceeds 80 years. Crop damages statewide were \$2.67 billion.
- **1987-1992**—California experienced a serious drought due to low precipitation and runoff levels. During this multi-year, multi-county drought, the runoff from the San Joaquin Valley was 47 percent of average. In 1991, the U.S. Department of Agriculture Economic Research Report Agricultural Outlook reported that the Merced River flow would be inadequate to provide sufficient water for

agricultural uses for the fifth consecutive year. A U.S. Department of Agriculture (USDA) drought disaster declaration was declared.

- **2004-2005**—On January 15, 2005, the USDA designated 53 of California's 58 counties as natural disaster areas due to damages and losses caused by extreme drought.
- **2008-2009**—On June 12, 2008, the Governor proclaimed Merced County as a state disaster area due to the Central Valley Drought.
- **2012 – 2017**—In September 2012, the USDA designated Merced County a contiguous disaster area due to drought that occurred since January 1, 2012. In January 2014, the Governor proclaimed a State of Emergency and directed state officials to take all necessary actions to prepare for these drought conditions: to assist farmers and communities that are economically impacted by dry conditions and to ensure the state can respond if Californians face drinking water shortages. The Governor also directed state agencies to use less water and hire more firefighters and initiated an expansive water conservation public awareness campaign. Drought produced severe impacts to water wells throughout the planning area, with a high number of wells running dry. Land subsidence due to increased groundwater pumping also occurred in areas of the San Joaquin Valley. Crop damage was widespread as well. Water allotments were drastically reduced in many towns and water agencies, with extremely high costs for procuring water. In addition, job loss occurred with many families requiring food supply assistance, and water supply assistance provided to homeowners with dry wells. According to a report released by UC Davis Center for Watershed Sciences, the 2014 California drought cost the state's agriculture industry about \$1 billion in lost revenue, with a total statewide economic cost of the drought calculated to be \$2.2 billion. The 2014 drought, the report says, is responsible for the greatest water loss ever seen in California agriculture - about one-third less than normal. The report calls the groundwater situation in California "a slow-moving train wreck." (NCICS 2019). According to the 2018 State of California Hazard Mitigation Plan, by the time the drought was declared officially in 2017, the state been declared a federal disaster area and had expended \$6.6 billion in drought response and mitigation programs.

As shown in Table 4-4, of the 18 total Secretary of Agricultural Disaster Designations for Merced County in the past 8 years, 15 were specific to drought. In addition to the USDA designations there have also been two federal disaster declarations due to drought in the county (Refer to Table 4-3).

The National Drought Mitigation Center developed the Drought Impact Reporter in response to the need for a national drought impact database for the United States. Information comes from a variety of sources: online, drought-related news stories and scientific publications, members of the public who visit the website and submit a drought-related impact for their region, members of the media, and members of relevant government agencies. The database is being populated beginning with the most recent impacts and working backward in time. The Drought Impact Reporter contains information on 195 impacts from droughts that affected Merced County between 2000 and 2020. Most of the impacts (113) were classified as "water supply and quality" and "relief, response and restrictions" (101). Other impacts included "agriculture" (79), "society and public health" (72), "plants and wildlife" (23), "fire" (16), "business and industry" (13), "tourism and recreation" (7) and "energy" (6). These categories are described as follows:

- **Water Supply and Quality (113)** —Drought effects associated with water supply and water quality include dry wells, voluntary and mandatory water restrictions, changes in water rates, increasing of water restrictions, increases in requests for new well permits, changes in water use due to water restrictions, greater water demand, decreases in water allocation or allotments, installation or alteration of water pumps or water intakes, changes to allowable water contaminants, water line damage or repairs due to drought stress, drinking water turbidity, change in water color or odor, declaration of drought watches or warnings, and mitigation activities.

- **Relief, Response, and Restrictions (101)** —This category refers to drought effects associated with disaster declarations, aid programs, requests for disaster declaration or aid, water restrictions, or fire restrictions. Examples include disaster declarations, aid programs, USDA Secretarial disaster declarations, Small Business Association disaster declarations, government relief and response programs, state level water shortage or water emergency declarations, county-level declarations, a declared "State of Emergency," requests for declarations or aid, nonprofit organization based relief, water restrictions, fire restrictions, National Weather Service (NWS) Red Flag Warnings, and declaration of drought watches or warnings.
- **Agriculture (79)** —Drought effects associated with agriculture, farming, aquaculture, horticulture, forestry, or ranching. Examples of drought-induced agricultural impacts include damage to crop quality; income loss for farmers due to reduced crop yields; reduced productivity of cropland; insect infestation; plant disease; increased irrigation costs; cost of new or supplemental water resource development (wells, dams, pipelines) for agriculture; reduced productivity of rangeland; forced reduction of foundation stock; closure/limitation of public lands to grazing; high cost or unavailability of water for livestock, Christmas tree farms, forestry, raising domesticated horses, bees, fish, shellfish, or horticulture.
- **Society and Public Health (72)** —Drought effects associated with human, public and social health include: health-related problems related to reduced water quantity or quality, such as increased concentration of contaminants; loss of human life (e.g., from heat stress, suicide); increased respiratory ailments; increased disease caused by wildlife concentrations; increased human disease caused by changes in insect carrier populations; population migration (rural to urban areas, migrants into the United States); loss of aesthetic values; change in daily activities (non-recreational, like putting a bucket in the shower to catch water); elevated stress levels; meetings to discuss drought; communities creating drought plans; lawmakers altering penalties for violation of water restrictions; demand for higher water rates; cultural/historical discoveries from low water levels; cancellation of fundraising events; cancellation/alteration of festivals or holiday traditions; stockpiling water; public service announcements and drought information websites; protests; and conflicts within the community due to competition for water.
- **Plants and Wildlife (23)**—Drought effects associated with unmanaged plants and wildlife, both aquatic and terrestrial, include: loss of biodiversity of plants or wildlife; loss of trees from rural or urban landscapes, shelterbelts, or wooded conservation areas; reduction and degradation of fish and wildlife habitat; lack of feed and drinking water; greater mortality due to increased contact with agricultural producers (as predators seek food from farms and producers are less tolerant of the intrusion); disease; increased vulnerability to predation (from species concentrated near water); migration and concentration (loss of wildlife in some areas and too much wildlife in others); increased stress on endangered species; salinity levels affecting wildlife; wildlife encroaching into urban areas; and loss of wetlands.
- **Fire (16)**—Drought often contributes to forest, range, rural, or urban fires, fire danger, and burning restrictions. Specific impacts include enacting or increasing burning restrictions, fireworks bans, increased fire risk, occurrence of fire (number of acres burned, number of wildfires compared to average, people displaced, etc.), state of emergency during periods of high fire danger, closure of roads or land due to fire occurrence or risk, and expenses to state and county governments of paying firefighters overtime and paying equipment (helicopter) costs.
- **Business and Industry (13)** —This category tracks drought's effects on non-agriculture and non-tourism businesses, such as lawn care, recreational vehicles, or gear dealers, and plant nurseries. Typical impacts include reduction or loss of demand for goods or services, reduction in employment, variation in number of calls for service, late opening or early closure for the season, bankruptcy, permanent store closure, and other economic impacts.

- **Tourism and Recreation (7)**—Drought effects associated with recreational activities and tourism include closure of state hiking trails and hunting areas due to fire danger; water access or navigation problems for recreation; bans on recreational activities; reduced license, permit, or ticket sales (e.g., hunting, fishing, ski lifts, etc.); losses related to curtailed activities (e.g., bird watching, hunting and fishing, boating, etc.); reduced park visitation; and cancellation or postponement of sporting events.
- **Energy (6)**—This category concerns drought's effects on power production, rates and revenue. Examples include production changes for both hydropower and non-hydropower providers, changes in electricity rates, revenue shortfalls and/or windfall profits, and purchase of electricity when hydropower generation is down.

Probability of Future Occurrences

Likely – Historical drought data for the County planning area and the San Joaquin Valley region indicate there have been five significant multi-year droughts in the last 91 years. This equates to a multi-year drought every 18 years on average, or a 5 percent chance of a drought in any given year. Based on this data, droughts will likely affect the planning area. Given the historical occurrence of severe drought impacts throughout Merced County and across the state, the HMPC understands that drought will continue to pose a high degree of risk to the entire planning area, potentially impacting crops, livestock, water resources, the natural environment at large, buildings and infrastructure (from cascading or compound hazards), and local economies.

In addition, although drought affects the entire planning equally, the potential impacts may be variable and specific to each jurisdiction, depending on contextual factors such as the degree of assets and activities historically impacted by drought within each jurisdiction, such as the agricultural and parks and tourism industries.

Climate Change Considerations

Water resources in California area already experiencing stresses related to population growth, increased water demand, poor water quality, groundwater overdraft, and aging infrastructure. Scientific studies prepared for various California climate assessments and adaptations strategies also already show that drought conditions in California are likely to become more frequent and persistent over the next century due to climate change. Temperatures are warming, heat waves are more frequent, and precipitation has become increasingly variable (California Natural Resources Agency 2018a). According to California's Climate Adaptation Strategy, also referred to as "Safeguarding California Plan: 2018 Update", climate change is likely to significantly diminish California's future water supply. As a result, the state must change its water management, as climate change will create greater competition for limited water supplies (California Natural Resources Agency 2018b). The recent drought conditions over the past decade underscore the need to examine water supply and distribution management, conservation, and use policies. California and the San Joaquin Valley region have experienced a succession of dry spells and with warmer temperatures and periodic droughts that frequently contribute to water shortages in the region.

Climate change projections of extreme prolonged droughts will exacerbate the San Joaquin Valley's existing water supply challenges. In an average year, approximately 40 percent of the state's total water supply comes from groundwater, and during a dry year this increases to more than half of the state's water supply, with groundwater acting as a critical buffer against the impacts of drought and climate change (California Natural Resources Agency 2018).

Table 4-22 Summary of Climate Change Impacts on Water Resources

Resource	Type of Impact	Description
Soil Moisture	Direct	Prolonged dry seasons can lead to decreases in soil moisture; drier vegetation
Vegetation	Indirect	Longer and more intense fire season with increased extent of area burned
Stream Conditions	Direct	Increases in water temperature; potential effects on fish
Snowpack	Indirect	Increases in temperature will lead to decreases in snowpack
Runoff	Direct	Warmer temperatures are likely to lead to a shift in peak runoff from spring to winter and a likely decrease in summer baseflow
Hydropower	Indirect	Decreased summer flows resulting from earlier snowmelt and a shift in peak runoff could affect hydropower generation during summer months
Precipitation	Direct	Warmer winter temperatures will result in a greater percentage of precipitation falling as rain rather than as snow
Groundwater	Indirect	Reduction in snowpack and extended periods of drought are likely to increase dependency on groundwater

Source: <http://frap.fire.ca.gov/data/assessment2010/pdfs/3.1water.pdf> p. 140

Vulnerability Assessment

All of Merced County is vulnerable to drought. Drought is one of the few hazards with the potential to impact all the citizens of the county through water restrictions, economic losses, and increased energy costs. The urbanized areas of the county and the agriculture industry are most likely to experience hardships associated with reduced water supply.

Impacts include water restrictions associated with domestic supplies, agricultural and livestock losses and economic impacts, hydroelectric power reductions, and increased costs for water. Secondary effects include susceptibility to wildfires and increased groundwater pumping that can contribute to land subsidence problems and degraded water quality.

General Property

Based on the USDA's Risk Management Agency (RMA) Crop Indemnity Reports, which were collected for the years 2007-2020, crop losses due to drought were only reported between 2007 and 2014 across the county. Table 4-22 summarizes the agricultural losses experienced across the county communities. A total of \$885,477 was indemnified for 14,660 acres of insured crops.

Table 4-23 Crops Loss Due to Drought, Risk Management Agency Crop Indemnity Reports, 2007-2020

Year	Crop	Net Determined Acres	Indemnity Amount
2007	Wheat	301.9	\$16,130
	Oats	228.3	\$1,241
	Barley	1,345.9	\$32,857

Year	Crop	Net Determined Acres	Indemnity Amount
	Total	1,876	\$50,228
2008	Wheat	683.2	\$75,727
	Oats	1,376.3	\$34,192
	Barley	960.9	\$45,245
	Total	3,020	\$155,164
2009	Wheat	2,179.4	\$280,639
	Oats	882.7	\$32,334
	Barley	1,534.2	\$74,455
	Total	4,596	\$387,428
2010	Wheat	860.2	\$5,599
	Total	860.2	\$5,559
2011	Wheat	170	\$22,806
	Total	170	\$22,806
2012	Wheat	1,910.3	\$167,880
	Oats	1,482	\$56,827
	Total	3,392	\$224,707
2013	Wheat	243.9	\$8,907
	Oats	35	\$633
	Total	279	\$9,540
2014	Wheat	313.9	\$26,623
	Oats	151.4	\$3,382
	Total	465	\$30,005
Grand Total		14,660	\$885,477

Source: USDA RMA Crop Indemnity Reports, 2007-2020

People

According to this California DOF the 2020 County population was 283,521 people. The County's population is projected to continue to increase by 1 percent to 1.48 percent annually until 2060 (CBPR 2016). This projected population growth would add additional strain to the surface water supplies and already depleted groundwater supplies but through the County Groundwater ordinance which prohibits the unsustainable extraction or conveyance may help with reducing the impacts on drought on the regional groundwater supply.

The historical and potential impacts of drought on populations include agricultural sector job loss, secondary economic losses to local businesses and public recreational resources, increased cost to local and state government for large-scale water acquisition and delivery, and water rationing and water wells running dry for individuals and families. As drought is often accompanied by prolonged periods of extreme heat, negative health impacts such as dehydration can also occur, where children and elderly are most susceptible. Air quality often declines in times of drought which can affect those with respiratory ailments.

Critical Facilities

Drought impacts to critical facilities include water shortfalls for facility operations and critical functions, and potential structural destabilization and damage resulting from land subsidence. Refer to the section on Subsidence for more information.

Economy

Drought impacts to the local or regional economy can be difficult to quantify but can be extensive and long-lasting depending on the circumstances during, and after a severe drought event. If water resources are limited, effects would be more severe for industries that rely on large amounts of water and any prolonged drought would intensify these impacts. Sectors critical to the economy such as commerce, distribution, agriculture, tourism, related environmental resources, municipal and industrial water supply, key city assets, energy generation, and even socioeconomic aspects can be affected due to lack of, or even reduced quality of water resources.

Agriculture in the San Joaquin Valley relies on artificial irrigation using mostly imported water and/or groundwater. Local droughts are expected and accommodated for; however, a prolonged statewide drought could exceed local capabilities to handle reductions of imported surface water supplies and potentially lead to reductions in distribution from local water storage districts.

The costs of drought are difficult to quantify because the impacts affect so many different sectors including wildlife and natural resources, business and industry, tourism and recreation, agriculture, and individual households. Agriculture often suffers the most financial losses from drought and is the major component of the Merced County economy. For example, according to the California Integrated Climate Adaptation and Resiliency Program's 2020 Report and 2020 Recommendations, the 2014-2017 multi-year drought was estimated to cost over \$6.6 billion once it was over and the loss of 5,000 jobs in 2016 (OPR 2020).

Historic, Cultural and Natural Resources

The Merced National Wildlife Refuge encompasses over 10,000 acres of wetlands, native grasslands, vernal pools and riparian areas and is home to various bird species and other wildlife including the largest wintering population of lesser Sandhill cranes and Ross' geese, and both species are vulnerable to drought. The impacts of drought on vegetation and wildlife can include death from dehydration and spread of invasive species or disease because of stressed conditions, loss of biodiversity, loss of trees in rural and urban landscapes, loss of wetlands, and degradation of habitat.

In general, environmental impacts from drought are more likely at the interface of the human and natural world. The loss of crops or livestock due to drought can have far reaching economic effects on communities, wind and water erosion can alter the visual landscape, and dust can damage property. Water-based recreational resources are also heavily affected by drought conditions. Indirect impacts from drought arise from increased wildfire risk and greater occurrence of fire.

Future Development

With the County's population projected to continue to grow while climate change projections are showing an increased duration and intensity of drought events for the San Joaquin Valley, it will be important for each new development application to be reviewed with existing and future water supplies in mind.

Because future development encompasses all forms of property, buildings, infrastructure, critical facilities and all related populations and their functions, drought impacts to future development align with the historical and potential impacts to populations, property, natural environment, and critical facilities discussed (above).

Risk Summary

- Due to the widespread impacts in San Joaquin Valley, it can have, drought is considered a High significance hazard.
- There have been five multi-year droughts in the past 91 years. Most recent drought lasted from 2012 to 2017 and resulted in a declared State of Emergency.

- 15 USDA Disaster Designations due to drought have been made in the last 8 years.
- 195 reports of impacts related to drought were made within Merced County between, 2000 and 2020.
- Between 2007-2014 a total of \$885,477 crop indemnity claims was paid due to crop losses for a total of 14,660 acres due to drought impacts.
- Climate change projections show that extreme prolonged drought is likely to continue and will exacerbate existing water supply challenges.
- **Related Hazards:** Extreme Heat, Wildfire, Subsidence, Agricultural Pest Infestation and Disease

Table 4-24 Hazard Risk Summary – Drought

Jurisdiction	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Extensive	Likely	Critical	High
City of Atwater	Extensive	Likely	Limited	Medium
City of Dos Palos	Extensive	Likely	Limited	Medium
City of Gustine	Extensive	Likely	Limited	Medium
City of Livingston	Extensive	Likely	Limited	Medium
City of Los Banos	Extensive	Likely	Limited	Medium
City of Merced	Extensive	Likely	Negligible	Low

4.2.3 Earthquake

Hazard/Problem Definition

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. The magnitude of earthquakes is usually measured using the Richter scale; a logarithmic scale calculated from the amplitude of the largest seismic wave recorded for the earthquake.

Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. Seismic shaking is typically the greatest cause of damage to structures during earthquakes. Seismologists have developed the Mercalli scale to quantify the shaking intensity of an earthquake's effects, which is measured by how an earthquake is felt by humans and the damage to buildings.

Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks such as water, power, gas, communication, and transportation lines. Other damage-causing effects of earthquakes are surface rupture, fissuring, settlement, and permanent horizontal and vertical shifting of the ground. Secondary impacts can include landslides, seiches, liquefaction, and dam failure. Liquefaction occurs when ground shaking causes the mechanical properties of some fine grained, saturated soils to liquefy and act as a fluid (liquefaction). It is the result of a sudden loss of soil strength due to a rapid increase in soil pore water pressures caused by ground shaking, in areas of shallow groundwater (within 10' of surface or less). Liquefaction that produces surface effects generally occurs in the upper 40 to 50 feet of the soil column, although the phenomenon can occur deeper than 100 feet. The duration of ground shaking is also an important factor in causing liquefaction to occur. The larger the earthquake magnitude, and the longer the duration of strong ground shaking, the greater the potential there is for liquefaction to occur.

In populated areas, the greatest potential for loss of life and property damage can come as a result of ground shaking from a nearby earthquake. The degree of damage depends on many interrelated factors. Among these are the moment magnitude, focal depth, distance from the causative fault, duration of shaking, type of surface deposits or bedrock, presence of high ground water, topography, and finally, the design, type, and quality of building construction.

Geographic Area

The nearest faults of major significance are the San Andreas to the west of Merced County, a distance of approximately 15 miles from the county line; the Hayward and Calaveras faults to the northwest; the White Wolf, Garlock, and Sierra Nevada faults to the south; and the Bear Mountain Fault Zone about 5 miles east of and parallel to the eastern border of Merced County. These faults have been and will continue to be the principal source of seismic activity affecting the County of Merced.

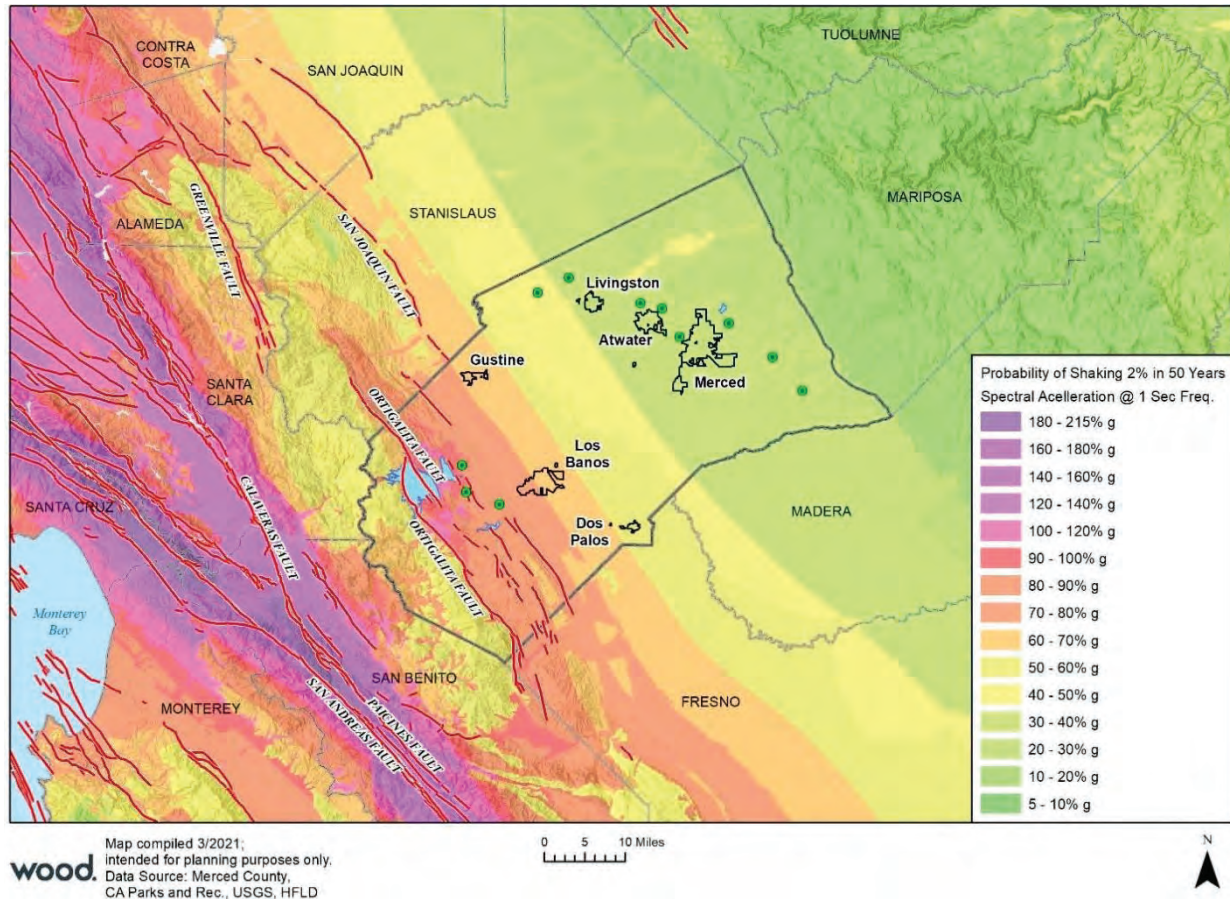
The only fault known inside the County is the "Ortogonalita", also known as the "Telsa-Ortogonalita Fault", located in the western quarter of the County, dissecting the Coast Range in a northwesterly direction. This fault has not been active in historic times, however, there is no guarantee that it will never become active again.

There have been no records of major seismic activity originating in the county, with most epicenters in the county being below a magnitude 4.0. However, the county has been shaken by earthquakes originating elsewhere. There is documented evidence of six earthquakes that shook the area, those of 1872, 1906,

1952, 1966, 1984, and 1989. Major damage occurred in Los Banos in 1906, with minor damage recorded throughout the county from other occurrences.

The San Andreas Fault occurs where the North American and Pacific plates come together and grind in a side-by-side motion relative to each other. Another large known fault, the White Wolf fault, is located to the south near Arvin and Bakersfield in Kern County and produced a severe M 7.7 earthquake in 1952. Figure 4-7 below shows the known faults and potential for ground shaking resulting from earthquakes in and near Merced County, based on USGS probabilistic ground shaking with a 2% in 50-year occurrence (AKA 2500-year probabilistic ground shaking).

Figure 4-7 Merced County Earthquake Ground Shaking Potential and Nearby Faults



Earthquakes can occur at any time of the day or night and any time of the year. Earthquakes are particularly dangerous due to their rapid onset, generally without warning. Aftershocks can occur for days, weeks, and even months following a major earthquake. This additional damage to structures already weakened by the main earthquake increases the danger to rescue and recovery personnel.

Extent (Magnitude/Severity)

For extent, the severity of an earthquake, or the amount of energy released during an earthquake is usually expressed in terms of intensity or magnitude as described further below.

Intensity: Intensity represents the observed effects of ground shaking at any specified location and earthquake shaking decreases with distance from the earthquake epicenter. Intensity is an expression of the amount of shaking at any given location on the ground surface based on felt or observed effects.

Seismic shaking is typically the greatest cause of losses to structures during earthquakes. Intensity is measured with the Modified Mercalli Intensity (MMI) scale. The intensity of ground shaking at a particular site or structure is a function of many factors including: 1) earthquake magnitude, 2) distance from the epicenter, 3) duration of strong ground motion, 4) local geologic conditions (soil type and topography), and 5) the fundamental period of the structure. A brief description of those factors is presented below. The Modified Mercalli Intensity scale is summarized in Table 4-24, along with the effects associated with the MMI scale. Damage typically occurs in MMI of scale VII or above.

Earthquake Magnitude: Magnitude represents the amount of seismic energy released at the hypocenter of an earthquake. It is based on the amplitude of the earthquake waves recorded. Seismologists have developed several magnitude scales; one of the first was the Richter Scale, developed in 1932 by the late Dr. Charles F. Richter of the California Institute of Technology. The Richter scale is numeric and has a logarithmic relationship between scale factors, so that a difference of one scale number represents a tenfold increase in measured amplitude, which in turn corresponds to an approximate 31x energy release difference when compared to the next whole number value. The Moment Magnitude scale (M_w , or M), which is a measurement of energy released by the movement of a fault and is the modern method used by seismologists to measure earthquakes. Overall, as the amount of energy released by an earthquake increases, the potential for ground shaking impacts also increases.

Distance from Epicenter: Earthquake energy generally dissipates (or attenuates) with distance from a fault. Over long distances, this loss of energy can be significant, resulting in a significant decrease in ground shaking with increased distance from the epicenter.

Duration of Strong Shaking: The duration of the strong ground shaking constitutes a major role in determining the amount of structural damage and the potential for ground failure that can result from an earthquake. Larger magnitude earthquakes have longer durations than smaller earthquakes.

Local Geologic Conditions: The geologic and soil conditions at a particular site have the potential to substantially increase the effects of ground shaking. The thickness, density, and consistency of the soil, as well as shallow ground water levels, have the potential to amplify the effects of ground shaking depending on the characteristics of the earthquake. In general, the presence of unconsolidated soils above the bedrock surface can amplify the ground shaking caused by an earthquake.

Fundamental Periods: Every structure has its own fundamental period or natural vibration. If the vibration of ground shaking coincides with the natural vibration period of a structure, damage to the structure can be greatly increased. The extent of damage suffered during an earthquake can also depend on non-geologic factors. The type of building and its structural integrity will influence the severity of the damage suffered. Generally, small, well-constructed, one- and two-story wood and steel frame buildings have performed well in earthquakes because of their light weight and flexibility. Reinforced concrete structures will also usually perform well. Buildings constructed from non-flexible materials, such as unreinforced brick and concrete, hollow concrete block, clay tile, or adobe, are more vulnerable to earthquake damage.

Effects of Ground Shaking: The primary effect of ground shaking is the damage or destruction of buildings, infrastructure, and possible injury or loss of life. Building damage can range from minor cracking of plaster to total collapse. Disruption of infrastructure facilities can include damage to utilities, pipelines, roads, and bridges. Ruptured gas and water lines can result in fire and produce scour/inundation damage, respectively, to structures, as can fire from other causes, such as electrical damages. Secondary effects can include geologic impacts such as co-seismic fault movement along nearby faults, seismically induced slope instability, liquefaction, lateral spreading, and other forms of ground failure and seismic response. These secondary effects were demonstrated in Oceano by the San Simeon 2003 earthquake.

Table 4-25 Earthquake Magnitude and Intensity Measurements and Intensity Characteristics

Magnitude	Mercalli Intensity	Effects	Frequency
Less than 2.0	I	Microearthquakes, not felt or rarely felt; recorded by seismographs.	Continual
2.0-2.9	I to II	Felt slightly by some people; damages to buildings.	Over 1M per year
3.0-3.9	II to IV	Often felt by people; rarely causes damage; shaking of indoor objects noticeable.	Over 100,000 per year
4.0-4.9	IV to VI	Noticeable shaking of indoor objects and rattling noises; felt by most people in the affected area; slightly felt outside; generally, no to minimal damage.	10K to 15K per year
5.0-5.9	VI to VIII	Can cause damage of varying severity to poorly constructed buildings; at most, none to slight damage to all other buildings. Felt by everyone.	1K to 1,500 per year
6.0-6.9	VII to X	Damage to a moderate number of well-built structures in populated areas; earthquake-resistant structures survive with slight to moderate damage; poorly designed structures receive moderate to severe damage; felt in wider areas; up to hundreds of miles/kilometers from the epicenter; strong to violent shaking in epicentral area.	100 to 150 per year
7.0-7.9	VIII <	Causes damage to most buildings, some to partially or completely collapse or receive severe damage; well-designed structures are likely to receive damage; felt across great distances with major damage mostly limited to 250 km from epicenter.	10 to 20 per year
8.0-8.9	VIII <	Major damage to buildings, structures likely to be destroyed; will cause moderate to heavy damage to sturdy or earthquake-resistant buildings; damaging in large areas; felt in extremely large regions.	One per year
9.0 and Greater	VIII <	At or near total destruction - severe damage or collapse to all buildings; heavy damage and shaking extends to distant locations; permanent changes in ground topography.	One per 10-50 years

Source: USGS

Past Occurrences

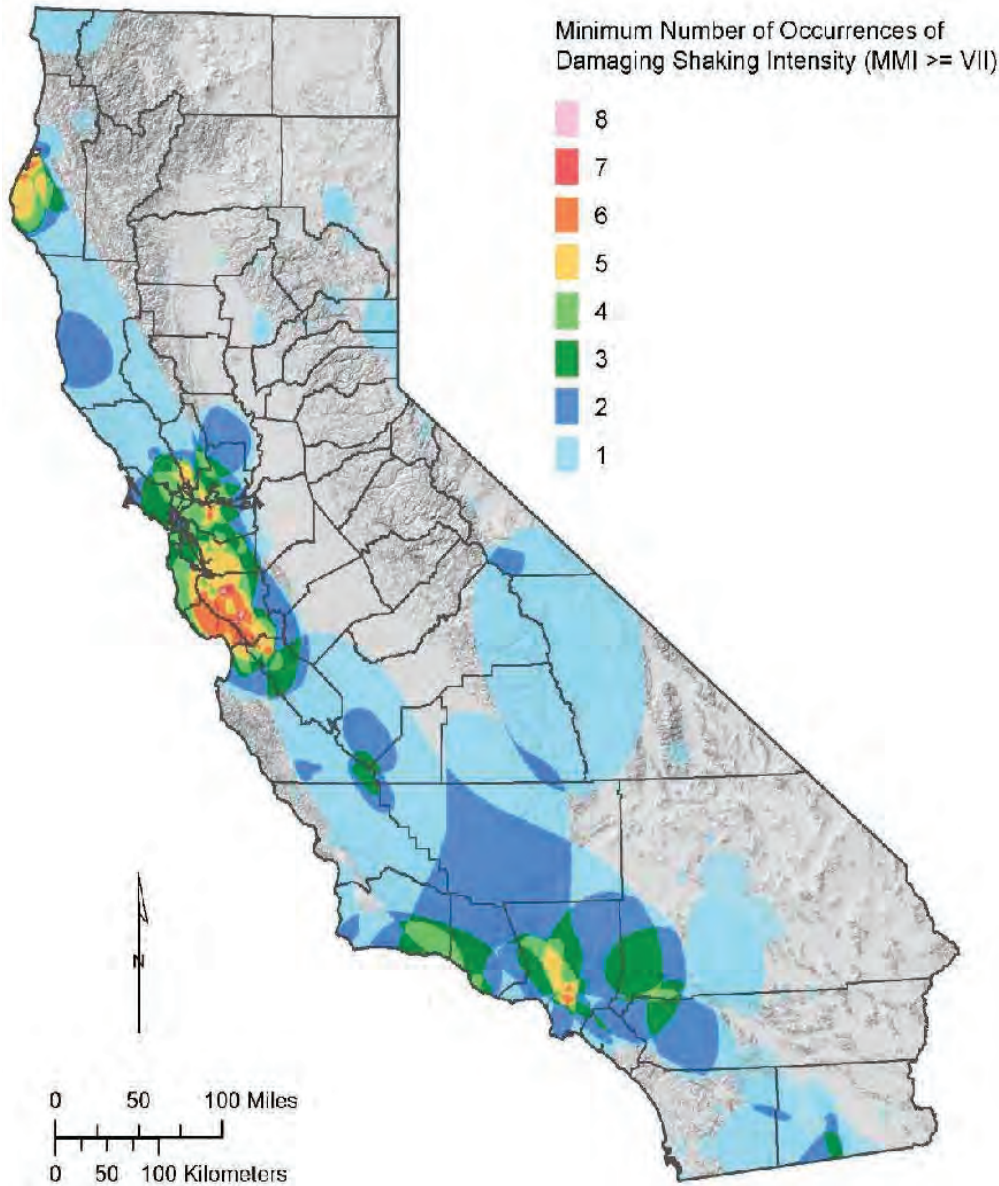
There have not been any damaging earthquakes greater than M 6.0 recorded in Merced County in over 200 years and the County has not been included in any federal disaster declarations involving earthquakes, though several have been very close. The most recent large earthquake near Merced County was 16 miles east north-east of King City at a magnitude of 5.3 on October 20, 2012. Several aftershocks followed the main earthquake, including a 3.1 aftershock. This quake was preceded by two earthquakes located approximately 100 miles from Merced County, the 1982 New Idria earthquake (M 5.4) and the 1983 Coalinga (M 6.5). There was a low level of ground shaking reported.

Major earthquakes have occurred near Merced County and resulted in ground shaking felt in the county. The Fort Tejon earthquake in 1857 of M 7.9 was one of the greatest earthquakes ever recorded in the United States and the largest in California. It left an extensive surface rupture scar over 215 miles in length along the San Andreas Fault. The epicenter is now thought to have been located near Cholame, approximately 134 miles southwest of the City of Merced. During the Fort Tejon earthquake, strong shaking lasted from one to three minutes. As a result of the shaking, the flow of the Kern River was turned upstream, and water ran four feet deep over its banks. The waters of Tulare Lake were thrown upon its shores, stranding fish miles from the original lakebed. Property loss was heavy at Fort Tejon, one of the only settlements at the time, an Army post in south-central Kern County about four miles from the San

Andreas Fault. In 1857, two buildings were declared unsafe, three others were damaged extensively but were habitable, and still others sustained moderate damage. One person was killed in the collapse of an adobe house at Gorman.

Figure 4-8 below displays the common areas damaged by earthquakes based on historic evidence dating back to the year 1800. The occurrences are color-coded by damaging shaking intensity across the state of California, and Merced County is enclosed within a black circle. The figure shows that, per the MMI scale noting occurrences equal to or greater than an Intensity of VII, the county has experienced 1 to 3 earthquake events of this kind, mostly affecting the far western and southwestern portions of the County.

Figure 4-8 Areas Damaged by Earthquakes from 1800 to 2017



Source: California State Hazard Mitigation Plan, 2018; California Geologic Survey

Probability of Future Occurrences

It is estimated that major earthquakes (ranging from a magnitude of 7 to 7.9) occur in California one out of every 10 years. However, strong earthquakes (from magnitudes 6 to 6.9) strike the state about once every two to three years. A strong earthquake can cause major damage depending on the epicenter's location with regards to populated areas, and can lead to billions of dollars in disasters, deaths, injuries, and disruptions in services and communities' way of life. Moderate earthquakes (around magnitudes of 5.5) can occur three to four times a year in the state.

Along the San Andreas Fault, segments exist where no large earthquakes have occurred for long intervals of time. These areas accumulate potential energy and provide clues as to where the next earthquake may occur and when. Scientists term these segments "seismic gaps" and, in general, have been successful in forecasting the time when some of the seismic gaps will produce large earthquakes. Geologic studies show that over the past 1,400 to 1,500 years, large earthquakes have occurred at about 150-year intervals on the southern San Andreas Fault. As the last large earthquake on the southern San Andreas was the Fort Tejon earthquake in 1857, that section of the fault is considered a likely location for an earthquake within the next few decades (USGS 1997).

Based on the earthquake shaking potential mapped for Merced County, the proximity to the San Andreas Fault with a history of shaking, but no surface rupture, the probability of damaging seismic ground shaking in Merced County is occasional. The shaking levels expected with a 2% in 50 years probability are depicted in Figure 4-7.

Climate Change Considerations

Climate change is not expected to directly affect earthquake frequency or intensity.

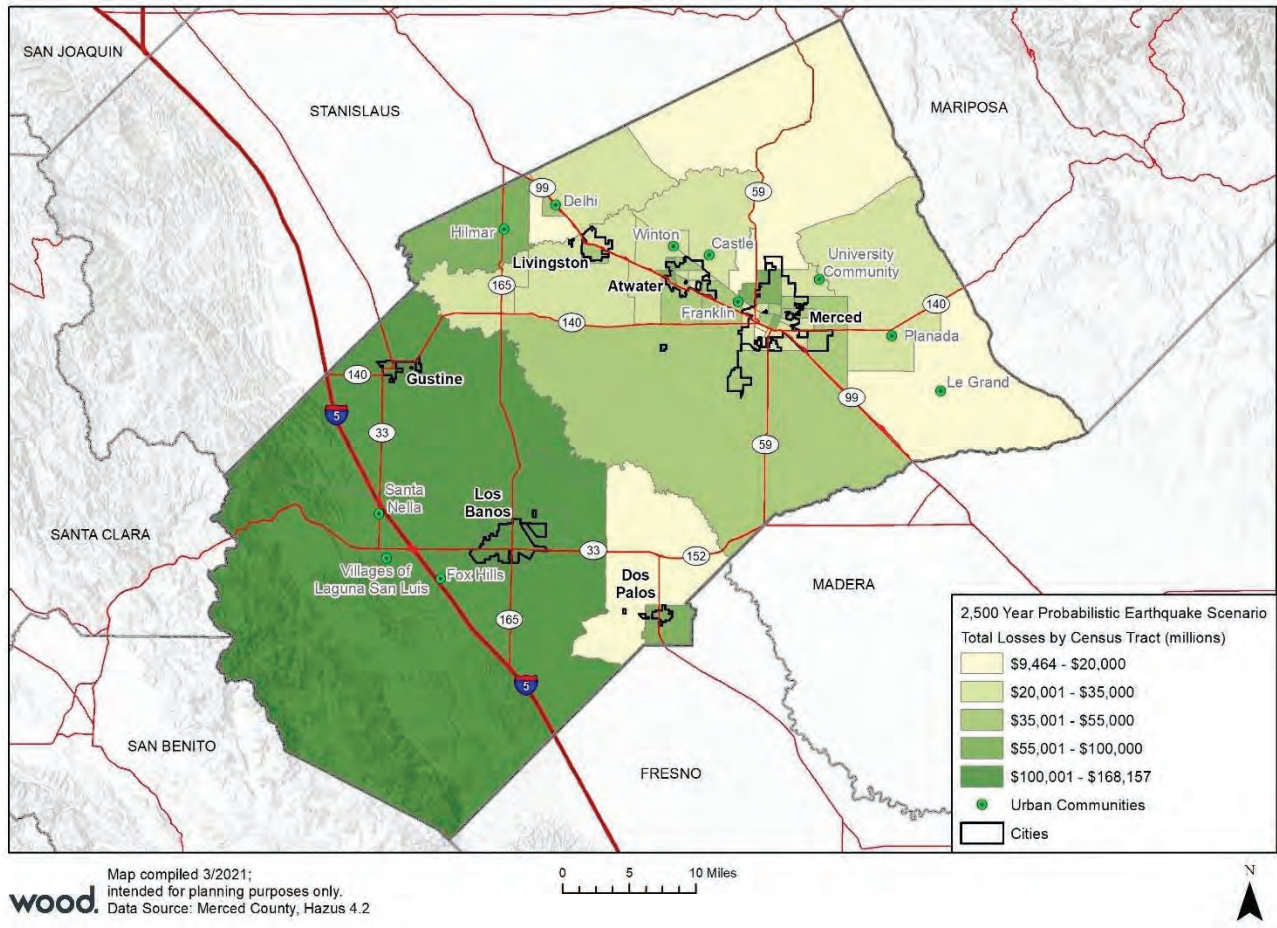
Vulnerability Assessment

Earthquake loss estimation for the 2021 HMP update utilized FEMA's Hazus-MH 4.2 natural hazard loss estimation software. Hazus is a GIS based, standardized, nationally applicable multi-hazard loss estimation methodology and software. Local, state and federal government officials use Hazus for preparedness, emergency response, and mitigation planning. A level 1 Hazus analysis was performed which estimates damage based on an inventory database compiled at a national level aggregated to Census Tracts. As with any model there are uncertainties, and the results should be considered approximate for planning purposes.

To evaluate potential losses associated with earthquake activity in the planning area, a Hazus 2,500-year probabilistic scenario was run for Merced County. The 2,500-year scenario represents the level of shaking considers multiple faults in the region instead of a single scenario. The methodology utilizes probabilistic seismic hazard contour maps developed by the U.S. Geological Survey (USGS) for the 2018 update of the National Seismic Hazard Maps that are included with HAZUS-MH. The USGS maps provide estimates of potential ground acceleration and spectral acceleration at periods of 0.3 second and 1.0 second, respectively. The 2,500-year return period analyzes ground shaking estimates from the various seismic sources in the area with a 2 percent probability of being exceeded in 50 years. The International Building Code uses this level of ground shaking for building design in seismic areas.

Hazus estimates the number of people displaced, the number of buildings and facilities/infrastructure damaged, the number of casualties, and the damage to transportation systems and utilities. Results produced by Hazus are reported at the census tract level. Figure 4-9 below displays the Census Tracts within the county which were analyzed in this scenario, color-coded by the amount of total losses each tract experienced. The map is followed by the Hazus results broken up in respective sections.

Figure 4-9 Hazus Earthquake Analysis for Merced County – Total Losses by Census Tract (in Thousands of Dollars)



General Property

Unreinforced Masonry Building (URM)s: Unreinforced masonry building type structures consist of buildings made of unreinforced concrete and brick, hollow concrete blocks, clay tiles, and adobe. Buildings constructed of these materials are heavy and brittle, and typically provide little earthquake resistance. In small earthquakes, unreinforced buildings can crack, and in strong earthquakes, they have a tendency to collapse. These types of structures pose the greatest structural risk to life and safety of all general building types.

Per Hazus, there are an estimated 77,000 buildings in Merced County with a total building replacement value (excluding contents) of \$24 Billion. Approximately 94% of these buildings (and 82% of the building value) are associated with residential housing. In terms of building construction types found in the region, wood frame construction makes up 87% of the building inventory. The remaining percentage is distributed between the other general building types.

The categories of damages defined by Hazus are:

Slight damage includes diagonal hairline fractures on most shear wall surfaces and hairline cracks on most infill walls.

Moderate damage includes cracks on most walls and failure of some shear walls.

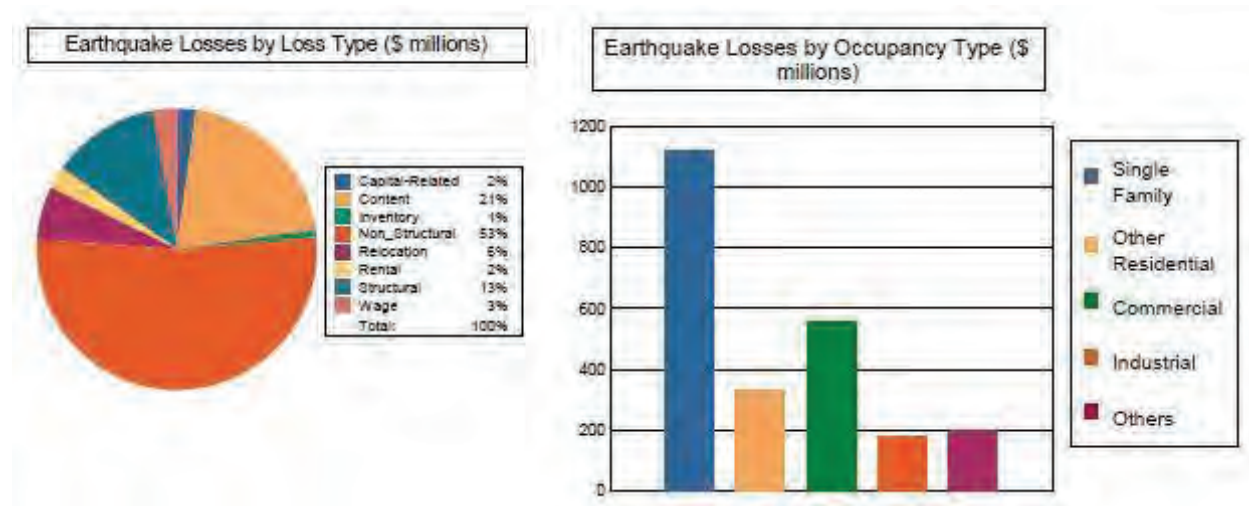
Extensive damage means that most shear wall surfaces in the structure have reached or exceeded their capacity exhibited by large, through-the-wall diagonal cracks.

Complete damage means that the structure has collapsed or is in danger of collapse.

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

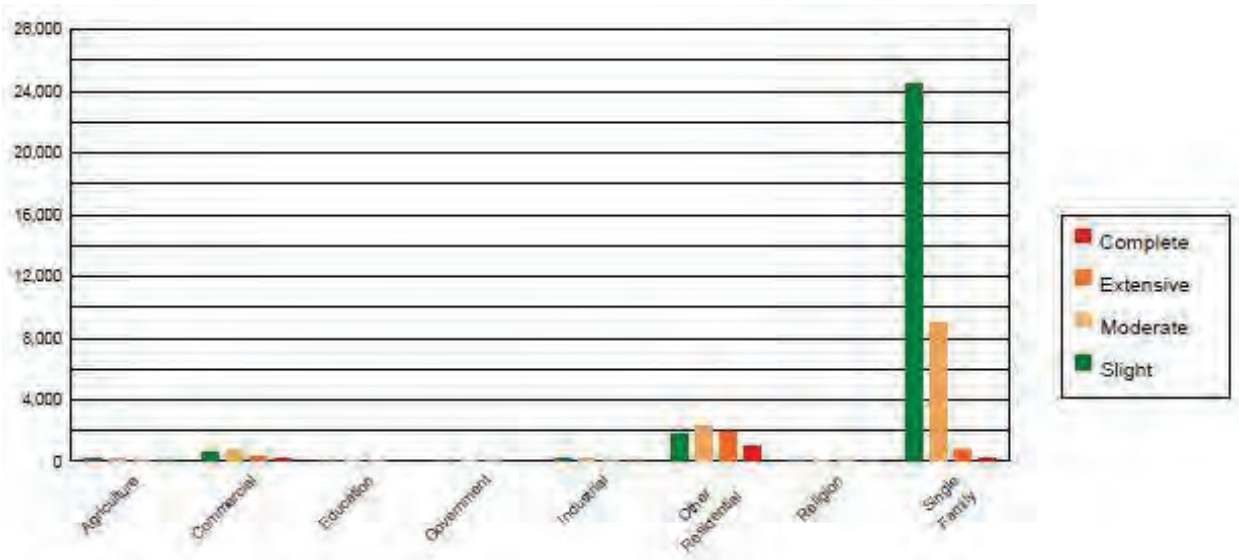
The total building-related losses were \$2.4 billion. By far, the largest loss was sustained by the residential occupancies which made up over 61% of the total loss. Figure 4-10 and Figure 4-11 below provide a summary of the losses associated with the building damage.

Figure 4-10 Earthquake Losses by Loss Type and Occupancy Type (in Millions of Dollars)



Source: Hazus-MH 4.2

Figure 4-11 Hazus 2,500 Year Probabilistic Earthquake Scenario Structure Damage by Occupancy Type



Source: Hazus-MH 4.2

Hazus estimates that about 17,106 buildings will be at least moderately damaged. This is over 22% of the total building stock in the county. There are an estimated 1,386 buildings that will be damaged beyond repair. Table 4-25 summarizes the expected damage by property occupancy type in more detail, whereas Table 4-26 contains the results of the expected building damage by building material type.

Table 4-26 Expected Building Damage by Occupancy Class

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	226.89	0.69	187.14	0.68	158.75	1.27	71.02	2.19	34.20	2.47
Commercial	837.94	2.56	642.98	2.35	719.69	5.77	365.76	11.27	151.63	10.94
Education	63.86	0.19	42.33	0.15	32.11	0.26	12.63	0.39	4.07	0.29
Government	32.81	0.10	23.11	0.08	23.37	0.19	12.88	0.40	5.83	0.42
Industrial	178.83	0.55	144.88	0.53	174.96	1.40	92.63	2.85	39.80	2.87
Other Residential	1769.01	5.40	1774.89	6.48	2266.28	18.17	1933.79	59.58	949.04	68.37
Religion	100.47	0.31	73.80	0.27	65.35	0.52	32.27	0.99	12.90	0.93
Single Family	29559.17	90.20	24503.59	89.46	9033.68	72.42	724.45	22.32	190.11	13.71
Total	32,769		27,392		12,474		3,245		1,387	

Source: Hazus-MH 4.2

Table 4-27 Expected Building Damage by Building Material (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	30934.11	94.40	25883.22	93.76	9410.09	75.44	736.00	22.68	208.25	15.02
Steel	280.75	0.80	214.23	0.78	333.22	2.67	194.40	5.99	83.47	6.02
Concrete	305.90	0.93	238.68	0.86	211.70	1.70	118.20	3.64	50.29	3.63
Precast	228.03	0.70	181.11	0.66	240.98	1.93	119.06	3.67	44.99	3.24
RM	755.42	2.31	355.11	1.30	406.68	3.26	200.84	6.19	51.19	3.69
URM	74.27	0.23	69.02	0.25	81.32	0.65	42.94	1.32	29.15	2.10
MH	210.61	0.64	652.34	2.38	1790.19	14.35	1833.98	56.51	919.23	66.30
Total	32,769		27,392		12,474		3,245		1,387	

*Note:

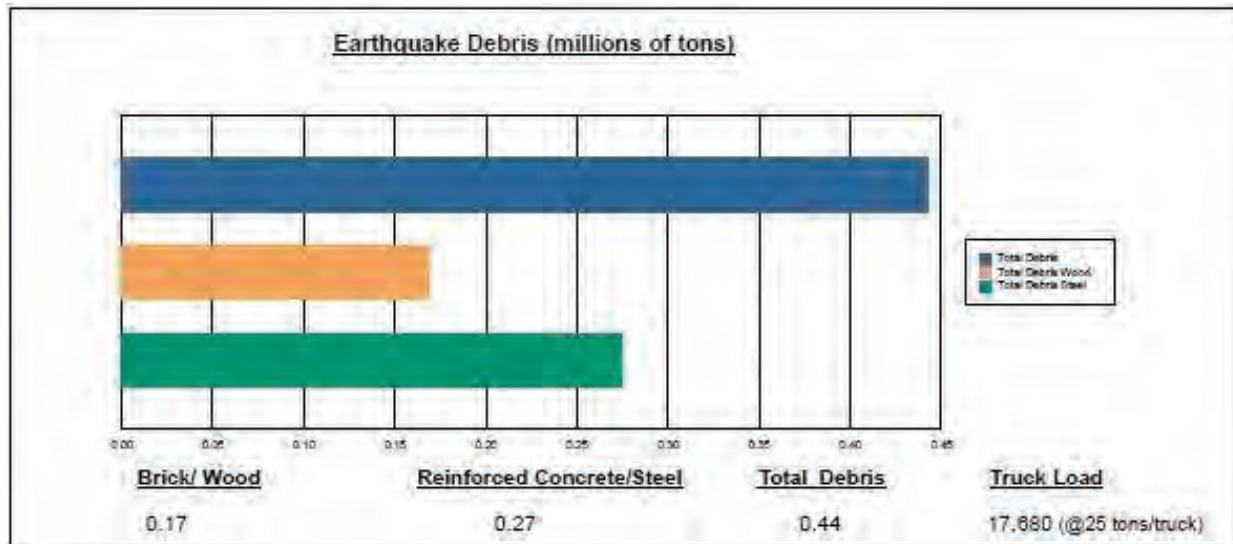
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Source: Hazus-MH 4.2

Hazus also estimates the amount of debris that will be generated by the earthquake event analyzed. The model subdivides the debris into two general categories: a) Brick/Wood, and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 442,000 tons of debris will be generated. Of that total amount, Brick/Wood comprises 38% of the debris, while the remainder would be Reinforced Concrete/Steel. If the debris tonnage was converted to estimates of truckloads required to remove it, debris generated would convert to about 17,680 truckloads, with each truckload carrying 25 tons. Figure 4-12 summarizes the debris generation estimate and material type for this earthquake event.

Figure 4-12 Debris Generation in Millions of Tons and by Material Type



Source: Hazus-MH 4.2

People

Shelter Requirement: Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 918 households to be displaced due to the earthquake. Of these, approximately 882 people (out of a total population of 255,793) will seek temporary shelter in public shelters.

Casualties: Ground movement during an earthquake is seldom the direct cause of death or injury. Most earthquake-related injuries result from collapsing walls, flying glass, and falling objects as a result of the ground shaking, or people trying to move more than a few feet during the shaking. Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four severity levels that describe the extent of the injuries. The levels are described as follows:

Severity Level 1: Injuries will require medical attention, but hospitalization is not needed.

Severity Level 2: Injuries will require hospitalization but are not considered life-threatening.

Severity Level 3: Injuries will require hospitalization and can become life-threatening if not promptly treated.

Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is at its maximum. The 2:00 PM estimate considers that the educational, commercial and industrial sector loads are at their maximum, and has the highest numbers of casualties estimated. The 5:00 PM represents peak commute time. These estimates of casualties are broken down in Table 4-27.

Table 4-28 Hazus Earthquake Casualty Estimates from Merced County

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	6.81	1.81	0.28	0.55
	Commuting	0.10	0.13	0.23	0.04
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	14.37	3.78	0.56	1.11
	Other-Residential	219.62	47.57	3.89	6.96
	Single Family	166.82	21.11	0.97	1.70
	Total	408	74	6	10
2 PM	Commercial	431.33	114.03	17.57	34.39
	Commuting	0.94	1.16	2.08	0.40
	Educational	248.76	65.96	10.46	20.47
	Hotels	0.00	0.00	0.00	0.00
	Industrial	105.82	27.79	4.15	8.08
	Other-Residential	48.08	10.42	0.89	1.59
	Single Family	38.13	4.91	0.26	0.39
	Total	873	224	35	65
5 PM	Commercial	323.34	85.21	13.17	25.49
	Commuting	13.68	16.82	30.12	5.75
	Educational	19.57	5.08	0.80	1.56
	Hotels	0.00	0.00	0.00	0.00
	Industrial	86.14	17.37	2.59	5.05
	Other-Residential	79.77	17.33	1.46	2.59
	Single Family	83.91	8.23	0.44	0.66
	Total	566	150	49	41

Source: Hazus-MH 4.2

Social Vulnerability

Populations most vulnerable to earthquake and liquefaction activity would be those that rely on specific services or electrical power, which may not be available during or after a quake, or those which are homeless, would have a difficult time evacuating due to age or disability, cannot communicate easily due to speaking English less than well, for example.

Critical Facilities and Infrastructure

Critical Facility Inventory: Hazus breaks critical facilities into two groups: essential facilities and high potential loss facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police

stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

Essential Facility Damage: There are four (4) hospitals in the region with a total bed capacity of 246 beds. There are 145 schools, 31 fire stations, 14 police stations and one (1) emergency operation facility. The inventory also includes 23 hazardous material sites.

On the day of the earthquake, the model estimates that only 125 hospital beds (51%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 75% of the beds will be back in service. By 30 days, 94% will be operational. The essential facility inventory and expected damages from the earthquake event are provided in Table 4-28.

Transportation Systems Inventory: Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The transportation systems inventory and expected damages from the earthquake, in terms of number of structures and locations affected, are provided in Table 4-29, while losses in millions of dollars are summarized in Table 4-30. The total value of the lifeline inventory is over \$9.4 billion. This inventory includes over 274 miles of highways, 532 bridges, and 11,935 miles of pipes.

Utility Lifeline Systems Inventory: The replacement value of the transportation and utility lifeline systems is estimated to be \$4.48 billion and \$4.97 billion, respectively. The expected utility system facility damages in terms of total structures or systems affected, along with the inventory of this dataset, are summarized in Table 4-31. Economic losses in millions of dollars are found in Table 4-32. Site specific expected utility system pipeline damages (including their inventory) are included in Table 4-33, while the potable water and electric power system performance limitations, damages, and inventory will be in Table 4-34.

Table 4-29 Essential Facility Inventory and Expected Damage

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	4	1	0	3
Schools	145	25	0	84
EOCs	1	0	0	1
Police Stations	14	2	0	7
Fire Stations	31	2	0	17

Source: Hazus-MH 4.2

Table 4-30 Transportation Systems Inventory and Expected Damage by Number of Locations

System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	124	0	0	124	124
	Bridges	532	80	16	454	488
	Tunnels	0	0	0	0	0
Railways	Segments	168	0	0	168	168
	Bridges	84	0	0	84	84
	Tunnels	0	0	0	0	0
	Facilities	2	0	0	2	2
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	3	1	0	2	3
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	5	2	0	4	5
	Runways	5	0	0	5	5

Source: Hazus-MH 4.2

Table 4-31 Transportation System Economic Losses in Millions of Dollars

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	2385.6784	0.0000	0.00
	Bridges	973.0743	94.7029	9.73
	Tunnels	0.0000	0.0000	0.00
	Subtotal	3338.7527	94.7029	
Railways	Segments	359.5631	0.0000	0.00
	Bridges	386.1241	18.5744	5.07
	Tunnels	0.0000	0.0000	0.00
	Facilities	5.3280	1.4119	26.51
	Subtotal	731.0132	19.9863	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Bus	Facilities	5.4918	1.9346	35.23
	Subtotal	5.4918	1.9346	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Airport	Facilities	45.9943	14.7320	32.03
	Runways	356.9607	0.0000	0.00
	Subtotal	402.9550	14.7320	
	Total	4,478.21	131.36	

Source: Hazus-MH 4.2

Table 4-32 Expected Utility System Facility Inventory and Damages

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	239.2398
	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		239.2398
Waste Water	Distribution Lines	NA	143.5439
	Facilities	10	1636.1172
	Pipelines	0	0.0000
	Subtotal		1779.6611
Natural Gas	Distribution Lines	NA	95.6959
	Facilities	0	0.0000
	Pipelines	7	53.5959
	Subtotal		149.2918
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		0.0000
Electrical Power	Facilities	6	2798.5613
	Subtotal		2798.5613
Communication	Facilities	14	1.6520
	Subtotal		1.6520
		Total	4,968.40

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	10	10	0	0	10
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	6	6	0	1	1
Communication	14	12	0	12	14

Source: Hazus-MH 4.2

Table 4-33 Utility System Economic Losses in Millions of Dollars

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	239.2398	25.2500	10.55
	Subtotal	239.2398	25.2500	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	1636.1172	346.6573	21.19
	Distribution Lines	143.5439	12.6837	8.84
	Subtotal	1779.6611	359.3410	
Natural Gas	Pipelines	53.5959	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	95.6959	4.3454	4.54
	Subtotal	149.2918	4.3454	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Electrical Power	Facilities	2798.5613	1725.0585	61.64
	Subtotal	2798.5613	1725.0585	
Communication	Facilities	1.6520	0.3758	22.75
	Subtotal	1.6520	0.3758	
	Total	4,968.41	2,114.37	

Source: Hazus-MH 4.2

Table 4-34 Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	7,433	5611	1403
Waste Water	4,460	2819	705
Natural Gas	43	6	1
Oil	0	0	0

Source: Hazus-MH 4.2

Table 4-35 Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	75,642	42,814	41,518	38,748	18,012	0
Electric Power		14,748	9,414	4,092	849	20

Source: Hazus-MH 4.2

Beyond the modeling estimates of Hazus-MH, there are several other critical facilities which are unique to Merced County and are crucial to the function of the wider region and the state of California. The California Aqueduct, part of the California State Water Project, runs through the western part of Merced County. The State Water Project is a water storage and delivery system of reservoirs, aqueducts, power plants, and pumping plants. Its main purpose is to store water and distribute it to 29 urban and agricultural water suppliers in Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California. The State Water Project makes deliveries to two-thirds of California's population. An earthquake event, or landslides triggered by one, which damage the aqueduct could disrupt the aqueduct's ability to deliver water, which would have serious impacts to agriculture in the county and water users in many areas of California. Similarly, Interstate 5 runs through the western portion of the county and serves as a major shipping and transportation corridor for all of California and the west coast of the United States. Any damage or impacts to Interstate 5 in Merced County from an earthquake would result in disruptions to the entire state.

Economy

Hazus estimates the long-term economic impacts to the region. The model quantifies this information in terms of income and employment changes within the region. The total economic loss estimated for the earthquake is \$4.6 Billion, which includes building and lifeline related losses based on the region's available inventory. An estimated 14% of losses computed by Hazus were related to the business interruption of the region.

Since the building losses are broken into two categories (of direct building losses compared to business interruption losses), building-related losses, which summarize estimated costs to fix or replace structures and damages to properties and their contents, are discussed in more detail in Table 4-26 of this section.

However, business interruption losses are summarized herein. They included the temporary living expenses for people displaced from their homes because of the earthquake event. These business-related economic losses are included in Table 4-35 below.

Table 4-36 Building-Related Economic Loss Estimates in Millions of Dollars

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	3.6769	55.7318	2.1345	3.8320	65.3752
	Capital-Related	0.0000	1.5656	48.6350	1.2722	1.2523	52.7251
	Rental	18.9985	12.4327	24.6908	0.9579	2.0234	59.1033
	Relocation	68.2027	18.8524	37.6404	5.3634	16.1644	146.2233
	Subtotal	87.2012	36.5276	166.6980	9.7280	23.2721	323.4269
Capital Stock Losses							
	Structural	120.4648	44.9343	69.7343	23.0556	41.8445	300.0335
	Non_Structural	669.4625	205.7760	214.1487	82.3839	81.8916	1,253.6627
	Content	238.9910	47.3851	103.4403	56.4407	47.3073	493.5644
	Inventory	0.0000	0.0000	2.7310	9.0400	2.4403	14.2113
	Subtotal	1028.9183	298.0954	390.0543	170.9202	173.4837	2061.4719
	Total	1116.12	334.62	556.75	180.65	196.76	2384.90

Source: Hazus-MH 4.2

Historic, Cultural, and Natural Resources

Earthquake effects on the environment, natural resources, and historic and cultural assets could be very destructive depending on the type of seismic activity experienced and secondary/cascading effects from an event (e.g. wildfire). The biggest impact would likely be on older properties such as wooden or masonry buildings, though reinforced masonry structures would be much more resilient during earthquakes.

Future Development

Future development in the county is not anticipated to significantly affect vulnerability to earthquakes when designed according to modern building codes. However future development will result in a slight increase in exposure of the population, building stock, and related infrastructure to earthquakes.

Risk Summary

- Merced County is located in a geologically complex and seismically active region, albeit less so than other areas of California. There are numerous active and potentially active faults in close proximity to the County. The County does not have a history of significant damaging earthquakes.
- The overall significance of earthquakes is Medium but ranked High for communities on the western side of the county including Dos Palos and Gustine and in the more densely populated cities such as Merced.
- A moderate earthquake occurring in or near Merced County could result in deaths, casualties, property damage, agricultural and environmental damage, and disruption of normal government and community services and activities.
- The location of the epicenter as well as the time of day and season of the year would have a profound effect on the number of deaths and casualties, as well as property damage.
- The hazard of earthquakes varies from place to place, dependent upon the regional and local geology.
- **Effects on people:** Hazus probabilistic scenario modeling of worst case ground shaking results in estimates of 488-1,132 people needing hospitalization and between 10-65 deaths depending on the time of day the earthquake hits.

- **Effects on property: Hazus** probabilistic scenario modeling indicates about 17,106 buildings will be at least moderately damaged, with approximately \$2.4 billion in losses.
- **Effects on economy:** The total economic loss estimated for a large earthquake is \$4.6 billion, which includes building and lifeline related losses based on the region's available inventory. An estimated 14% of losses computed by Hazus were related to the business interruption of the region.
- **Effects on critical facilities and infrastructure:** Essential facility damage (police, fire, school, medical) is predicted to be low; only 246 hospital beds (51%) would be available during the earthquake. Utility lifeline systems impacts would be significant particularly to bridges; moderate damage can be expected to water, wastewater, power and communications facilities; loss of water and power would be significant in the days and weeks following the earthquake.
- **Cascading and Secondary Effects:** Earthquakes can cause many cascading effects such as fires, flooding, hazardous materials spills, utility disruptions, landslides, and transportation emergencies. Ground shaking may cause tsunamis or seiche, the rhythmic sloshing of water in lakes or bays.

Table 4-37 Hazard Risk Summary - Earthquake

Jurisdiction	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Significant	Unlikely	Critical	Medium
City of Atwater	Extensive	Occasional	Critical	Medium
City of Dos Palos	Extensive	Occasional	Critical	Medium
City of Gustine	Significant	Likely	Critical	Medium
City of Livingston	Limited	Occasional	Limited	Medium
City of Los Banos	Limited	Likely	Limited	Medium
City of Merced	Extensive	Occasional	Critical	Medium

4.2.4 Flood & Levee Failure

Hazard Description

Floods are among the most frequent and costly natural disasters in terms of human hardship and economic loss. Floods can cause substantial damage to structures, bridges and roadways, landscapes, and utilities as well as life safety issues. Certain health hazards are also common to flood events. Standing water and wet materials in structures can become breeding grounds for microorganisms such as bacteria, mold, and viruses. This can cause disease, trigger allergic reactions, and damage materials long after the flood. When floodwaters contain sewage or decaying animal carcasses, infectious disease becomes a concern. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Where flooding occurs in populated areas, warning and evacuation will be of critical importance to reduce life and safety impacts.

Floodplains are defined as the areas immediately adjacent to a channel from a river, stream, or other waterway. Floodplains are illustrated on inundation maps, which show areas of potential flooding and water depths. In its common usage and based on FEMA guidelines, the floodplain most often refers to the area that is inundated by the 100-year flood, or the flood that has a one percent chance occurrence in any given year of being equaled or exceeded. The 100-year flood is the national minimum standard to which communities regulate their floodplains through the FEMA NFIP. The 500-year flood is the flood that has a 0.2 percent chance of being equaled or exceeded in any given year. A 500-year flood event would be slightly deeper and cover a greater area than a 100-year flood event. The potential for flooding can change and increase through various land use changes and changes to land surface, which then may result in a change to the floodplain. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

A levee is a raised area that runs along the banks of a river or canal. Levees reinforce the banks and help prevent flooding. By confining the flow, levees can also increase the speed of the water. Levees can be natural or manmade. A natural levee is formed when sediment settles on the riverbank, raising the level of the land around the river. To construct a manmade levee, workers pile dirt or concrete along the riverbanks, creating an embankment. This embankment is flat at the top, and slopes at an angle down to the water. For added strength, sandbags are sometimes placed over dirt embankments.

Levees provide strong flood protection, but they are not failsafe. Levees are designed to protect against a specific flood level and could be overtopped during severe flood events. Levees reduce, not eliminate, the risk to individuals and structure behind them. A levee system failure or overtopping can create severe flooding and high-water velocities. It's important to remember that no levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

Riverine flooding - Riverine flooding, defined as the condition when a watercourse (e.g. river or channel) exceeds its "bank-full" capacity, generally occurs as a result of prolonged rainfall, or rainfall that is combined with already saturated soils from previous rain events. This type of flood occurs in river systems whose tributaries may drain large geographic areas and include one or more independent river basins. The onset and duration of riverine floods may vary from a few hours to many days. Factors that directly affect the amount of flood runoff include precipitation amount, intensity and distribution, the amount of soil moisture, seasonal variation in vegetation, snow depth, and water-resistance of the surface due to urbanization. Intense storms can overwhelm the local waterways as well as the integrity of any flood control structures. The warning time associated with slow rise floods assists in life and property protection

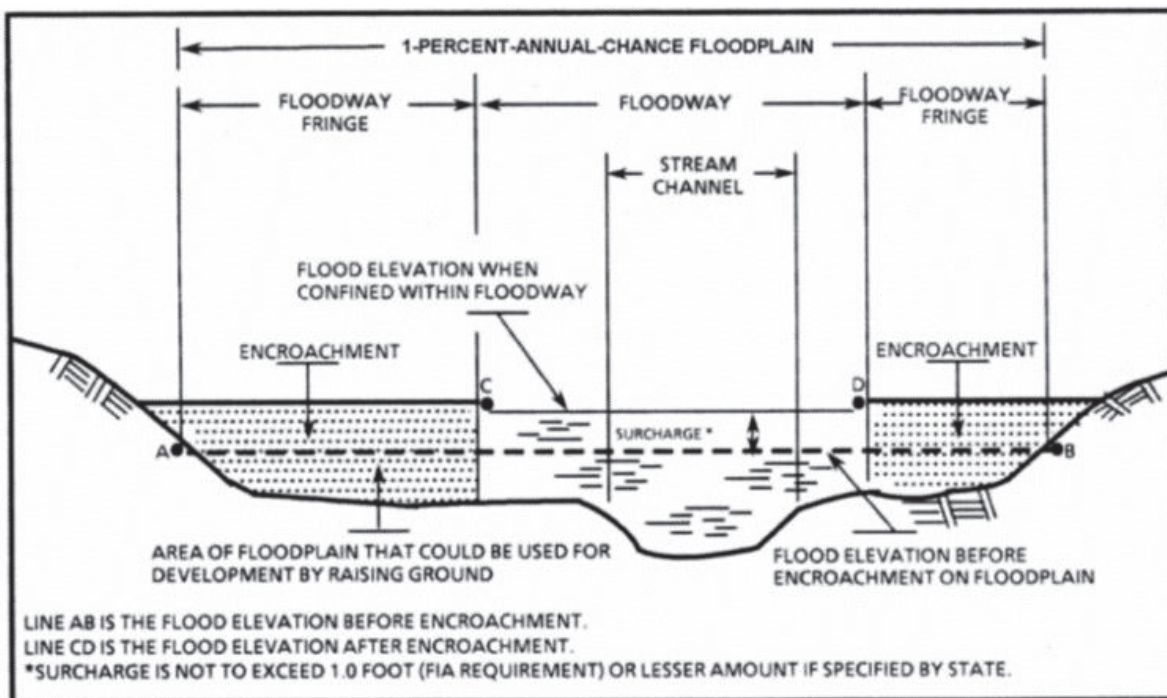
Localized flooding - Localized flooding problems are often caused by flash flooding, severe weather, or an unusual amount of rainfall. Flooding from these intense weather events usually occurs in areas experiencing an increase in runoff from impervious surfaces associated with development and urbanization as well as inadequate storm drainage systems.

Levee Failure – Flooding from the failure of levees throughout the county or upstream is also of concern. A catastrophic flood control structural failure could easily overwhelm local response capabilities to save lives and require mass evacuations. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Loss of life could result, and there could be associated health concerns as well as negative effects to local buildings and infrastructure.

The potential for flooding can change and increase through various land use changes and changes to land surface, which result in changes to the floodplain. Environmental changes can create localized flooding problems in and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

Encroachment into areas subject to inundation by floodwaters having rapid flows aggravates the risk of flood damage and heightens potential flood hazards by further increasing velocities. To reduce the risk of property damage in areas where the stream flows are high, the community may wish to restrict development in areas outside the floodway. FEMA defines a regulatory floodway as the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. The floodway is illustrated in Figure 4-13 below. The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water surface elevation of the base flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in schematic in the following.

Figure 4-13 Floodway Schematic



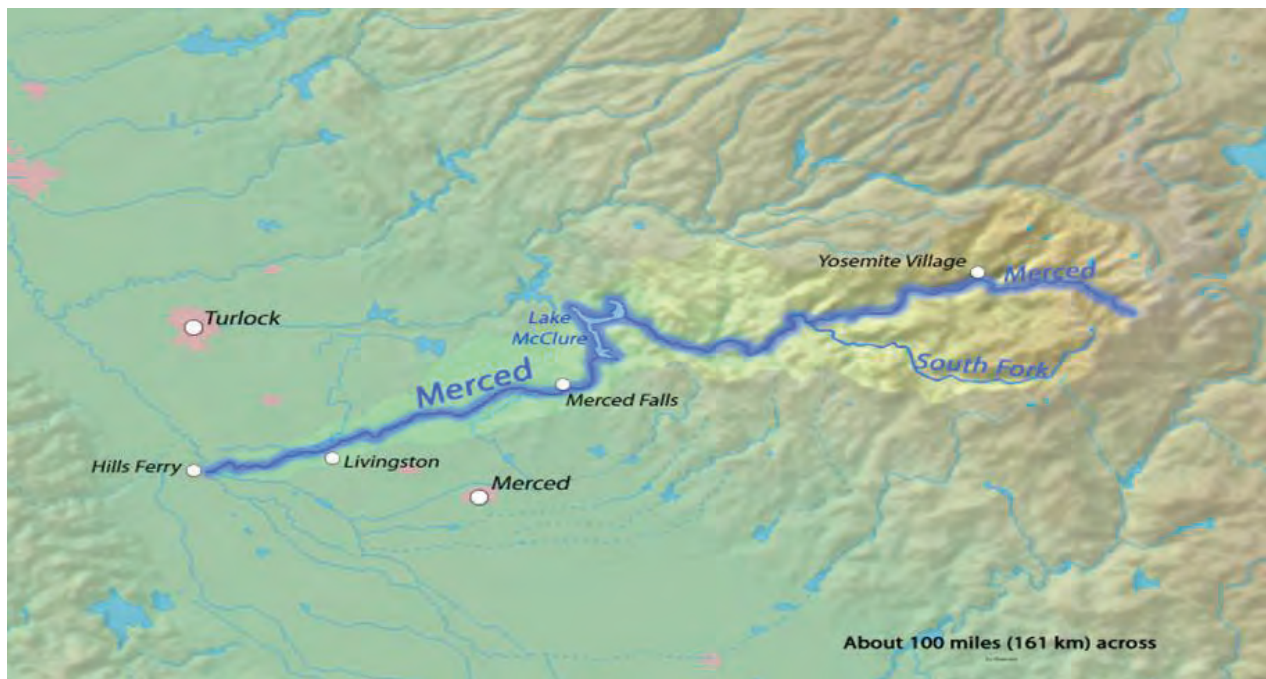
Source: Guidance for Flood Risk Analysis and Mapping – FEMA, 2019

Geographic Area

The Merced River, in the central part of California, is a 145-mile (233 km)-long tributary of the San Joaquin River flowing from the Sierra Nevada into the Central Valley. It is most well-known for its swift and steep course through the southern part of Yosemite National Park, and the world-famous Yosemite Valley. The river's character changes dramatically once it reaches the foothills and the lowlands, becoming a slow-moving waterway meandering through irrigated fields. Large-scale irrigated agriculture was introduced to the Central Valley in the late 19th century, and led to the construction of numerous state, federal and privately owned dams.

The San Joaquin River swings northwest, passing through many different channels, some natural and some manmade. Northeast of Dos Palos, it is joined by the Fresno and Chowchilla Rivers. Fifty miles downstream, the Merced River (highlighted below in Figure 4-14) empties into the San Joaquin. Canal and flood control development in the late 1800's and early 1900's redirected water flow and managed waterways through a series of canals, water storage and agricultural levies. This led to the conversion on thousands of acres of lake basin land into farmable ground.

Figure 4-14 Merced River



Source: Merced County website

The Tenaya, Yosemite, Bridalveil, and Pigeon Creeks join the Merced River before it breaches the glacial moraine at the valley's end. From there the river picks up Cascade Creek and turns south near El Portal, flowing through Merced River Canyon. State Route 140 follows the river out of the west entrance to the national park, a few miles before the South Fork Merced River, the largest tributary, joins from the left. The river arcs northwest to receive the North Fork, and a few miles after it enters Lake McClure, formed by New Exchequer Dam. Below New Exchequer, the river flows west through a heavily irrigated region of the Central Valley, passing through McSwain and Crocker-Huffman Dams and the cities of Hopeton, Delhi and Livingston. It joins the San Joaquin River at Hills Ferry, a few miles south of Turlock. There are also many lakes in the watershed of the Merced River, including Merced Lake, Tenaya Lake, the Chain Lakes, May Lake, Lake McClure, and Lake McSwain. The Merced River is the third largest tributary of the San Joaquin River.

The primary cause of local flooding is due to the drainage patterns that flow towards the San Joaquin River Basin and Merced County. The numerous tributaries of the San Joaquin – the Fresno, Chowchilla, Merced, Tuolumne, Mariposa Creek, Calaveras, Mokelumne, and others flowed freely across alluvial flood plains to join the river. All of the major tributaries of the river originate in the Sierra Nevada. Most of the streams that start in the Coast Range are intermittent and contribute little to the flow of the San Joaquin. During the winter, spring, and early summer, storms and snowmelt swell the river. In 1914 – before the development of major dams and irrigation diversions – the California Department of Engineering estimated the river's flow in full flood at 325,000 cubic feet per second (cfs). In late summer and autumn, there is little water left over to replenish stream flow.

The floodplain of the Merced River is well defined from the eastern county boundary to approximately 10 miles above the mouth of the river. Downstream of this point, the floodplain is undifferentiated from the valley floor and major floods can spread out over large areas. Floodplain storage reduces peak flows in the downstream direction. With the diminishing channel capacity of the Merced River, flood hazards increase. During the 1950 flood event, approximately 19,600 acres of land along the Merced River were inundated, including the towns of Snelling and Merced Falls.

The Merced River's primary human use is irrigation. The Merced Irrigation District (MID) operates most of the irrigation infrastructure, which supplies water to 154,394 acres (624.81 km²) of farmland. The Irrigation District and watershed are shown in Figure 4-15. As a whole, the system includes about 4,000 sets of control gates and 793 miles (1,276 km) of canals. Irrigation has taken most of the water out of the lower river, which now rarely reaches the sea. Water that does return to the river does so in form of irrigation return flows, which carry pesticides, fertilizer and other pollutants. The MID is federally required to allow at least 15,000-acre feet (19,000,000 m³) of water annually to flow continually down the river, not including flooding. The water has allowed the San Joaquin River below the Merced River confluence to contain water, while above the confluence all its water is usually diverted for irrigation.

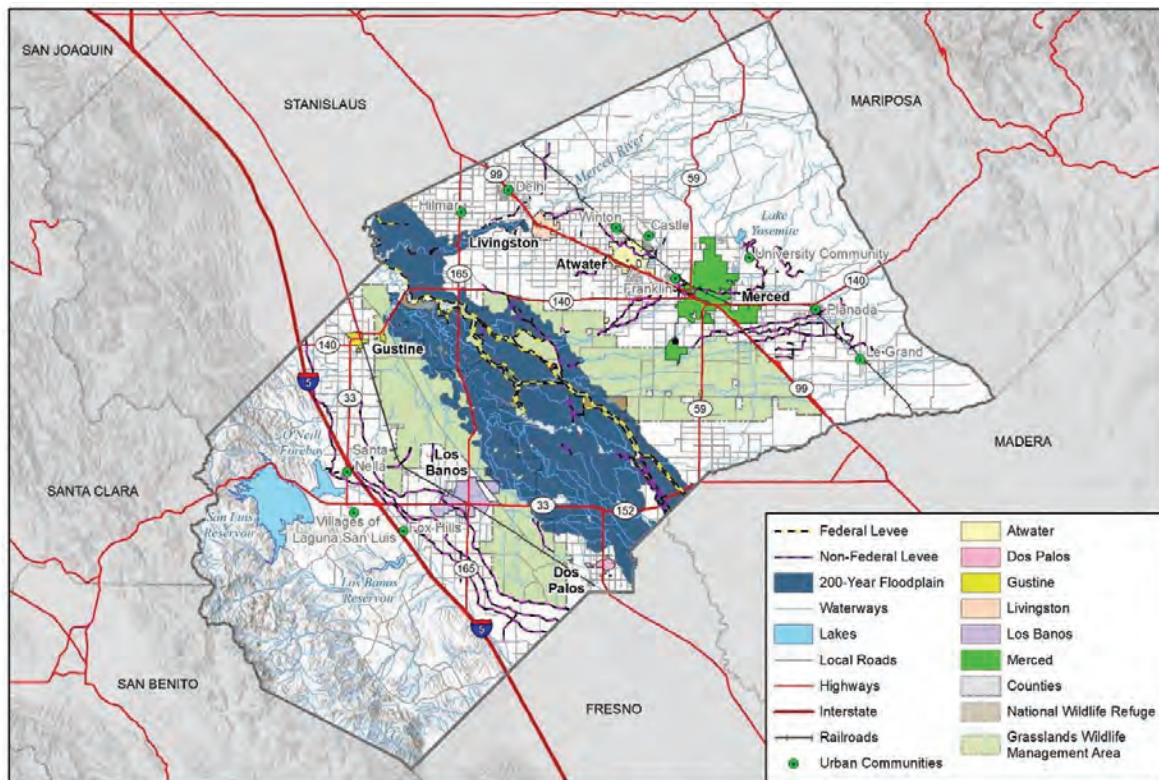
Figure 4-15 Merced Irrigation District Watershed System



Source: MID

The physical risks associated with potential flooding and the regulatory requirements for floodplain management are important considerations when decisions are being made regarding future land use throughout the County. Those same risks guide the local and community-level emergency response needs. Economic growth and prosperity in Merced County are dependent upon federal, state, and local agency involvement on regional and local flood management systems. Flood protection regulations within California have been increased over the past few years through legislation. This legislation included the requirement for the California DWR and Central Valley Flood Protection Board to prepare and adopt a Central Valley Flood Protection Plan (CVFPP) by 2012. The legislation also established certain flood protection requirements for local land use decision making based on the CVFPP. The law sets a higher standard for flood protection for the entire San Joaquin Valley. The standard was set for an urban level flood protection necessary to withstand a 1 in 200 chance of a flood event occurring in any given year (200-year flood) for areas developed or planned to have a population of at least 10,000. It also requires impacted counties to collaborate with cities to develop flood emergency response plans. Figure 4-16 shows the extent of this 200-year flood event based on the Best Available Maps (BAM) developed by California DWR.

Figure 4-16 Merced County 200-year Floodplain



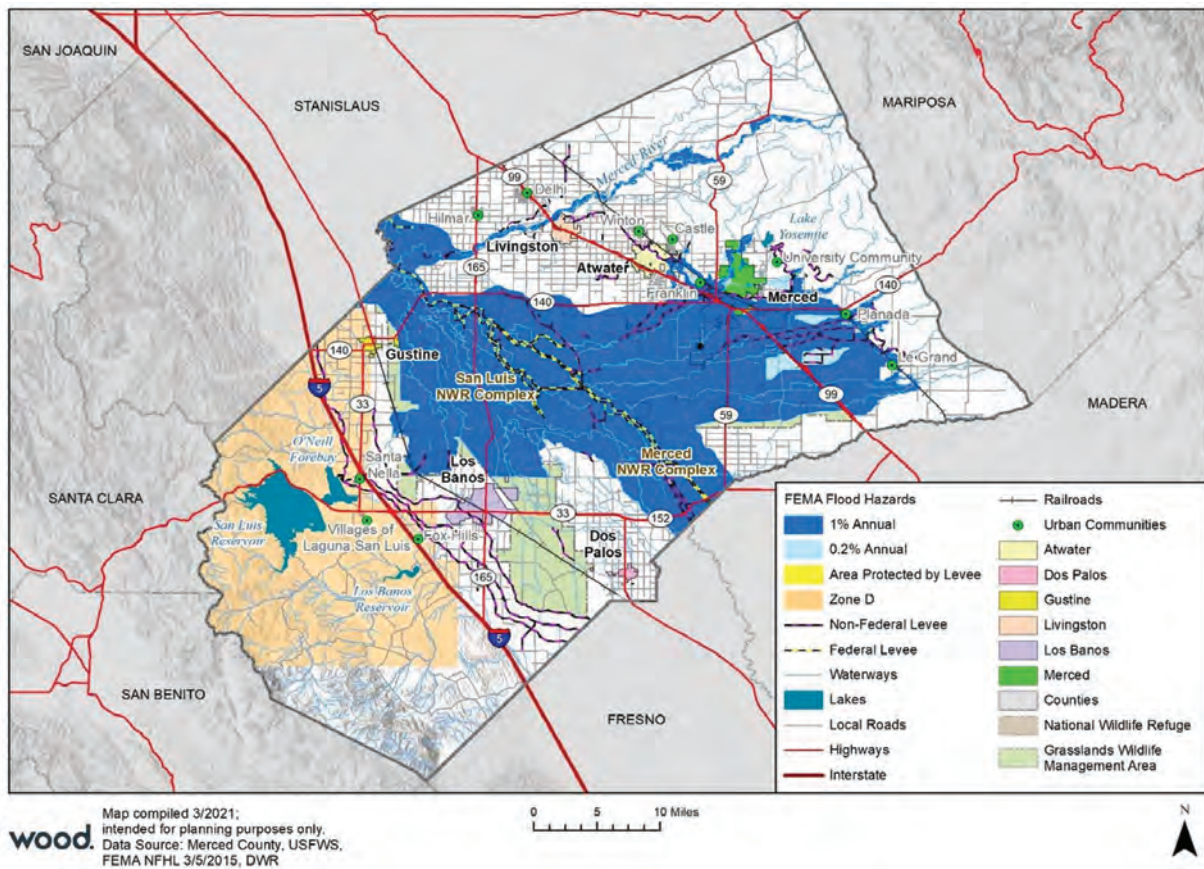
Map compiled 3/2021;
intended for planning purposes only.
Data Source: Merced County, USFWS,
USACE Comprehensive Study, DWR
Source: USACE, Wood Planning Team

In 2009, FEMA completed their DFIRM conversion and updated a number of flood zone areas using 2005 levee certification criteria. In 2007, the California DWR completed their Awareness Floodplain Mapping of Merced County to identify all pertinent flood hazard areas that are not mapped under FEMA's program, which provides an additional resource for identifying special flood hazard areas within the County.

Extent (Magnitude/Severity)

The FEMA and the Federal Insurance Administration have assessed flood hazards for major streams in Merced County. A large portion of Merced County continues to be subject to inundation during flood events, as approximately 380,010 acres have been determined to be in the FEMA floodplain. The extent of the floodplain is shown in Figure 4-17. Both a 100-year and 500-year flood event scenario are critical events in Merced County as the flooding would cover at least 35 to 50 percent of the County. More detailed maps are in the jurisdictional annexes.

Figure 4-17 Merced County 100-year and 500-year Floodplain



The largest flood of record on the Merced River was 46,200 cubic feet per second (cfs) and occurred on December 4, 1950, downstream of Old Exchequer Dam (built in Mariposa County in 1926). The New Exchequer Dam, which has more flood storage capacity, was built in 1967. Based on USGS stream data, the largest discharges along the Merced River since the construction of New Exchequer Dam occurred in 1983 followed by 1997.

During the major flood events in 1969, 1997, 1998, and 2006, Bear Creek overflowed at the southwest end of the City of Merced in the vicinity of Thornton Avenue and State Highway 140. Stream gauge data is not available to quantify the magnitude of these events. Historical records also indicate that Bear Creek overflowed its banks upstream from the G Street Bridge. This overflow was worsened by debris restricting flow under the bridge. The largest flood on the San Joaquin River since the completion of Friant Dam in 1943 occurred in 1997. Along the San Joaquin River during the past century, the five largest flood events include, in order of magnitude, those from 1997, 1938, 1983, 1969, and 2006 based on USGS data. The historical San Joaquin River floodplain widens from approximately 3 to 4 miles in the reach south of Merced County to approximately 19 miles in central Merced County. This large expansion of the floodplain is accompanied by a decrease in channel slope. The floodplain then narrows to approximately 2 miles downstream of the Merced River in the northern part of the county.

Previous Occurrences

Between 1992 and 2002, every county in California was declared a federal disaster area at least once for a flooding event. California has a chronic and destructive flood history. Of the 336 federally declared disasters in California between 1950 and 2020, 37 were flood related. This makes flooding second only to fire in the number of federal disaster declarations in the state. Historically, floods have been the most frequent cause of disaster in Merced County.

Significant flooding occurs in Merced County approximately every five years. Merced County has had two flood events that were federally declared disasters, once in 1969 and again in 2017. FEMA's Flood Insurance Study also listed flooding events in 1937-38, 1950, 1955, 1969, 1983, 1997, 1998, and 2006. Additionally, NOAA's National Centers for Environmental Information (NCEI) database lists 54 flood or flash flood events which have occurred in the county between 1950 and 2020.

Table 4-37 below highlights several notable flood events in the county that resulted in significant damages or involved federal disaster declarations.

Table 4-38 Major Floods in Merced County

Date of Event	Incident Description
January-February 1969	A series of storms delivered 12-50 inches of rainfall over an 8-day period throughout Central and Southern California. This affected the San Joaquin Valley and resulted in the first federal disaster for flood in Merced County.
March 25, 1998	A series of thunderstorms brought locally heavy rain to the City of Merced area, resulting in rainfall totals for 24 hours ending by the morning of the 25th from 3.5" to 5.9" in the Merced City area. One gauge in the north part of town showed 6.8" in the 48-hour period from the evening of the 23rd to the evening of the 25th. Over 1000 people were evacuated from Merced City and nearby County areas. Over 65 homes and 19 apartments were flooded in and around Merced City as the result of torrential/record-setting rainfall in the previous 18 hours. According to the NCEI database, \$9.6 million in property damage and \$1.5 million in crop damages occurred during this event.
October 24, 1998	The cool season's first significant rain pushed through Central California. Merced received 0.75" of rain in embedded frontal thundershowers and locally heavy rain in about 2 hours. Some local street flooding was reported just south of Hilmar and within Delhi. In Merced a

Date of Event	Incident Description
	tree was toppled by the storm. Several traffic accidents occurred on rain-slickened roads. According to NCEI, this event also resulted in \$120,000 in property damage and six injuries.
January 10, 2005	Heavy rain resulted in water overflowing from Bear Creek in the Merced area from heavy rainfall damaged a handful of homes on the 11 th , and \$200,000 in property damages.
March 22, 2005	Over 4 inches of rain fell in a 24-hour period in the Mariposa County area of Central California, upstream of Merced County. Numerous small creeks flooded in Mariposa, Merced, and Madera Counties. Flooding caused damage to structures within the town of Mariposa and several bridges and roads in and around Hornitos, Merced Falls, and Catheys Valley in Merced and Mariposa Counties. \$250,000 in property damage was recorded.
April 4, 2006	Due to continued heavy rain and subsequent high stream flows, a break in Black Rascal Creek flooded homes in north Merced. And Bear Creek raised over its banks in West Merced flooding a residential section in that vicinity. Overall, there were approximately 300 homes flooded around Merced with over 500 people evacuated during the event. \$9.72 million in property damage.
March 27, 2011	During the frequently stormy period that began on the 18th and ended on the 28th, as much as 7 inches of rain fell in the San Joaquin Valley and up to 10 inches of rain drenched the adjacent foothills while the higher elevations of the Sierra (above 7000 feet) received snow accumulations of up to 15 feet. Excessive runoff combined with an increase in reservoir releases at the major dams caused higher than normal flows along rivers and streams through the end of the month. The Merced River at Stevenson peaked a half of a foot below flood stage at 4:30 pm on the 21st but otherwise remained well above monitor stage during the last two weeks of the month. Water levels along the San Joaquin River approached levels that had not been observed since January 1997. In Merced County, several water swollen creeks briefly flowed out of their banks on the morning of the 20th and caused minor flooding. The event caused \$500,000 in property damage.
November 30, 2012	California highway patrol reported a multi-vehicle accident in heavy rain on Highway 99 at west side boulevard. Involved three cars and a big rig. Number of injuries unknown at this time. \$120,000 in damages were also recorded.
February 1-23, 2017	On March 19, 2017, Governor Edmund G. Brown Jr. requested a major disaster declaration due to severe winter storms, flooding, and mudslides during the period of February 1-23, 2017. The Governor requested a declaration for public assistance for 42 counties and Hazard Mitigation statewide. Merced County was included in the declaration.

Source: NCEI Storm Events Database, FEMA

Figure 4-18 Image of Past Flooding in Merced County



Source: Fox 26 News, Images of February 2017 flooding

Probability of Future Occurrences

Due to the history of past flooding events and the natural drainage pattern of the planning area, flooding in Merced County is likely to continue to occur. The potential for failure of one of the many levees throughout the county could create more risk for flooding. The 100-year flood is the flood that has a one percent chance in any given year of being equaled or exceeded. Based on past events, flooding events less severe than a 100-year flood and those outside of the 100-year floodplain occur frequently during periods of heavy rains. According to the NCEI Storm Events Database, there have been 54 flood events recorded for Merced County between 1990 and 2020. Utilizing the methodology explained in subsection 4.1.1, this means there is a 180% chance of a flood event occurring in a given year. Significant flooding occurs in Merced County approximately every five years.

Climate Change Considerations

California's Fourth Climate Assessment found that costs associated with direct climate change impacts by 2050 will be dominated by human mortality, coastal damage, and the potential for droughts and mega-floods (California Natural Resources Agency 2018). Scientific studies outlined in the same assessment also indicated shifts in California's precipitation regime, which show more dry days, more dry years, a longer dry season, and increases in occasional heavy precipitation events and floods. Studies also project greater storm intensity with climate change, resulting in more direct runoff and flooding (California Natural Resources Agency 2018). As a result, high frequency flood events in conjunction with heavy precipitation events and extreme storm events will increase with climate change. Certain climate studies noted in the Fourth Climate Assessment also forecast that during periods with heavy rain and frequent storm events there is an increase in flood events, as well as landslide and debris flow (California Natural Resources Agency 2018). For example, during the 2016-2017 winter, the storms resulted in many secondary hazards, including numerous landslides and in some watersheds an increased sediment load. Also, with wildfires already being a problem in California, increasing periods of drought and lack of precipitation are expected

to exacerbate conditions for fires to occur, and in turn worsen the potential for runoff and flooding associated with burned areas.

The Fourth Climate Assessment also includes nine reports for the nine regions in California. According to the preview for the San Joaquin Valley Region Summary Report, which has not yet been published at the time of this plan update, the frequency of catastrophic floods will increase in the coming years. This in turn will lead to increased stresses to agriculture, natural ecosystems, water resources, land use and community development, transportation, energy, public health, and climate justice.

Vulnerability Assessment

While there are some benefits associated with flooding, such as the replenishment of sediments and nutrients to agricultural lands, it is considered a hazard to development in floodplains. Floods can cause many cascading effects. Fire can break out as a result of dysfunctional electrical equipment. Hazardous materials can also get into floodways, causing health concerns and polluted water supplies. In many instances during a flood, the drinking water supply will be contaminated. During the 2021 update the following vulnerability analysis using GIS was performed to quantify flood risk.

General Property

Historically, Merced County has been at risk to flooding primarily during the winter and spring months when river systems in the county swell with heavier rainfall and runoff from winter snowmelt. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. But occasionally, extended heavy rains result in floodwaters that exceed normal high-water boundaries and cause damage. Flooding has occurred in the past within the 100-year floodplain and in other localized areas.

A flood vulnerability assessment was performed for Merced County using the following GIS methodology. The County's parcel layer and associated assessor's building improvement valuation data were provided by the County and were used as the basis for the inventory. Merced County's effective DFIRM was used as the hazard layer. A DFIRM is FEMA's flood risk data that depicts the 1% annual chance (100-year) and the 0.2% annual chance (500-year) flood events; this data is incorporated into the National Flood Hazard Layer (NFHL). Merced County's effective FEMA DFIRM, dated December 2, 2009, was determined to be the best available floodplain data. Figure 4-17 summarizes the flood zones included on these maps.

GIS was used to intersect the parcel boundaries with a master address point layer to obtain the number of buildings per parcel. Only parcels with improvement values greater than zero were used in the analysis, this method assumes that improved parcels have a structure of some type. The DFIRM flood zones were overlaid in GIS on the address points to identify structures that would likely be inundated during a 1% annual chance and 0.2% annual chance flood event. This overlay can be seen graphically in the regional maps in Figure 4-17, and in more detail in the jurisdictional annexes.

Building improvement values and counts for those points were then extracted from the parcel/assessor's data and summed for the unincorporated county and jurisdictions. Results of the overlay analysis are shown in Table 4-38 for the 1% annual chance flood and Table 4-39 for 0.2% annual chance flood. The jurisdictional annexes provide more detailed information based on property type. Property type refers to the land use of the parcel and includes agricultural, commercial, exempt, industrial, mixed use, residential, and vacant. A loss estimate analysis was also performed based on depth damage functions developed by the Army Corp of Engineers and FEMA. The loss curves depict the expected flood losses associated with the depth of flooding at a structure. Contents values were estimated as a percentage of building value based on their occupancy type, using FEMA/HAZUS estimated content replacement values. This includes 100% of the structure value for agricultural, commercial, exempt, and open space structures, 50% for

multi-residential and residential structures and 150% for industrial structures. Building and contents values were totaled to obtain total exposure.

There are different depth damage curves for structure and content losses. For the purposes of this planning level analysis, an average flood depth of 2 feet is assumed. A depth damage ratio of 25% was used for structural loss, based on the FEMA damage curves, assuming a 2-foot-deep flood. A loss ratio was also calculated to express the estimated losses in relation to the total value of all property in the jurisdiction, including property values not exposed to the floodplain boundaries. The results are shown in the loss estimate columns in Table 4-38 for the 1% annual chance flood.

The result is an inventory of the number and types of improved parcels subject to flooding. Results are presented by unincorporated county and incorporated jurisdictions. Detailed tables show counts of parcels by jurisdictions and land use type (agricultural, commercial, exempt, industrial, multi-residential, open space and residential) within each flood zone. It is important to note that there could be more than one structure or building on an improved parcel (i.e., a condo complex occupies one parcel but might have several structures). This flood loss analysis does not account for business disruption, emergency services, environmental damages, or displacement costs, thus actual losses could exceed the estimate shown. Conversely, this analysis does not differentiate parcels that may have been developed since when the county and cities adopted floodplain regulations, which would be mitigated to the 1% annual chance flood if developed in accordance with local floodplain regulations.

Table 4-39 1% Annual Chance Floodplain Exposure and Loss by Jurisdiction

Jurisdiction	Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Estimated Loss
Atwater	Commercial	4	8	\$446,109	\$446,109	\$892,218	\$223,055
	Exempt	7	7	\$0	\$0	\$0	\$0
	Industrial	1	1	\$16,651	\$24,977	\$41,628	\$10,407
	Residential	342	344	\$87,919,330	\$43,959,665	\$131,878,995	\$32,969,749
	Total	354	360	\$88,382,090	\$44,430,751	\$132,812,841	\$33,203,210
Livingston	Agricultural	1	1	\$7,441	\$7,441	\$14,882	\$3,721
	Total	1	1	\$7,441	\$7,441	\$14,882	\$3,721
Merced	Agricultural	17	19	\$704,235	\$704,235	\$1,408,470	\$352,118
	Commercial	527	1,873	\$339,551,353	\$339,551,353	\$679,102,706	\$169,775,677
	Exempt	433	960	\$9,185,588	\$9,185,588	\$18,371,176	\$4,592,794
	Industrial	118	218	\$167,406,079	\$251,109,119	\$418,515,198	\$104,628,799
	Mixed Use	9	9	\$185,869	\$185,869	\$371,738	\$92,935
	Residential	9,161	12,140	\$1,218,507,813	\$609,253,907	\$1,827,761,720	\$456,940,430
	Vacant Land	30	38	\$1,030,699	\$1,030,699	\$2,061,398	\$515,350
	Total	10,295	15,257	\$1,736,571,636	\$1,211,020,769	\$2,947,592,405	\$736,898,101
Unincorporated	Agricultural	2,240	2,920	\$571,674,871	\$571,674,871	\$1,143,349,742	\$285,837,436
	Commercial	182	516	\$45,633,503	\$45,633,503	\$91,267,006	\$22,816,752
	Exempt	84	115	\$9,565,302	\$9,565,302	\$19,130,604	\$4,782,651
	Industrial	57	82	\$63,423,427	\$95,135,141	\$158,558,568	\$39,639,642
	Mixed Use	15	17	\$233,502	\$233,502	\$467,004	\$116,751
	Residential	2,697	2,967	\$319,577,554	\$159,788,777	\$479,366,331	\$119,841,583

Jurisdiction	Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Estimated Loss
	Vacant Land	25	26	\$131,577	\$131,577	\$263,154	\$65,789
	Total	5,300	6,643	\$1,010,239,736	\$882,162,673	\$1,892,402,409	\$473,100,602
	Grand Total	15,950	22,261	\$2,835,200,903	\$2,137,621,633	\$4,972,822,536	\$1,243,205,634

Source: Merced County Assessor's Office; NFHL Effective date 12/02/2008, FEMA; GIS analysis

Large areas of Merced County are at risk of being inundated by a 100-year flood event. The City of Merced, City of Atwater, and unincorporated areas of the County are predominantly inundated by the 100-year floodplain and have the greatest percentages of total loss from a 100-year flood event. While other jurisdictions are far less at risk during in a 100-year flood event, several jurisdictions including Dos Palos and Gustine are at a greater risk of inundation in the event of a 200-year flood.

Based on this analysis, the Merced County planning area has 15,950 parcels and 22,261 buildings valued over \$2.8 billion in the 100-year floodplain. An additional 2,904 parcels and 3,866 buildings valued at roughly \$596 million fall within the 500-year floodplain. As a result, total structural exposure is approximately \$4.4 billion. When factoring the content values within these areas in addition to the structures the total combined value of exposure is \$6.1 billion. Development in the 500-year floodplain is typically not regulated, thus a large flood event could be extremely damaging in the County and Merced. This information is summarized in Table 4-39 below.

Table 4-40 0.2% Annual Chance Floodplain Exposure and Loss by Jurisdiction

Jurisdiction	Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Estimated Loss
Merced	Commercial	30	31	\$62,378,180	\$62,378,180	\$124,756,360	\$31,189,090
	Exempt	33	69	\$0	\$0	\$0	\$0
	Mixed Use	2	3	\$41,361	\$41,361	\$82,722	\$20,681
	Residential	1,594	2,412	\$337,480,454	\$337,480,454	\$674,960,908	\$168,740,227
	Total	1,659	2,515	\$399,899,995	\$399,899,995	\$799,799,990	\$199,949,998
Unincorporated	Agricultural	204	262	\$39,295,471	\$39,295,471	\$78,590,942	\$19,647,736
	Commercial	6	14	\$9,074,287	\$9,074,287	\$18,148,574	\$4,537,144
	Exempt	6	6	\$3,145,199	\$3,145,199	\$6,290,398	\$1,572,600
	Mixed Use	4	4	\$148,839	\$148,839	\$297,678	\$74,420
	Residential	1,022	1,062	\$144,732,798	\$144,732,798	\$289,465,596	\$72,366,399
	Vacant Land	3	3	\$6,699	\$6,699	\$13,398	\$3,350
	Total	1,245	1,351	\$196,403,293	\$196,403,293	\$392,806,586	\$98,201,647
	Grand Total	2,904	3,866	\$596,303,288	\$596,303,288	\$1,192,606,576	\$298,151,644

Source: Merced County Assessor's Office; NFHL Effective date 12/02/2008, FEMA; GIS analysis

Another method of assessing flood vulnerability is through the utilization of the California DWR BAM which display a 200-year floodplain. The BAM does not replace existing FEMA regulatory floodplains, but rather identifies potential flood risks that may warrant further studies or analysis. Analyzing this floodplain data in the same way as described above revealed an estimated additional 2,159 buildings exposed to flood hazard throughout the unincorporated portions of Merced County.

Insurance Coverage, Claims Paid, and Repetitive Losses

Unincorporated Merced County joined the NFIP in 1979. All of the jurisdictions in the county, with the exception of Gustine, are NFIP participants. The County currently does not participate in the optional CRS, nor do any of the jurisdictions.

In the unincorporated county, there are 1,558 policies in force, of which there are 1,285 single family units, 4 2-4 family, three all other residential, and 266 nonresidential. The number of policies in force by jurisdiction and flood zone are shown in Table 4-40 below. The City of Gustine is not included as it is not a NFIP participant.

Table 4-41 Merced County Community Information System Policies in Force by Flood Zone and Jurisdiction

Flood Zone	Merced County	City of Merced	City of Los Banos	City of Livingston	City of Dos Palos	City of Atwater
A01-30 & AE Zones	33	275	0	0	0	0
A Zones	411	51	0	0	0	0
AO Zones	240	573	0	0	0	0
AH Zones	80	114	0	0	0	0
AR Zones	0	0	0	0	0	0
A99 Zones	0	0	0	0	0	0
V01-30 & VE Zones	0	0	0	0	0	0
V Zones	0	0	0	0	0	0
D Zones	0	0	0	0	0	0
B, C & X Zone						
Standard	51	59	0	3	0	1
Preferred	62	119	16	1	3	13
Total	877	1,191	16	4	3	14

Source: FEMA NFIP Community Information System

NFIP data indicates that there are 4,987 insurance policies in Merced County representing \$1,084,286,000 of insurance coverage in force. Since 1979 there have been 281 paid losses, totaling \$4,484,055. Most of the losses have been in the City of Merced and the unincorporated county. Table 4-41 provides more details on flood insurance policies for each individual jurisdiction.

FEMA insures properties against flooding losses through the NFIP. As part of the process to reduce or eliminate repetitive flooding to structures across the United States, FEMA has developed an official Repetitive Loss Strategy. The purpose behind the national strategy is to identify, catalog, and propose mitigation measure to reduce flood losses to the relatively few numbers of structures that absorb the majority of the premium dollars from the national flood insurance fund.

A repetitive loss property is defined by FEMA as “a property for which two or more NFIP losses of at least \$1,000 each have been paid within any 10-year period since 1978”. A repetitive loss property may or may not be currently insured by the NFIP. There are 13 repetitive loss buildings in the unincorporated county, 3 of which are insured and a total of \$367,067 was paid out. There are no Severe Repetitive Loss properties, as defined by FEMA, anywhere in the County.

Table 4-42 Merced County Flood Insurance Policy Information

Jurisdiction	Policies	Insurance in Force	No. of Paid Losses	Total Losses Paid
Atwater	14	\$4,018,000	1	\$1,740
Dos Palos	3	\$553,000	0	\$0
Gustine	N/A	N/A	N/A	N/A
Livingston	4	\$665,000	0	\$0
Los Banos	16	\$5,180,000	0	\$0
Merced	3,401	\$772,521,900	151	\$2,230,265
Unincorporated	1,558	\$301,348,300	129	\$2,252,050
Total	4,996	\$1,084,286,000	281	\$4,484,055

Source: FEMA NFIP Community Information System

People

The total number of residential properties in each floodplain was multiplied by the average household size of 3.32 persons for the County (ACS 2019 estimates) to estimate resident population within mapped flood hazard areas. Based on this analysis, which accounts for residents only and not workers, there are 49,878 residents living in the 100-year flood zone throughout the County. Of all study areas, the City of Merced has the most residents living in the 1% annual chance flood area, followed by the unincorporated county. Table 4-42 below details population estimates by jurisdiction, followed by similar tables for the 500-year floodplain.

Table 4-43 Population Living in the 1% Annual Chance Flood Hazard Zone

Jurisdiction	Population
Atwater	1,094
Merced	38,877
Unincorporated County	9,907
Total	49,878

Source: Wood GIS analysis on Merced County Assessor's Office data and FEMA NFHL, ACS Census Estimates

The same analysis was conducted for the 500-year floodplain, indicating that there are 11,267 residents living in the 500-year flood zone throughout Merced County. The majority of people living in this floodplain are residents of the City of Merced, with almost 8,000 people in the 500-year floodplain. This population distribution is shown in the table below.

Table 4-44 Population Living in the 0.2% Annual Chance Flood Hazard Zone

Jurisdiction	Population
Merced	7,728
Unincorporated County	3,539
Total	11,267

Source: Wood GIS analysis on Merced County Assessor's Office data and FEMA NFHL, ACS Census Estimates

Critical Facilities and Infrastructure

Key support facilities and structures most necessary to withstand the impacts of, and respond to, natural disasters are referred to as critical facilities. Examples of these critical facility types include utilities, transportation infrastructure, and emergency response and services facilities, given failures of components along major lifelines or even closures or inaccessibility to key emergency facilities could limit if not

completely cut off transmission of commodities, essential services, and other potentially catastrophic repercussions. Floods and levee failure have the ability to disrupt, damage, or destroy these critical facilities, which in turn can impede the ability of Merced County to respond to and recover from a major flood event.

A GIS analysis of exposed critical facilities was conducted, similar to the parcel analysis, using HIFLD. The results of critical facilities throughout the county which are exposed to the various flood hazards are shown in Table 4-44 and Table 4-45 below, and organized by the jurisdiction they are located in and the FEMA Lifeline category into which they are classified.

Table 4-45 Critical Facilities Within the 1% Annual Chance Flood Hazard by FEMA Lifeline and Jurisdiction

Jurisdiction	Communications	Energy	Food, Water, Shelter	Hazardous Material	Health and Medical	Safety and Security	Transportation	Total
Atwater	2	2	1	-	-	1	4	10
Dos Palos	-	-	-	-	-	-	-	0
Gustine	-	-	-	-	-	-	-	0
Livingston	-	-	-	-	-	-	-	0
Los Banos	-	-	-	-	-	-	-	0
Merced	26	3	30	15	6	51	25	156
Unincorporated	13	5	13	11	-	34	180	256
Total	41	10	44	26	6	86	209	422

Source: HIFLD, FEMA NFHL

Table 4-46 Critical Facilities Within the 0.2% Annual Chance Flood Hazard by FEMA Lifeline and Jurisdiction

Jurisdiction	Communications	Energy	Food, Water, Shelter	Hazardous Material	Health and Medical	Safety and Security	Transportation	Total
Atwater	-	-	-	-	-	-	-	0
Dos Palos	-	-	-	-	-	-	-	0
Gustine	-	-	-	-	-	-	-	0
Livingston	-	-	-	-	-	-	-	0
Los Banos	-	-	-	-	-	-	-	0
Merced	-	-	2	-	2	5	-	9
Unincorporated	1	-	-	-	-	5	1	7
Total	1	0	2	0	2	10	1	16

Source: HIFLD, FEMA NFHL

Economy

Flooding can have a major economic impact on the economy. Based on the flood loss analysis, there are 2,397 commercial structures worth an estimated \$771 million in total value directly at risk to flooding in the 1% annual chance zone. Based on the loss analysis this could result in approximately \$193 million in direct losses. This does not account for other indirect losses such as business interruption, lost wages and other downtime costs.

Effects on the agriculture economy can be devastating, and a large amount of area at risk to flooding in the County is agricultural. Flooding can damage crops and livestock. In addition to the obvious impacts on crops and animals, flooding can have deleterious effects on soil and the ability to reinvigorate the agricultural activities impacted once the flood waters recede. Damage to water resources such as underground irrigation systems, water storage reservoirs, springs and other natural water bodies could have a serious effect upon agriculture operations.

Historic, Cultural, and Natural Resources

There are 15 properties throughout the County on the NRHP. Most of these places are located in the City of Merced, which has the highest risk and exposure to flood hazards.

Natural areas within the floodplain often benefit from periodic flooding as a naturally recurring phenomenon. These natural areas often reduce flood impacts by allowing absorption and infiltration of floodwaters. Natural resources are generally resistant to flooding except where natural landscapes and soil compositions have been altered for human development or after periods of previous disasters such as drought and fire. Wetlands, for example, exist because of natural flooding incidents. A large percentage of flood prone area in the County are wetlands that are part of the San Luis and Merced National Wildlife Refuges. These areas provide natural and beneficial functions to hold and absorb floodwaters. Areas recently suffering from wildfire damage may erode because of flooding, which can temporarily alter an ecological system.

Future Development

Flooding and floodplain management are significant issues for Merced County. The potential or likelihood of a flood event in the county increases with the annual onset of heavy rains in winter and spring months. Much of the historical growth in the problem areas connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards. For NFIP participating communities, floodplain management practices implemented through local floodplain management ordinances should mitigate the flood risk to new development in the 100-year floodplains. As noted previously, a large amount of development has occurred in the 500-year floodplain and these areas are not regulated or require flood mitigation.

The development trend in the Merced County planning area is steady growth. Much of this growth is occurring in the urban areas, which can increase stormwater runoff. The 2020 Caltrans Economic Forecast at the county-level for all 58 counties in California for 2018-2050, projects that Merced County's population will continue to increase by 1.3 percent through 2025. Such growth may consume previously undeveloped acres, and the increase in impervious surfaces could affect existing drainage and flood control facilities.

Changes in municipal boundaries such as annexations into the SOI may change the flood risk profile for certain communities. A GIS analysis of 1% annual chance flood exposure within SOI boundaries is summarized in the tables below.

Table 4-47 Sphere of Influence Risk to FEMA 1% Annual Chance Flood Hazard

Sphere of Influence	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Estimated Loss	Population	Loss Ratio
Atwater	72	80	\$9,559,223	\$6,160,259	\$15,719,482	\$3,929,871	169	1.4%
Livingston	1	1	\$103,862	\$103,862	\$207,724	\$51,931	0	0.2%
Merced	908	1,121	\$154,013,086	\$111,545,194	\$265,558,280	\$66,389,570	2,673	7.5%
Total	981	1,202	\$163,676,171	\$117,809,315	\$281,485,486	\$70,371,372	2,842	

Table 4-48 Sphere of Influence Risk to FEMA 0.2% Annual Chance Flood Hazard

Sphere of Influence	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Estimated Loss	Population	Loss Ratio
Atwater	1	1	\$81,844	\$40,922	\$122,766	\$30,692	3	0.01%
Merced	80	86	\$29,663,971	\$17,321,531	\$46,985,502	\$11,746,375	249	1.3%
Total	81	87	\$29,745,815	\$17,362,453	\$47,108,268	\$11,777,067	252	

Risk Summary

The overall significance of the flood hazard is High. The 100-year floodplain in Merced County is vast, and many thousands of residents and millions in property value are within the floodplain.

- Countywide there are 22,261 structures at risk worth \$4.9 billion, with a loss estimate of \$1.2 billion.
- The City of Merced accounts for 59% of the total losses in the 100-year floodplain. 48% of the City of Merced's buildings are in the floodplain.
- Commercial structures account for 15.5% of total losses in the 100-year floodplain, with a loss estimate of \$193M
- Countywide approximately 49,878 persons live in the 100-year floodplain, of which the vast majority (38,877) are in the City of Merced.
- There are 11,267 persons within the 500-year floodplain and a flood of this magnitude would have severe consequences.
- Levees and flood control dam infrastructure provide some protection, but also pose potential levee and dam failure risks.
- A total of 438 critical facilities are found in 1% annual chance (422 facilities) and 0.2% annual chance (16 facilities) flood zones in the county. Most of them are in the City of Merced or in the unincorporated areas of the county.
- **Related hazards:** Severe weather: Heavy Rain, Wildfire, Landslide and Debris Flow.

Table 4-49 Hazard Risk Summary – Flood & Levee Failure

Jurisdiction	Geographic Extent	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Extensive	Likely	Catastrophic	High
City of Atwater	Extensive	Likely	Critical	Medium
City of Dos Palos	Limited	Occasional	Limited	Low
City of Gustine	Significant	Occasional	Critical	Medium
City of Livingston	Limited	Occasional	Negligible	Medium

Jurisdiction	Geographic Extent	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
City of Los Banos	Limited	Likely	Limited	Medium
City of Merced	Significant	Likely	Limited	Medium

4.2.5 Landslide

Hazard Problem/Description

A landslide is a geologic hazard where the force of gravity combines with other factors to cause earth material to move or slide down an incline. Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly. Slopes with the greatest potential for sliding are between 34 degrees and 37 degrees. Although steep slopes are commonly present where landslides occur, it is not necessary for the slopes to be long.

Debris flows are a mixture of rock fragments, soil, vegetation, water and, in some cases, entrained air that flows downhill as a fluid. Debris flows can range in consistency from that of freshly mixed concrete to running water. Debris flows can be further classified as mudflows and earth flows depending on the ratio of water to soil and rock debris.

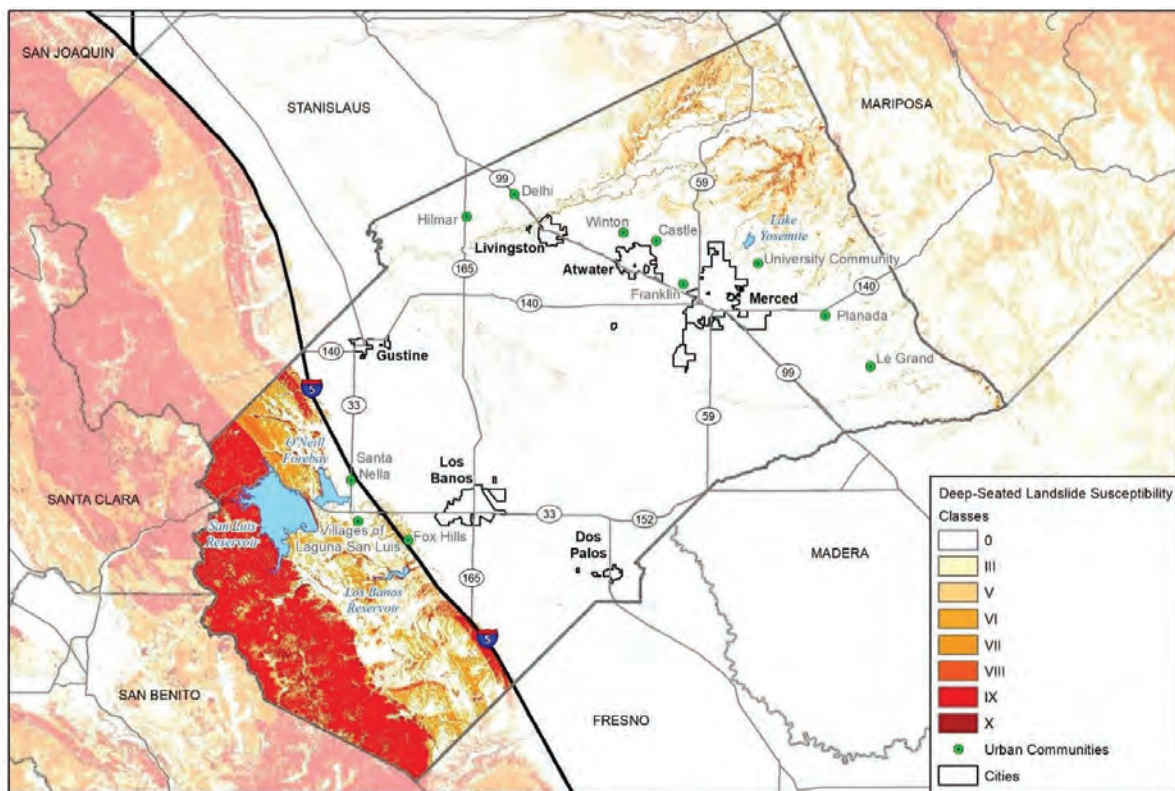
Landslide and debris flow problems can be caused by land mismanagement, particularly in mountain, canyon, and coastal regions. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides and debris flows. As human populations expand over more of the land surface, these processes become an increasing concern.

There are predictable relationships between local geology and landslides, rockslides, and debris flows. The downslope movement of earth material, either as a landslide, debris flow, mudslide, or rockslide, is part of the continuous, natural process of erosion. This process, however, can be influenced by a variety of causes that change the stability of the slope. Slope instability may result from natural processes, such as the erosion of the toe of a slope by a stream, or by ground shaking caused by an earthquake. Slopes can also be modified artificially by grading, or by the addition of water or structures to a slope. Development that occurs on a slope can substantially increase the frequency and extent of potential slope stability hazards. Knowledge of these relationships can improve planning and reduce vulnerability. Slope stability is dependent on many factors and their interrelationships, including rock type, moisture content, slope steepness, and natural or manmade undercutting.

Geographic Area

In Merced County the landscape is largely characterized by the San Joaquin Valley, which is relatively flat and takes up the majority of the central portion of the county. To the eastern edge of the county, lying within the foothills of the Sierra Nevada range, and the western edge, within the Coast Range, there are several geologic formations commonly associated with slope stability problems. Figure 4-19 below provides a summary of landslide hazard potential. As shown in the map, the areas of the county with the greatest potential susceptibility to landslide hazards are in the far southwest of the county, on the western side of Interstate 5. This area is all unincorporated area in the county and is largely rural in character, indicating a lower potential risk to property and infrastructure relative to other counties in California.

Figure 4-19 Merced County Deep-Seated Landslide Susceptibility



Map compiled 3/2021;
intended for planning purposes only.
Data Source: Merced County,
Department of Conservation, California Geological Survey

Extent (Magnitude/Severity)

The extent of landslides and debris flow events within the county range from negligible to significant. Landslides and rockslides can result in the destruction of infrastructure such as water and sewer lines, electrical and telecommunications utilities and drainage where they are present. There is potentially risk to Interstate 5, near the county border with Fresno County. There is limited potential for complete destruction of buildings and death and injury from landslides and debris flow.

Previous Occurrences

There have not been any disaster declarations associated with landslides in Merced County. According to records from the California Department of Conservation's Geological Survey, there have been no recent records of landslides in Merced County and no active mapping efforts within the county. Several adjacent counties, such as Madera, Mariposa, and Santa Clara, have recent or active landslides which have been recorded. This historic record would indicate that landslides occasionally occur in Merced County, but largely affect undeveloped areas.

Probability of Future Occurrences

Based on historical data which suggests limited risk of landslides, but given the presence of landslide susceptible geology and steep slopes within the planning area, it is safe to assume that landslides may occur in the future, with damaging landslides occurring much less frequently. Landslides are usually a cascading effect of severe weather or a period of extended wet weather that saturates local soils. The probability for more severe and damaging landslides increases during El Niño years or severe winter storms. The potential for debris flows dramatically increases following a wildfire.

Climate Change Considerations

Landslides can result from intense rainfall and runoff events. Projected climate change-associated variance in rainfall events may result in more high-intensity events, which may increase landslide frequency. In addition, the increased potential of wildfire occurrence also escalates the risk of landslide and debris flows in the period following a fire, when slopes lack vegetation to stabilize soils and burned soil surfaces create more rainfall runoff. As climate change affects the length of the wildfire season, it is possible that a higher frequency of large fires may occur into late fall, when conditions remain dry, and then be followed immediately by intense rains early in the winter, as occurred with the Thomas Fire in December 2017 and subsequent Montecito and Carpinteria debris flows in January 2018 in Santa Barbara County (CA SHMP 2018).

Vulnerability Assessment

General Property

Landslides directly damage engineered structures in two general ways: 1) disruption of structural foundations caused by differential movement and deformation of the ground upon which the structure sits, and 2) physical impact of debris moving downslope against structures located in the travel path.

During the 2021 update of this plan, a GIS analysis of exposure to landslide hazard areas was performed. GIS analysis indicates approximately \$317 million of property improvements exposed, which takes into account improved values of properties. Table 4-49 summarizes landslide exposure by jurisdiction. GIS was used to intersect the parcel boundaries with a master address point layer to obtain the number of buildings per parcel. Only parcels with improvement values greater than zero were used in the analysis, this method assumes that improved parcels have a structure of some type.

Based on this analysis there is a total of 482 improved parcels and 547 buildings potentially within landslide hazard areas. The majority of this exposure is in the western unincorporated county. There is a high level of uncertainty as to the actual risk to these exposed parcels, thus a more specific loss estimation is not provided. A more detailed, site specific analysis would be needed to assess actual risk within the identified parcels.

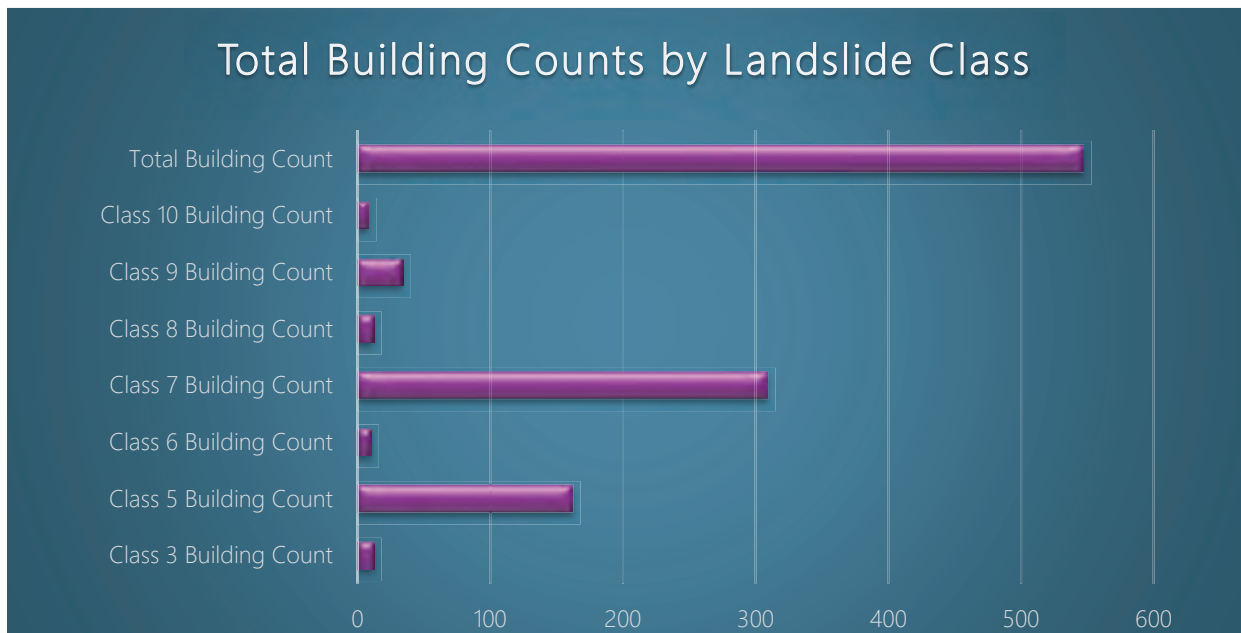
Table 4-50 Merced County Improved Properties at Risk to Landslide

Jurisdiction	Improved Parcel Count	Total Building Count	Improved Value	Estimated Content Value	Total Value	Population
Atwater	11	11	\$3,479,587	\$2,831,312	\$6,310,899	32
Livingston	1	1	\$2,714,360	\$1,357,180	\$4,071,540	4
Merced	27	42	\$4,762,383	\$2,381,192	\$7,143,575	112
Unincorporated	443	493	\$156,446,776	\$142,936,749	\$299,383,525	322
Total	482	547	\$167,403,106	\$149,506,432	\$316,909,538	470

Source: Dept. of Conservation, California Geological Survey, Merced County Assessor, Wood GIS Analysis

Figure 4-20 below further breaks down the numbers of exposed buildings by landslide class, as shown previously in Figure 4-19; the higher the class the greater the susceptibility.

Figure 4-20 Total Building Counts by Landslide Class



People

People could be susceptible if they are caught in a landslide or debris flow, potentially leading to injury or death. There is also a danger to drivers operating vehicles, as rocks and debris can strike vehicles passing through the hazard area or cause dangerous shifts in roadways. The parcel analysis described previously estimated the number of people potentially residing in landslide susceptible areas (470), but it is not likely that landslides will occur without warning and direct impacts to people are suspected to be minimal.

Critical Facilities and Infrastructure

In addition to buildings, utilities and transportation structures are vulnerable to the impact and ground deformation caused by slope failures. They present a particular vulnerability because of their geographic extent and susceptibility to physical distress. Lifelines are generally linear structures that, because of their geographic extent, have a greater chance of being affected by ground failure due to greater hazard exposure.

Extension, bending, and compression caused by ground deformation can break lifelines. Failure of any component along the lifeline can result in failure to deliver service over a large region. Once broken, transmission of the commodity through the lifeline ceases, which can have catastrophic repercussions down the line: loss of power to critical facilities such as hospitals, impaired disposal of sewage, contamination of water supplies, disruption of all forms of transportation, release of flammable fuels, and so on. Therefore, the overall impact of lifeline failures, including secondary failure of systems that depend on lifelines, can be much greater than the impact of individual building failures.

Table 4-50 below summarizes the results of the critical facilities analysis, highlighting the exposure of critical facilities throughout the county to landslide hazards. All of the exposed critical facilities are located in unincorporated areas of the county, largely to the west of Interstate 5.

Table 4-51 Critical Facilities Within the Class 9 Landslide Hazard by FEMA Lifeline

Jurisdiction	Landslide Class	Communications	Energy	Food, Water, Shelter	Hazardous Material	Health and Medical	Safety and Security	Transportation	Total
Uninc.	9	2	26	-	-	-	-	-	28
	8	1	48	-	-	-	-	-	49
	7	-	4	-	-	-	-	46	50
	6	1	-	-	-	-	-	-	1
	5	4	80	-	-	-	-	3	87
	3	1	-	-	-	-	-	-	1
	Total	9	158	0	0	0	0	49	216

Source: California Geological Survey, HIFLD, Wood GIS Analysis

Economy

Economic impacts typically center around transportation routes temporarily closed by debris flow or landslide activity. These roads may be used to transport goods across the county or provide access by visitors and tourists. Depending on the amount of damage, the road may simply need to be cleaned off, or may require some level of reconstruction.

Historic, Cultural, and Natural Resources

As primarily a natural process, landslides and debris flows can have varying impacts to the natural environment; debris flows have the potential to permanently alter the natural landscape.

Future Development

The severity of landslide problems is directly related to the extent of human activity in hazard areas. Human activities such as property development and road construction can also exacerbate the occurrence of landslides. Future development should take place carefully to prevent landslide damage to property or people. Adverse effects can be mitigated by early recognition and avoiding incompatible land uses in

these areas or by corrective engineering. Improving mapping and information on landslide hazards and incorporating this information into the development review process could prevent siting of structures and infrastructure in identified hazard areas. The 2030 General Plan has provisions to address this goal, by prohibiting habitable structures atop unconsolidated landslide debris, discouraging grading and construction on slopes greater than 30%, and enforcing grading standards of the International Building Code.

Risk Summary

The overall significance of landslides in Merced County is low.

- The geologic formations commonly associated with slope stability problems in Merced County, are largely concentrated in the far western and eastern edges of the county, which are also the least populated.
- Effects on people: People are most commonly at risk if they are caught in a landslide or debris flow, including when driving through a hazard area.
- Effects on property: Property loss is rare, but GIS analysis shows there is some property which could be exposed to landslides.
- Effects on economy: Landslides in adjacent counties can disrupt major transportation corridors, possibly affecting the local tourist economy and shipment of goods.
- Effects on critical facilities and infrastructure: Landslides and debris flows can result in the destruction of infrastructure such as water and sewer lines, electrical and telecommunications utilities and drainage. Disrupted transportation routes occur occasionally, usually during heavy rainstorms, and cause considerable inconvenience.
- **Related Hazards:** Earthquake, Adverse Weather, Wildfire.

Table 4-52 Hazard Risk Summary - Landslides

Jurisdiction	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Limited	Occasional	Limited	Low
City of Atwater	N/A			
City of Dos Palos	N/A			
City of Gustine	N/A			
City of Livingston	N/A			
City of Los Banos	N/A			
City of Merced	N/A			

4.2.6 Severe Weather: General

The climate in the Central Valley is defined generally by hot, dry summers and foggy, rainy winters. Severe weather is generally any destructive weather event, but usually occurs in Merced County as localized thunderstorms that bring heavy rain and strong winds that occur most often during the winter and spring months. The agricultural industry is among the most vulnerable asset to severe weather. Agricultural losses resulting from natural hazards can have dramatic impacts on the economic health of Merced County.

For this plan, adverse weather is broken down as follows:

- Freeze
- Extreme Heat
- Dense Fog
- Heavy Rain
- High Wind/Tornado

The National Oceanic and Atmospheric Administration's NCEI has been tracking adverse weather since 1950. Their Storm Events Database contains data on the following: all weather events from 1993 to 2017 (except from 6/1993-7/1993); and additional data from the Storm Prediction Center, which includes tornadoes (1950-1992), thunderstorm winds (1955-1992), and hail (1955-1992). This database contains 254 storm events that occurred in Merced County between January 1, 1950, and December 2020. The table below summarizes these events.

Table 4-53 NCEI Hazard Event Reports for Merced County, 1950-2020

Hazard	# of Events	Property Loss (\$)	Crop Loss (\$)	Deaths	Injuries
Dense Fog*	102	\$1,160,00	\$0	3	7
Frost/Freeze*	31	\$0	\$0	0	0
Heavy Rain	23	\$2,007,500	\$15,660,000	0	0
Strong Wind*	20	\$90,800	\$513,000	0	0
Funnel Cloud	18	\$0	\$0	0	0
Tornado	14	\$410,000	\$50,000	0	1
Heat*	13	\$0	\$0	0	0
High Wind*	12	\$995,000	\$2,110,000	0	4
Hail	9	\$30,000	\$1,233,000	0	4
Lightning	8	\$1,000,000	\$0	0	1
Thunderstorm Wind	4	\$430,000	\$3,100,000	0	0
Total	254	\$4,963,300	\$22,666,000	3	17

Source: NCEI Storm Events Database, www.ncdc.noaa.gov/stormevents/

*Hazards with wide extents reflect larger zones that extend beyond Merced County.

The NCEI table above summarizes adverse weather events that have occurred in Merced County from 1950 to 2020. Only a few of the events actually resulted in state and federal disaster declarations. It is interesting to note that different data sources capture different events during the same time period, and often different information specific to the same events. While the HMPC recognizes these inconsistencies, this data provides value in depicting the County's "big picture" hazard environment.

Due to size of the County and changes in elevation and climate, weather conditions can vary greatly across the County. The profiles that follow provide information, where possible, from two weather stations in different parts of the County: Merced Municipal Airport Weather Station in the northeastern part of the county (1889-2016) and the Los Banos City weather station in the southwestern part of the county (1906-2016). The temperature data from these two weather stations are displayed in subsection 4.3.7 below.

4.2.7 Severe Weather: Extreme Temperatures: Freeze and Extreme Heat

Hazard/ Problem Description

Extreme temperature events, both cold and hot, can have severe impacts on human health and mortality, natural ecosystems, and agriculture and other economic sectors.

Freeze

Extreme cold often accompanies a winter storm or is left in its wake. Prolonged exposure to cold can cause frostbite or hypothermia and can be life-threatening. Infants and the elderly are most susceptible. Pipes may freeze and burst in homes or buildings that are poorly insulated or without heat. Freezing temperatures can cause significant damage to the agricultural industry.

Extreme Heat

Extreme heat events can have severe impacts on human health and mortality, natural ecosystems, the agriculture sector and other economic sectors. According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities, usually from heat stroke. In a normal year, about 175 Americans succumb to the demands of summer heat. According to the NWS, among natural hazards, only the cold of winter—not lightning, hurricanes, tornadoes, floods, or earthquakes—takes a greater toll. As a comparison, in the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died. The 2018 California State Hazard Mitigation Plan (SHMP) notes the 2006 heat wave led to 650 deaths in a 13-day period (Cal OES 2018) and in the past 15 years heat waves have claimed more lives in California than all other declared disaster events combined (California Climate Adaptation Strategy 2018).

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

Geographic Area

Freeze

The entire county is susceptible to extreme temperatures. Unseasonable cold temperatures can have large impacts on crops in Merced County. The growing season is approximately 257 days per year, and the frost-free period usually extends from mid-February to mid-November. The mean frost-free period in the western part of the county is 225-250 days.

Extreme Heat

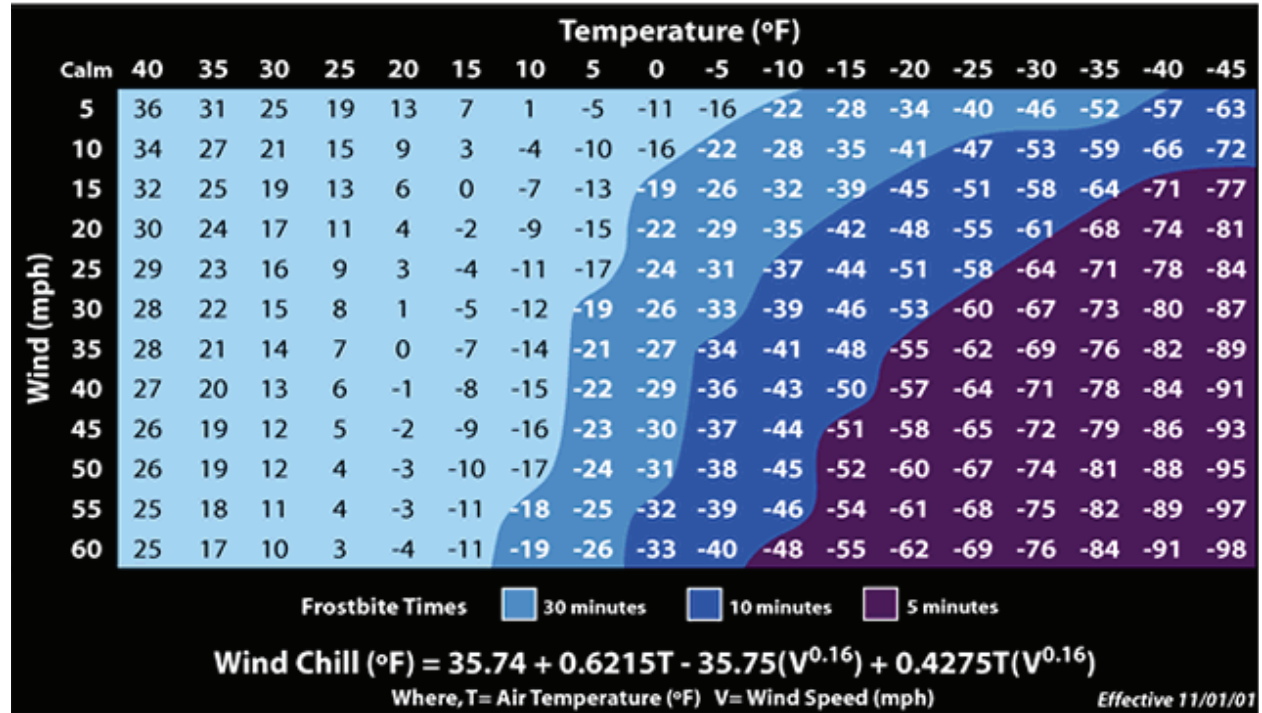
The climate in Merced County is hot and arid, and the entire county is susceptible to extreme heat. The agriculturally dominated central region of the county is likely to experience the greatest impacts from large or unseasonable temperature variations. The more urbanized areas of the County may experience the Urban Heat Island Effect due to the amount of impervious surfaces in those areas that absorb and keep heat longer. The HMPC noted the cities of Merced and Dos Palos have experienced annual summer heat waves that have taken place in the past five years and have led to opening of cooling centers.

Extent (Magnitude/Severity)

Freeze

In 2001, the NWS implemented an updated Wind Chill Temperature index. This index was developed to describe the relative discomfort/danger resulting from the combination of wind and temperature. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature. Overall, freeze impacts would likely be limited in the planning area, with the greatest impact being on the agricultural industry.

Figure 4-21 National Weather Service Wind Chill Chart



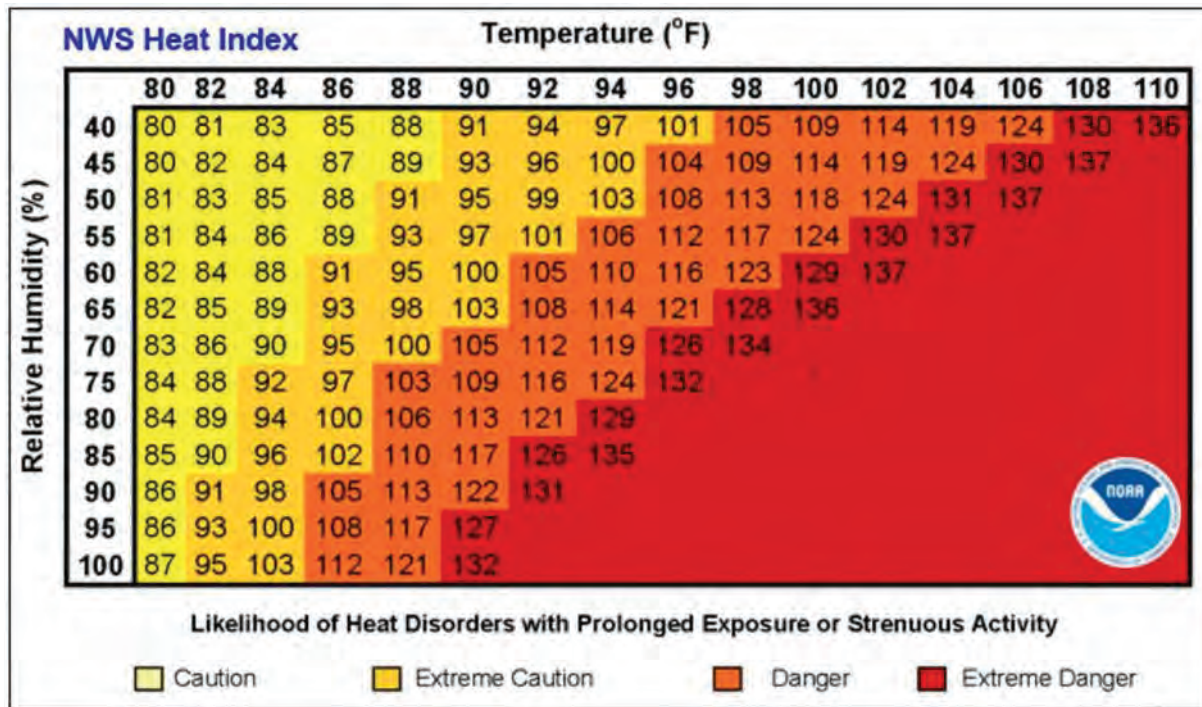
Source: NWS

Extreme Heat

Figure 4-22 illustrates the relationship of temperature and humidity to heat disorders. The heat index describes how hot the heat-humidity combination makes the air feel. As relative humidity increases, the air seems warmer than it actually is because the body is less able to cool itself via evaporation of perspiration. As the heat index rises, so do health risks. Specifically:

- When the heat index is 90°F, heat exhaustion is possible with prolonged exposure and/or physical activity.
- When it is 90° to 105°F, heat exhaustion is probable with the possibility of sunstroke or heat cramps with prolonged exposure and/or physical activity.
- When it is 105° to 129°F, sunstroke, heat cramps or heat exhaustion is likely, and heatstroke is possible with prolonged exposure and/or physical activity.
- When it is 130°F and higher, heatstroke and sunstroke are extremely likely with continued exposure. Physical activity and prolonged exposure to the heat increase the risks.

Figure 4-22 National Weather Service Heat Index Chart



Source: Source: NWS Note: Since heat index values were devised for shady, light wind conditions, exposure to full sunshine can increase heat index values by up to 15°F. Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

The NWS has a system in place to initiate alert procedures (advisories, watches, and warnings) when high temperatures are expected to have a significant impact on public safety. The expected severity of the heat determines which type of alert is issued. The "California OES Contingency Plan for Excessive Heat Emergencies" (2014) indicates that through the use of historical weather and mortality data, the NWS and the California Department of Public Health have identified five major types of climate regions within California to account for climate differences among regions in order to recognize what constitutes an excessive heat event in each of the regions. When temperatures spike for two or more consecutive days without an adequate drop in nighttime temperature to cool the outdoor and indoor environments, there is a significant increase in the risk to vulnerable populations.

Overall, extreme heat impacts would likely be limited in the planning area, with the central portions of the County being most affected. Extreme heat will have an impact on vulnerable populations as well as impact the agricultural industry if the event occurs during certain times of the year.

Past Occurrences

A search of records from 1950 to 2020 in the NCEI Storm Events Database showed that between 2000 and 2016 there were 31 frost and freeze events and 13 heat events in Merced County. No records for either hazards were found between 1950 and 2000 or after 2016 in the NCEI database. Since 1972 there have been 4 federally declared disaster in the County for freeze events (refer to Table 4-3). In 2007, 2009 and 2011 and 2012 the USDA designated Merced County as a disaster area due to freeze and extreme cold. During these events, California's San Joaquin Valley farming communities were hit with freezing temperatures that severely affected the region's crops and resulted in presidential disaster declarations (2007). The declarations made federal funds available to supplement unemployment compensation for farm laborers and other farm industry workers put out of work as a direct result of lost seasonal crops.

Probability of Future Occurrences

Highly Likely - Temperatures at or above 95°F are common most summer days throughout Merced County, and it is highly likely that extreme heat will continue to occur on an annual basis in the future.

In the past, severe freezes have occurred every few years. Based on the NCEI data, 31 frost and freeze events incidents over a 16-year period equates to a major event every 2 years and a 52 percent chance of a major freeze event in any given year.

Climate Change Considerations

Although heat waves will likely become more frequent, there is also the potential for continued cold outbreaks in winter, even in an overall warmer climate. This could have direct impacts on human health in terms of heat related illness. With the general trend of increased warming of average temperatures, extreme high temperatures will likely increase as well. Cascading impacts include increased stress on water quantity and quality, degraded air quality, and increased potential for more severe or catastrophic natural events such as heavy rain, droughts, and wildfire. Another cascading impact includes increased duration and intensity of wildfires with warmer temperatures. According to the 2013 document, "Preparing California for the Extreme Heat", Cal-Adapt projects that throughout California urban and rural population centers will experience an average of 40 to 53 extreme heat days by 2050 and an average of 40 days by 2099; compared to a historical average of 4 per year (Cal-Adapt 2013).

Extreme heat has also been shown to accelerate wear and tear on the natural gas system and electrical infrastructure (California Natural Resources Agency 2018a). Projected increases in summer demand associated with rising temperatures may increase risks to energy infrastructure and may exceed the capacity of existing substations and distribution line infrastructure and systems.

Vulnerability Assessment

General Property

The risks of extreme temperatures are often profiled as part of larger hazards, such as severe winter storms or drought. However, as temperature variances may occur outside of larger hazards or outside of the expected seasons but still incur large costs, it is important to examine them as stand-alone hazards.

Extreme cold may also lead to higher electricity and natural gas demands to maintain appropriate indoor heating levels combined with damages caused to the delivery infrastructure such as frozen lines and pipes. Cold temperatures may also impact transportation infrastructure and road conditions through increased wear and stresses on asphalt roads and bridges. Exposed populations may be at risk while waiting for public transportation, particularly when combined with wind chill, and some vehicles may not start, which impacts the commute of the workforce and, in worst case scenarios, the movement of emergency services personnel.

Recent research indicates that the impact of extreme heat, particularly on vulnerable (?) populations, has been historically under-represented. The risks of extreme heat are often profiled as part of larger hazards, such drought or wildfire. However, as temperature variances may occur outside of larger hazards or outside of the expected seasons but still incur large costs, it is important to examine them as stand-alone hazards. Extreme heat may overload demands for electricity to run air conditioners in homes and businesses during prolonged periods of exposure and presents health concerns to individuals that work outside in extreme temperatures. While extreme heat rarely damages buildings, like cold temperatures it can cause infrastructure damage to roads.

People

Traditionally, the very young and very old are considered at higher risk to the effects of extreme temperatures, but any populations working or recreating outdoors during periods of extreme cold or heat are exposed, including otherwise young and healthy adults and homeless populations. While everyone is vulnerable to extreme temperature incidents, some populations are more vulnerable than others. Extreme heat poses the greatest danger for Merced's thousands of outdoor laborers who support the County's agriculture economy who are exposed to extreme temperatures and at higher risk of heat related illnesses than other populations of the county.

The elderly, children, people in poor physical health, and the homeless are also vulnerable to exposure. Arguably, the young-and-otherwise-healthy demographic may also experience a higher vulnerability of exposure, due to the increased likelihood that they will be out in temperatures of extreme heat and cold, whether due to commuting for work or school, conducting property maintenance such as lawn care, or for recreational reasons.

Critical Facilities

Water infrastructure is at risk from freezing, including line breaks and frozen valve gates affecting the distribution system. The county and municipal governments wrap pipes before freezing temperature events to help prevent damage.

Extreme heat can affect road infrastructure, damaging and buckling road surfaces. Other direct impacts to critical infrastructure includes power line sagging and power surges. Critical infrastructure such as water pumping stations that rely on public utility systems that could be overloaded may result in impacts during extreme heat events. Peak demand exceeding the local utility's capacity for supply can lead to blackout or brownout conditions, or Public Safety Power Shutoffs (PSPS). The loss of utilities or power outages during extreme heat events could also result in adverse secondary impacts to sensitive populations. Electrical power outages may impact response capabilities or care capabilities for hospitals and clinics.

Economy

Prolonged freezing temperatures can damage or destroy crops, affecting the economy and agricultural jobs in Merced County. According to the USDA RMA Indemnity Report, since 2007 there have been 22,308 acres lost to freeze/frost resulting in \$12,933,721 indemnity payments due to insured crop loss. Annualized crop loss is estimated to be \$170,181 due to freeze events.

Extreme heat impacts on the economy may be more indirect compared to other hazards. Merced County has a large agriculture economy. As noted previously outdoor laborers who are exposed to extreme heat and at a high risk of heat related illnesses, and a long-term heat event could cause work interruptions. Crops are also impacted by heat events and could have an impact on the overall economy in the county. According to the USDA RMA Indemnity Report, since 2007 there have been 20,207 acres lost to heat resulting in \$17,612,071 indemnity payment due to insured crop loss. There is an estimated \$187,362 of annualized crop loss due to heat.

Historic, Cultural and Natural Resources

Extreme heat may cause temporary drought-like conditions. For example, several weeks of extreme heat increases evapotranspiration and reduces moisture content in vegetation, leading to higher wildfire vulnerability for that time period even if the rest of the season is relatively moist. Extreme cold can cause vegetation to freeze and cause high stress leading to decline and even disappearance of vegetation on or within landscapes.

Future Development

Since structures are not usually directly impacted by severe temperature fluctuations, continued development is less impacted by this hazard than others in the plan. However, pre-emptive measures such as construction of green buildings that require less energy to heat and cool, use of good insulation on pipes and electric wirings, and smart construction of walkways, parking structures, and pedestrian zones that minimize exposure to severe temperatures may help increase the overall durability of the buildings and the community to temperature variations. Continued development also implies continued population growth, which raises the number of individuals potentially exposed to variations in temperature. Public education efforts should continue to help the population understand the risks and vulnerabilities of outdoor activities, property maintenance, and regular exposures during periods of extreme heat.

Risk Summary

- Average annual maximum temperature is 76°F and the average annual minimum temperatures is 47°F /48°F.
- On average there is between 97 and 98 days per year above 90°F and about 30 days per year where the minimum temperatures is below freezing (32°F).
- Highest recorded temperatures for the northwestern portion of County is 114°F on July 24, 1902. While the lowest recorded temperature was 13°F on January 13, 2007.
- High recorded temperatures for the southwestern portion of County is 116°F on July 25, 1931. The lowest recorded temperatures is 14°F on January 11, 1949.
- Extreme temperatures can have considerable impacts on human health, the natural environment and the economy.
- The County's agriculture economy is at risk of extreme temperatures from outdoor laborers being vulnerable to heat illnesses as well as crop losses due to heat and freeze and frost.
- Since 2007 there has been 42,515 acres of crop lost to extreme temperatures and a combined \$30,545,793 indemnity payments made for insured crop loss to due freeze/frost and heat events.
- The very young, the very old, people with poor physical health and the homeless are more susceptible to the impacts of extreme temperatures.
- Climate change is projected to increase temperatures in the Central Valley region of the State.
- **Related hazards:** Drought, Land Subsidence, Wildfire, Agriculture/Pest Infestation/Plant Disease

Table 4-54 Hazard Risk Summary – Extreme Temperatures (Freeze)

Jurisdiction	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Extensive	Highly Likely	Critical	High
City of Atwater	Limited	Likely	Limited	Low
City of Dos Palos	Significant	Likely	Limited	Medium
City of Gustine	Limited	Occasional	Negligible	Medium
City of Livingston	Limited	Occasional	Negligible	Medium
City of Los Banos	Limited	Occasional	Negligible	Medium
City of Merced	Significant	Likely	Limited	Low

Table 4-55 Hazard Risk Summary – Extreme Temperatures (Extreme Heat)

Jurisdiction	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Extensive	Highly Likely	Critical	High
City of Atwater	Extensive	Likely	Limited	High
City of Dos Palos	Extensive	Likely	Negligible	Low
City of Gustine	Extensive	Likely	Limited	High
City of Livingston	Extensive	Likely	Limited	High
City of Los Banos	Significant	Highly Likely	Negligible	Medium
City of Merced	Extensive	Highly Likely	Limited	Medium

4.2.8 Severe Weather: Dense Fog

Hazard/Problem Description

Fog results from air being cooled to the point where it can no longer hold all of the water vapor it contains. For example, rain can cool and moisten the air near the surface until fog forms. A cloud-free, humid air mass at night can lead to fog formation, where land and water surfaces that have warmed up during the summer are still evaporating water into the atmosphere. This is called radiation fog. A warm moist air mass blowing over a cold surface also can cause fog to form, which is called advection fog.

The interior California valleys have a unique fog problem called the tule fogs. The tule fog is a radiation fog, which condenses when there is a high relative humidity, typically after a heavy rain, calm winds, and rapid cooling during the night. The longer nights during the winter months create this rapid ground cooling and results in a pronounced temperature inversion at a low altitude, creating a thick ground fog. Above the cold, foggy layer, the air is typically warm and dry. Once the fog has formed, turbulent air is necessary to break through the inversion. Daytime heating can also work to evaporate the fog in some areas. The tule fogs get their name from the tule reeds, which grew around the swamps and deltas of the great Tulare Lake that once covered the southern end of the San Joaquin Valley.

The tule fog season in Merced County is typically in the late fall and winter (November through March) but can occur as late as May. Fog typically forms rapidly in the early morning hours. Tule fogs can last for days, sometimes weeks. Fog can have devastating effects on transportation corridors in the County. Nighttime driving in the fog is dangerous and multi-car pileups have resulted from drivers using excessive speed for the conditions and visibility. Tule fog has also been found to be connected to air pollution and exacerbates the naturally occurring fog. A study published in the Journal of Geophysical Research in 2019 found that air pollution is a key contributor to the seasonal fog, and due to the passage of the Clean Air Act in 1970, it has declined about 75 percent since 1980 (Gray 2019).

Figure 4-23 Tule Fog over Central Valley



Source: NASA, Jeff Schmaltz, January 5, 2005

Geographic Area

The San Joaquin Valley is hemmed in on three sides by mountain ranges, with resulting inversion layers trapping cooler air on the valley floor. This predisposes the area to severe episodes of fog in winter months, when barometric pressures are high, humidity is increased, and ambient temperatures are low. All areas of the county are vulnerable to dense fog events.

Extent (Magnitude/Severity)

Tule fog forms on clear nights when the ground is moist, and the wind is near calm and can be widespread throughout the San Joaquin Valley. On nights like this, the ground cools rapidly. In turn, the moist air above it cools and causes water vapor to condense. Once it has formed, the air must be heated enough to either evaporate the fog or lift it above the surface so that visibilities improve. Common areas for tule fog to form include foothills and valleys. Visibility in tule fog is usually less than an eighth of a mile (about 600 ft or 200 m) but can be much lower. Visibility can vary rapidly; in only a few feet, visibility can go from 10 feet (3.0 m) to near zero.

Fog contributes to transportation accidents and is a significant life safety hazard. These accidents can cause multiple injuries and deaths and could have serious implications for human health and the environment if a hazardous or nuclear waste shipment were involved. Other disruptions from fog include delayed emergency response vehicles and school closures.

In 2018 the NWS in Hanford, California developed the Experimental Fog Severity Index in conjunction with the NWS issues fog advisories to help give motorists advance warning of fog events. A dense fog advisory is issued when widespread dense fog develops, and visibilities drop to one-quarter of a mile or less. The Fog Severity Index has five levels with level 5 being the most severe. Figure 4-24 describes each level of the Index.

Figure 4-24 National Weather Service Experimental Fog Severity Index

Level 5	Very High Risk For Transportation Visibilities 200 Feet To Zero Stopped Traffic Ahead Highest Risk For Chain Reaction Accidents
Level 4	High Risk For Transportation Visibility 800 Feet Or Less Very Slow Or Stopped Traffic Ahead Higher Risk For Chain Reaction Accidents
Level 3	Moderate Risk For Transportation Visibility Half Mile Or Less Slow Traffic Ahead Moderate Risk For Fog Related Accidents
Level 2	Low Risk For Transportation Visibility One Mile Or Less Traffic May Slow Below Speed Limit Low Risk For Fog Related Accidents
Level 1	No Transportation Risks

Source: NWS

Past Occurrences

The NCEI records 102 dense fog events in the Central San Joaquin Valley that impacted Merced County between 2000 and 2020 (refer to Table 4-52 above). The following are descriptions of three events of record in the NCEI Storm Events Database:

- **November 14 - 20 2002** - Following the very substantial rain for the 3-day period from the 7th through the 9th of the month, high pressure aloft built and resided over Interior Central California. This weather regime, quite conducive to dense morning fog formation, established itself between the 10th and 13th, and maintained itself through the end of the month. The fog was especially widespread from the 14th through the morning of the 21st. Numerous vehicle accidents occurred due to the extremely poor visibilities on Central and Southern San Joaquin Valley roadways. On the 20th along a 3-mile stretch of Highway 99 just north of the Merced-Madera County Line, 50 trucks and cars were involved in multi-vehicle pileups.
- **December 1-5, 2002** - With the large rainfall amounts on the San Joaquin Valley floor by November 9th, haze and fog prevailed subsequently for a 30+-day period while the adjacent foothills, mountains, and Kern Desert dried again in rainless conditions. Widespread dense fog from mid to late-November ceased by the morning of the 1st of December on the Valley floor. But patchy dense fog and haze prevailed from the 1st of the month through the 9th before the major precipitation in December began on the 13th. The morning of the 5th had some very dense, but again patchy fog. A 9-vehicle pile-up occurred near Los Banos in Merced County (CAZ89) on Highway 152 around 8:35 AM PST that killed one and injured three others.
- **January 10, 2019** - Visibility below a quarter mile was reported in Fresno, Madera, Merced and Atwater. Several school districts either had delayed openings or delayed morning bus service. A head on crash in dense fog near Atwater at 6:12 PST caused one fatality and three injuries.

Probability of Future Occurrences

Likely --Based on the NCEI data, 102 dense fog incidents over a 20-year period equates to a major fog event every 5.1 years and a 20 percent chance of a major fog event in any given year. It is likely that minor fog events will continue to occur annually in the Merced County planning area.

Climate Change Considerations

California's winter tule fog has declined dramatically over the past three decades, raising a red flag for the state's multibillion-dollar agricultural industry, according to researchers at UC Berkeley. Crops such as almonds, pistachios, cherries, apricots and peaches go through a necessary winter dormant period brought on and maintained by colder temperatures. Tule fog that descends upon the state's Central Valley between late fall and early spring, helps contribute to this winter chill. "The trees need this dormant time to rest so that they can later develop buds, flowers and fruit during the growing season," said biometeorologist and study lead author Dennis Baldocchi. "An insufficient rest period impairs the ability of farmers to achieve high quality fruit yields." The findings have implications for the entire country since many of these California crops account for 95 percent of U.S. production, the authors noted. The researchers paired NASA and National Oceanic and Atmospheric Administration satellite records with data from a network of University of California weather stations, covering 32 consecutive winters. There was a great deal of variability from year to year, but on average, the researchers found a 46 percent drop in the number of fog days between the first of November and the end of February. Climate forecasts suggest that the accumulation of winter chill will continue to decrease in the Central Valley. Tule fog was also less prevalent in recent years in part due to the multi-year drought.

Vulnerability Assessment

General Property

Based on historic information, the primary effect of fog has not resulted in significant damages to property, or the losses are typically covered by insurance.

People

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

Critical Facilities

Fog can have devastating effects on transportation corridors in the County. Multi-car pileups have resulted from drivers using excessive speed for the conditions and visibility.

These accidents can cause multiple injuries and deaths and could have serious implications for human health and the environment if a hazardous or nuclear waste shipment were involved. Other disruptions from fog include delayed emergency response vehicles and school closures.

Economy

Economic impacts due to dense fog are generally related to road closures leading to a decrease in travel to businesses. Other economic impacts relate to property damages to vehicles from accidents. As shown in Table 4-52 above there is a recorded \$1,060,000 of property damages as a result of dense fog all of which are from traffic accidents in the Central Valley region and the records mention Merced County. Based on that amount the Merced County region has an estimated average loss expectancy of \$10,495 and annualized loss of \$1,070,495 due to dense fog events.

Historic, Cultural and Natural Resources

As referred to in the Climate Change Considerations section, California's winter tule fog has declined dramatically over the past three decades, raising a red flag for the state's multibillion-dollar agricultural industry. Crops such as almonds, pistachios, cherries, apricots and peaches go through a necessary winter dormant period brought on and maintained by colder temperatures and tule fog that descends upon the state's Central Valley between late fall and early spring, helps contribute to this winter chill.

Future Development

Population and commercial growth in the County and outside the County will increase the potential for complications with traffic accidents and commerce interruptions associated with dense fog.

Risk Summary

- Tule Fog season begins in late fall and lasts from winter (November – March).
- Between 2000 and 2020 there were 102 dense fog events that impacted Merced County and have resulted in \$1,060,000 in property damages, largely due to traffic accidents.
- Fog can have devastating effects on transportation corridors. On November 4, 2002, a 50-vehicle collision occurred on Highway 99 near Merced.
- Major fog events in the County are estimated to occur every 5.1 years or a 20% chance in any given year.
- **Related Hazards:** Hazardous Materials Incidents

Table 4-56 Hazard Risk Summary – Dense Fog

Jurisdiction	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Extensive	Highly Likely	Critical	High
City of Atwater	Extensive	Highly Likely	Critical	High
City of Dos Palos	Extensive	Highly Likely	Critical	High
City of Gustine	Extensive	Highly Likely	Critical	High
City of Livingston	Extensive	Highly Likely	Limited	Medium
City of Los Banos	Extensive	Highly Likely	Limited	Medium
City of Merced	Extensive	Highly Likely	Limited	Medium

4.2.9 Severe Weather: Heavy Rain

Hazard/ Problem Description

Most of the adverse weather experienced in Merced takes place in the winter months as heavy rain and thunderstorm events sometimes accompanied by high winds, dense fog events. Dense fog is profiled under 4.2.8 and high winds and tornado events are profiled in 4.3.10.

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

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

Research suggests that atmospheric rivers contributed to the collapse of both Oroville Dam spillways in February 2017 (NASA Global Hydrology Resource Center), as well as the winter flooding in 1861-1862, which completely inundated Sacramento and is considered the worst flood event in California's history (Ingram 2013). When an atmospheric river forms in the tropical regions of the Pacific near Hawaii it is known as a "Pineapple Express". This type of atmospheric river can produce as much as five inches in one day (NOAA, 2018). In 2018 two Pineapple Express ARs hit California causing significant heavy precipitation events throughout state.

Geographic Area

Thunderstorms are generally expansive in size. The entire county is susceptible to any of the effects of a severe thunderstorm, including heavy rain.

Extent (Magnitude/Severity)

The heavy precipitation events that Merced County and all of California experiences is often the result of an atmospheric river. Atmospheric rivers are categorized by a unit of measurement known as the Integrated Water Vapor Transport (IVT), which takes into account the amount of water vapor in the system and the wind that moves it around. For a storm to be classified as an atmospheric river it has to reach an IVT threshold of 250 units; 1,000 IVT or more is considered to be "extreme" (Arcuni 2019). In 2019 a system for categorizing the strength and impacts of atmospheric rivers was developed by the Center for Western Weather and Water Extremes (CW3E), out of the Scripps Institution of Oceanography at UC San Diego. The newly developed scale ranks ARs into five categories from weak to exceptional. Unlike the Fujita Scale for tornadoes that focuses on potential damages, the AR scale accounts for both storms that may be hazardous and storms that can provide benefits to the local water supply. A category

one AR is considered to be primarily beneficial, generally lasting only 24 hours and produces modest rainfall. While a category five AR is considered “exceptional” and primarily hazardous, lasting for several days and associated with heavy rainfall and runoff that may cause significant damages. Table 4-56 below describes the scale further. The CW3E developed the scale as a tool for officials with an operational need to assess flooding potential in their jurisdictions before the storms makes landfall.

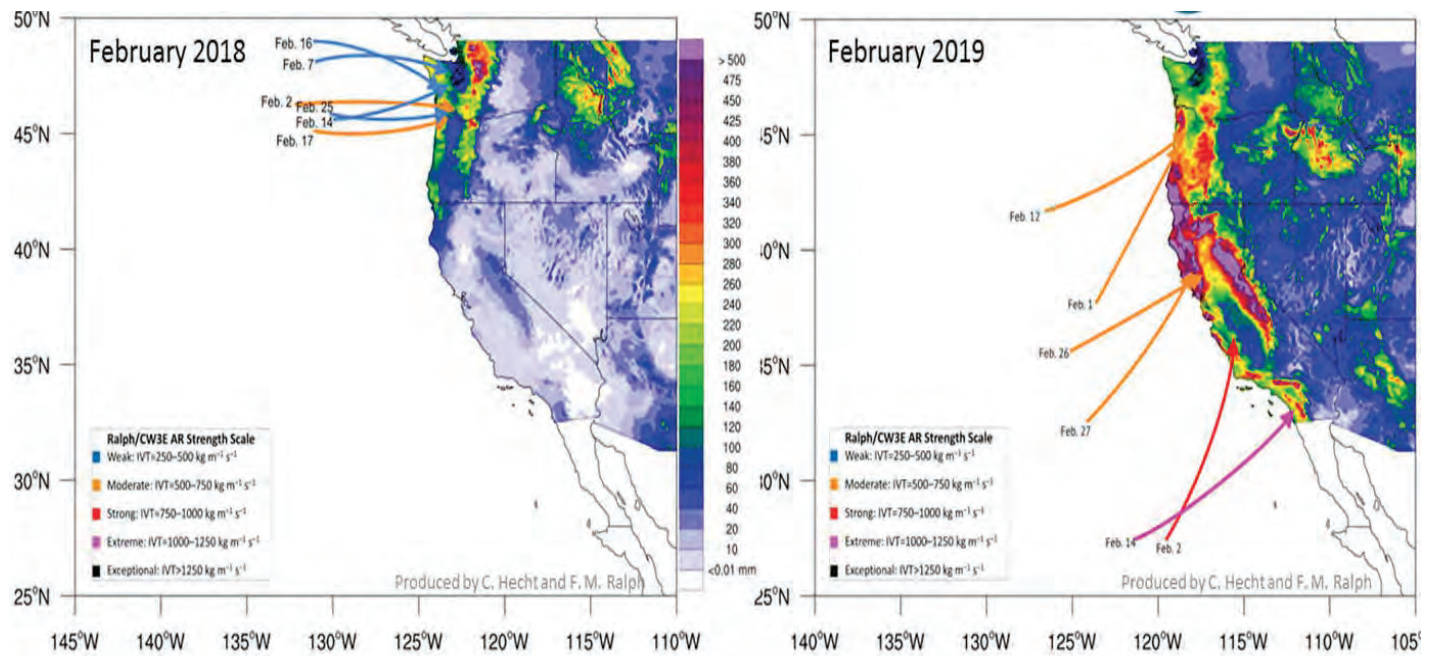
Table 4-57 Atmospheric River Categories

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

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

In both February 2018 and 2019 the West Coast experienced six atmospheric rivers. But as the following figure from the Center for Western Weather and Water Extremes shows, California experienced vastly different precipitation totals due to the location of where the atmospheric river made landfall as well as each atmospheric river’s IVT. Using the AR scale developed by CW3E, the ARs in February 2019 were all considered to be moderate to extreme and concentrated more on California, resulting in heavy precipitation.

Figure 4-25 Atmospheric River Strength and Land Distribution, February 2018 vs. February 2019



Source: Center for Western Weather and Water Extremes, Scripps Institution of Oceanography at UC San Diego

Past Occurrences

Heavy rains and adverse storms occur in the Merced County primarily during the late fall and winter but have a chance of occurring in every month of the year. According to information obtained from the Western Regional Climate Center (WRCC) the majority of precipitation is produced by storms during January and other winter months. Precipitation during the summer months is in the form of rain showers and is rare.

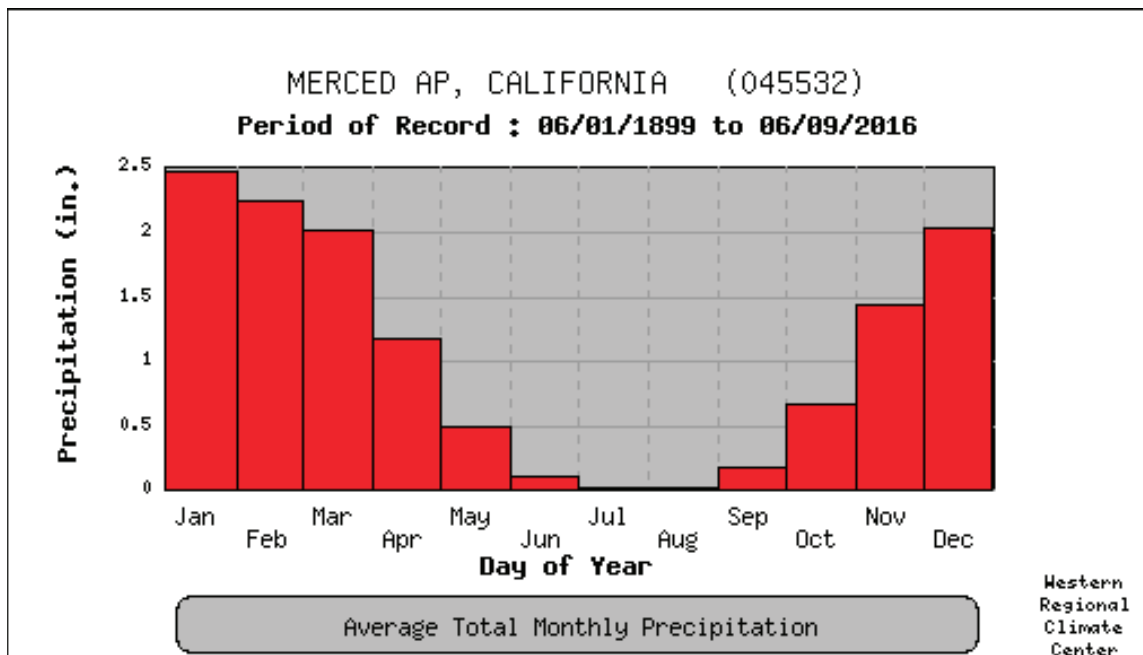
The NCEI records show heavy rainstorms can cause both widespread flooding which can lead to extensive localized drainage issues. In addition to the flooding that often occurs during these storms, strong winds, when combined with saturated ground conditions, can down very mature trees. Refer to the Flood section for more information related to flooding events in the county. There have been two USDA disaster designations (2016, 2019) for excessive rainfall in Merced County (refer to Table 4-4).

Information from the three representative weather stations introduced in subsection 4.3.6 Severe Weather: General are summarized below and in Figure 4-26 and Figure 4-27.

Northeastern Merced County - Merced Municipal Airport Weather Station (1899-2016)

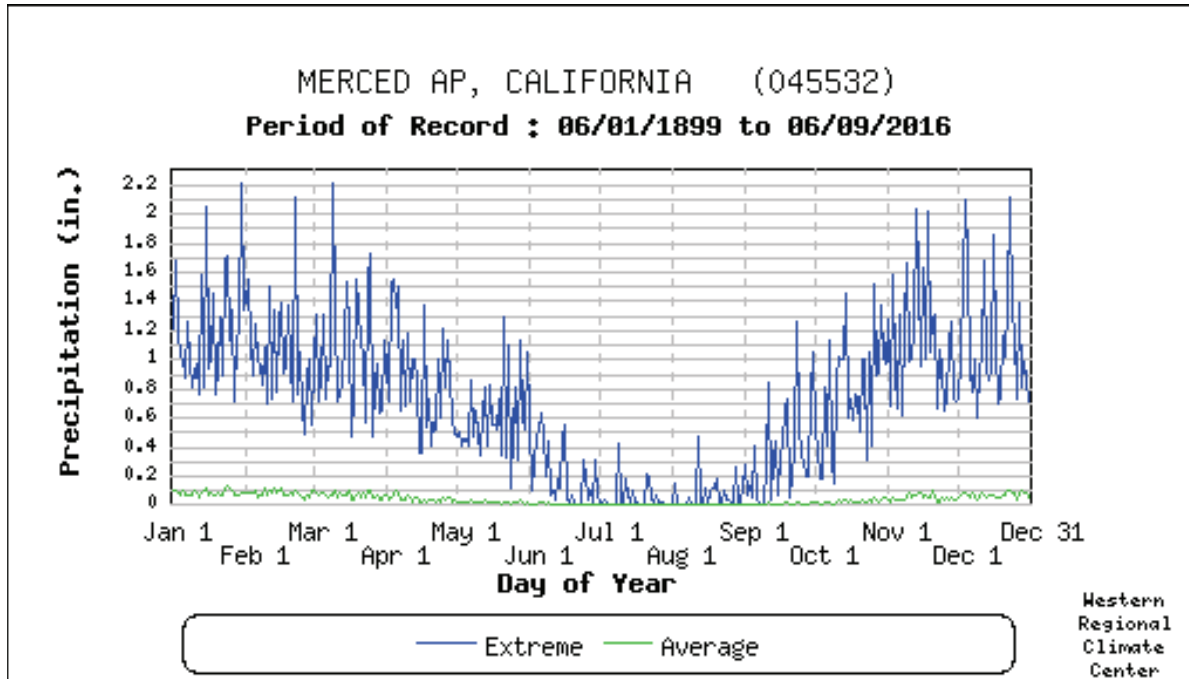
Information from the closest weather station with the most comprehensive data to represent the northeastern county area, the Merced Municipal Airport Weather Station, is summarized below in Figure 4-26 and Figure 4-27. Average annual precipitation recorded at this weather station is 12.27 inches per year. The highest recorded annual precipitation was 21.66 inches in 1998; the highest recorded precipitation for a 24-hour period is 2.20 inches on January 30, 1911. The lowest recorded annual precipitation was 5.50 inches in 1947.

Figure 4-26 Merced Municipal Airport Weather Station Monthly Average Total Precipitation (Period of Record 1899-2016)



Source: WRCC, www.wrcc.dri.edu/

Figure 4-27 Merced Municipal Airport Weather Station Daily Precipitation Average and Extreme (Period of Record 1899-2016)

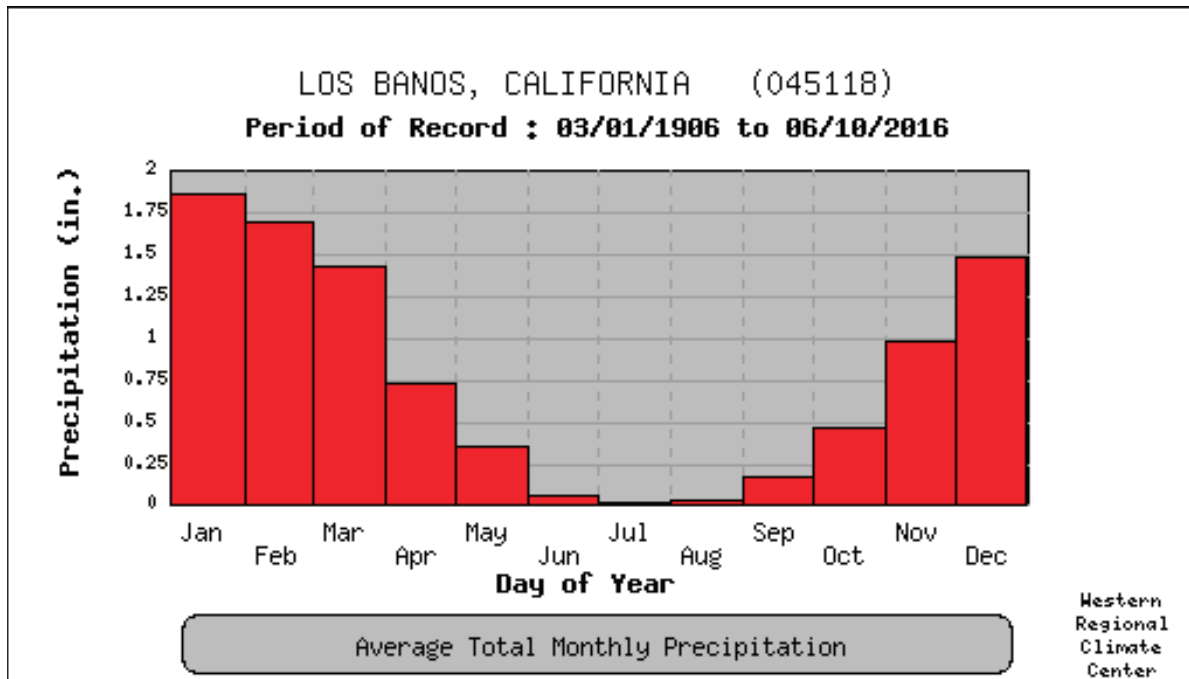


Source: WRCC, www.wrcc.dri.edu/

Southwestern Merced County - Los Banos City Weather Station (1906-2016)

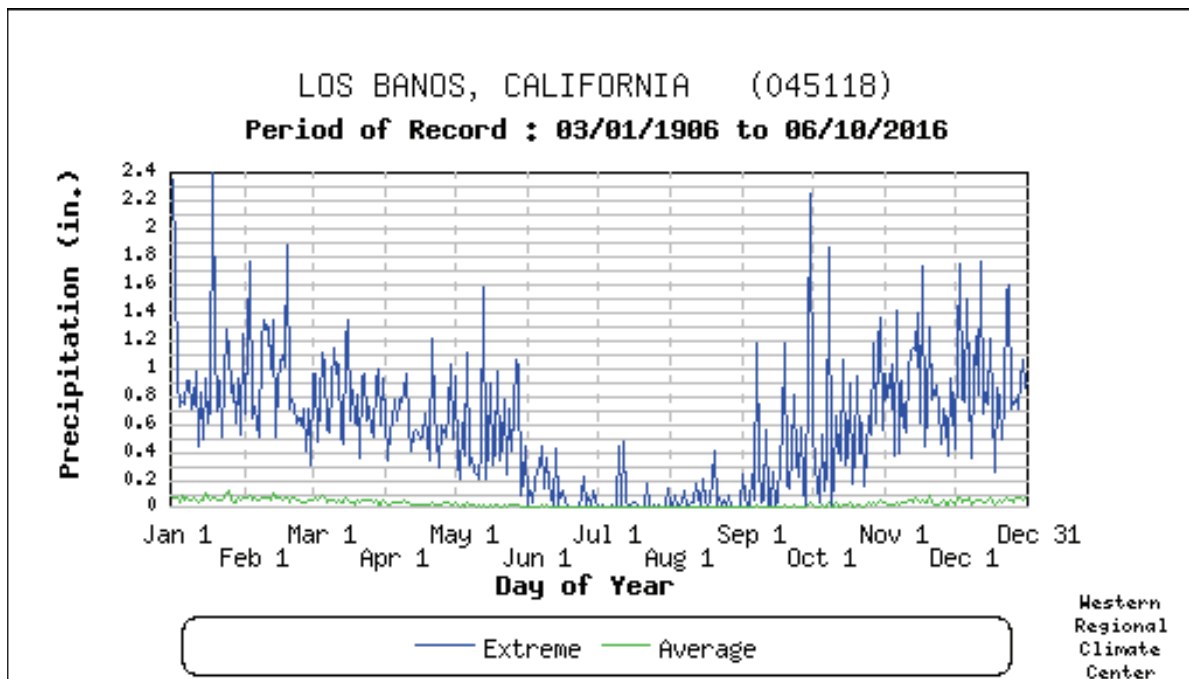
Information from the closest weather station with the most comprehensive data to represent the southwestern county area the Los Banos Weather Station, is summarized below in Figure 4-28 and Figure 4-29. Average annual precipitation recorded at this weather station is 9.19 inches per year. The highest recorded annual precipitation was 21.08 inches in 1998; the highest recorded precipitation for a 24-hour period is 2.40 inches on January 18, 1914. The lowest recorded annual precipitation was 4.61 inches in 1947.

Figure 4-28 Los Banos Weather Station Monthly Average Total Precipitation (Period of Record 1906-2016)



Source: WRCC, www.wrcc.dri.edu/

Figure 4-29 Los Banos Weather Station Daily Precipitation Average and Extreme (Period of Record 1906-2016)



Source: WRCC, www.wrcc.dri.edu/

The NCEI Storm Events Database records 23 heavy rain events in Merced County between 1998 and 2018. Note no heavy rain events are recorded in the database after 2018. No casualties are recorded for any of the events. As noted above there is a connection between heavy rain events and flooding and is it assumed that the property damages listed in the NCEI database are the results of flooding caused by heavy rain events.

The following table show the records collected from the NCEI Strom Events Database for heavy rain.

Table 4-58 Heavy Rain Events in Merced County, 1998-2018

Location	Date	Property Damages (\$)	Crop Damages (\$)
Merced	2/1/1998	\$2,000,000	\$1,400,000
Merced	5/1/1998	\$0	\$10,200,000
Merced	5/15/2000	\$0	\$100,000
Merced ARPT	12/13/2002	\$0	\$0
Merced	4/21/2003	\$7,500	\$0
Countywide	5/1/2003	\$0	\$2,000,000
Countywide	12/7/2004	\$0	\$0
Countywide	12/27/2004	\$0	\$0
Countywide	1/1/2005	\$0	\$0
Countywide	1/7/2005	\$0	\$0
Countywide	1/24/2005	\$0	\$0
Merced	2/15/2005	\$0	\$0
Merced ARPT	3/22/2005	\$0	\$0
Dos Palos/Atwater	9/20/2005	\$0	\$0
Countywide	1/1/2006	\$0	\$0
Countywide	3/2/2006	\$0	\$0
Livingston	3/28/2006	\$0	\$0
Countywide	4/2/2006	\$0	\$1,960,000
Merced	2/23/2010	\$0	\$0
Gustine	12/11/2014	\$0	\$0
Atwater Muni ARPT	4/27/2016	\$0	\$0
Santa Nella, Los Banos, Brito	5/5/2016	\$0	\$0
Cregan	4/16/2018	\$0	\$0
Total		\$2,007,500	\$15,660,000

Source: NCEI

Probability of Future Occurrences

Highly Likely – Based on the NCEI data, 23 heavy rain incidents over a 20-year period equates to a major event every 1.2 years and an 87 percent chance of a major heavy rain event in any given year.

Climate Change Considerations

As average temperatures increase over time, this generally will result in higher extreme temperatures and more warming in the atmosphere can trigger climate changes, which could result in more frequent extreme weather events. Pacific Northwest National Laboratory researchers have also found that atmospheric rivers will reach the West Coast more frequently (Gao 2015). Currently, the west receives rain or snow from these atmospheric rivers between 25 and 40 days each year. By the end of this century, days on which the atmospheric rivers reach the coast could increase by a third, or between 35 and 55 days a year.

Vulnerability Assessment

General Property

The Merced County planning area experiences a rainy season in the winter months through early spring. These winter storms can include significant precipitation. The primary effect of these storms has not resulted in significant injury or damages to people and property, or the losses are typically covered by insurance. It is the secondary hazards caused by weather, such as floods, that have had the greatest impact on the County. Damage and disaster declarations related to adverse weather have occurred and will continue to occur in the future. Heavy rain and thunderstorms are the most frequent type of severe weather occurrences in the County. Utility outages, downing of trees, debris blocking streets and damage to property can be a direct result of these storm events. Given the nature of these types of storms, the entire County is potentially at risk.

People

Exposure is the greatest danger to people from heavy rain events. People can be caught in rising waters and need to be rescued.

Critical Facilities

Because of the unpredictability of heavy rain events, most critical facilities and infrastructure that is above ground is equally exposed to the storm's impacts. Due to the random nature of this hazards, a more specific risk assessment was not conducted for this plan.

Economy

Economic impact of a heavy rain event is typically short-term. Generally, long-term economic impacts center more around hazards that cascade from a heavy rain even such as flooding.

In general, all severe weather poses a risk to agriculture economy in the county. Table 4-58 below describes the crops losses related to heavy rain events and associated indemnity amounts or loss payments from the USDA, RMA in the past 13 years. Merced County experiences an estimated \$249,076 annualized loss due to crop damages from heavy rain events.

Table 4-59 Crops Loss Due to Heavy Rain, Risk Management Agency Crop Indemnity Reports, 2007-2020

Year	Net Determined Acres	Indemnity Amount
2007	354.18	\$189,228
2009	1,639.58	\$1,464,029
2010	4,173.48	\$2,055,617
2011	584	\$280,280
2012	1,475.48	\$359,758
2013	354.6	\$106,905
2014	3,545	\$1,916,895
2015	3,303.7	\$2,974,961
2016	1,742.3	\$2,473,741
2017	4,920.1	\$3,936,051
2018	766.47	\$682,953
2019	6,741.8	\$4,983,748
2020	781.8	\$743,567
Total	30,382.49	\$22,167,733

Source: USDA RMA

Historic, Cultural and Natural Resources

As a natural process, the impacts of most heavy rain events by themselves are part of the overall natural cycle and do not cause long-term consequential damage.

Future Development

New critical facilities, such as communication towers should be built to withstand heavy rain damage. Future development projects should consider adverse weather hazards at the planning, engineering and architectural design stage with the goal of reducing vulnerability. Stormwater master planning and site review should account for buildings to withstand heavy rain events considered for all new development. Thus, development trends in the County are not expected to increase overall vulnerability to the hazard but all development will be affected by adverse weather and storm events and population growth will increase potential exposure.

Risk Summary

- During the 20-year period of 1998-2018 there were 23 heavy rain events in Merced County.
- Average annual precipitation ranges from 9.19 inches the southern portion of the County to 12.27 inches the northern portion.
- The County experiences an estimated \$249,076 annualized crop loss due to heavy rain events.
- **Related Hazards:** Flooding, Landslide

Table 4-60 Hazard Risk Summary – Heavy Rain

Jurisdiction	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Extensive	Highly Likely	Critical	High
City of Atwater	Extensive	Highly Likely	Critical	High
City of Dos Palos	Extensive	Highly Likely	Critical	High
City of Gustine	Extensive	Highly Likely	Critical	High
City of Livingston	Extensive	Highly Likely	Critical	High
City of Los Banos	Extensive	Highly Likely	Limited	Medium
City of Merced	Extensive	Highly Likely	Limited	Medium

4.2.10 Severe Weather: High Wind/Tornado

Hazard/ Problem Description

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

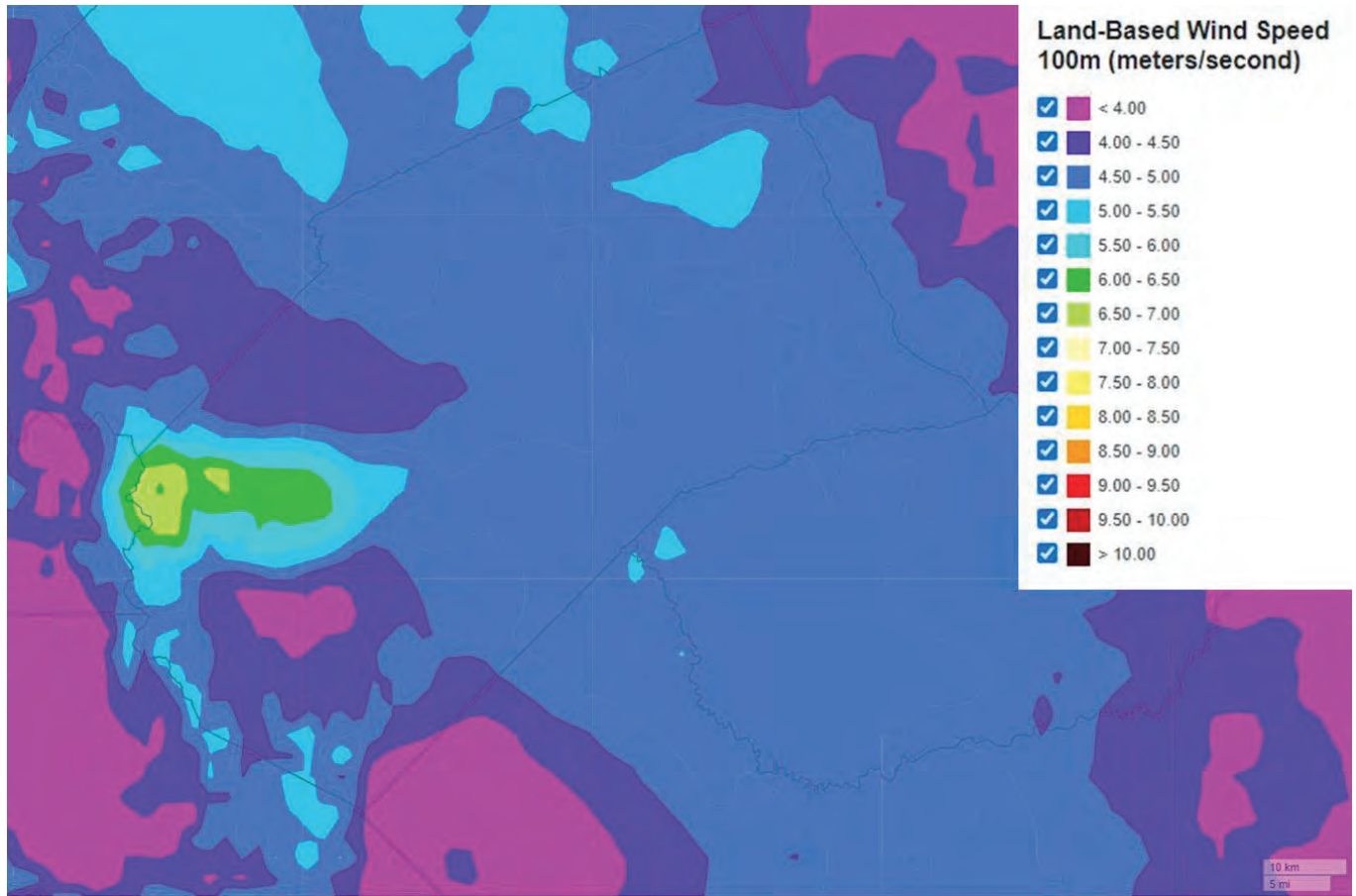
Tornadoes are another severe weather hazard that can affect the Merced County planning area. Tornadoes form when cool, dry air sits on top of warm, moist air. Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up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

Geographic Area

Wind and tornadoes have the potential to happen anywhere in the County. The resulting damage from wind and tornado events may be most severe in the downtown areas of incorporate communities where there are more large trees, infrastructure, and higher density development.

The National Renewable Energy Laboratory (NREL) collects data on wind resources in the United States to help determine the location of new wind energy sites. Figure 4-30 from the NREL Wind Prospector webviewer shows the average annual wind speed in Merced County at the height of 100 meters. The eastern and central portions of the County have average wind speeds between 4.50 meters/second and 5.50 meters/second. The wind speeds in the western portion of the County vary greater than the eastern portions. Average wind speeds in western Merced County range from less than 4.00 meters/second to 7.00 meter/second in northwest.

Figure 4-30 Merced County Average Annual Wind Speed at 100 meters



Source: NREL Wind Prospector

Extent (Magnitude/Severity)

High winds and tornadoes can cause damage to property and loss of life. While most tornado damage is caused by violent winds, most injuries and deaths result from flying debris. Property damage can include damage to buildings, fallen trees and power lines, broken gas lines, broken sewer and water mains, and the outbreak of fires. Agricultural crops and industries may also be damaged or destroyed. Access roads and streets may be blocked by debris, delaying necessary emergency response.

In 2007, the NWS began rating tornadoes using the Enhanced Fujita Scale (EF-scale). The EF-scale is a set of wind estimates (not measurements) based on damage. Its uses three-second gusts estimated at the point of damage based on a judgment of eight levels of damage to the 28 indicators listed in Table 4-60. These estimates vary with height and exposure. Standard measurements are taken by weather stations in open exposures.

Table 4-60 describes the EF-scale ratings versus the previous Fujita Scale used prior to 2007 (NOAA 2007).

Table 4-61 The Fujita Scale and Enhanced Fujita Scale

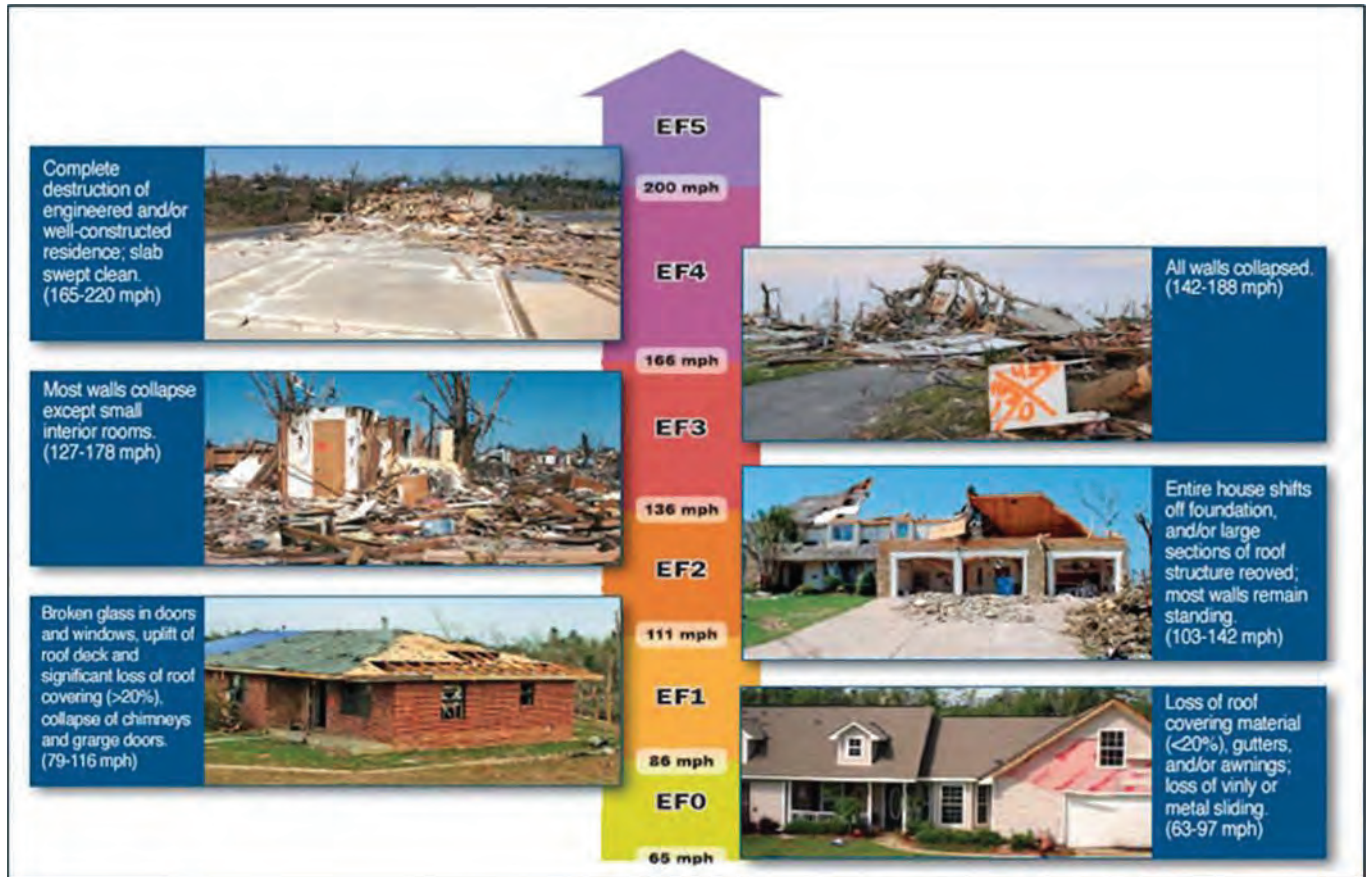
Fujita Scale			Derived		Operational EF-Scale	
F Number	Fastest ¼ mile (mph)	3-second gust (mph)	EF Number	3-second gust (mph)	EF Number	3-second gusts (mph)
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110

Fujita Scale			Derived		Operational EF-Scale	
F Number	Fastest ¼ mile (mph)	3-second gust (mph)	EF Number	3-second gust (mph)	EF Number	3-second gusts (mph)
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200

Source: NWS. Notes: EF - Enhanced Fujita F – Fujita mph - Miles per Hour

Figure 4-31 illustrates the potential impact and damage from a tornado.

Figure 4-31 Potential Impact and Damage from a Tornado



Source: NOAA NWS, Storm Prediction Center

The damaging effects of wind speed are measured using the Beaufort Wind Scale as shown in Table 4-61 below. This scale only reflects land-based effects and does not take into consideration the effects of wind over water.

Table 4-62 Beaufort Wind Scale

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

Source: NWS

Based on NCEI records between 1955 and 2019 there have been a combined 36 strong wind/high wind/thunderstorm winds and 32 tornado/funnel cloud events in Merced County which has resulted in a total of \$1,925,800 in property damage. The most damaging event took place on January 20, 2010 and was a 59-mph wind event that resulted in \$750,000 in property damages. Overall, high wind event impacts would likely be limited, with a majority of impacts being related to property damages caused by downed trees as well as power outages.

In the past 65 years all the tornado events that have taken place in Merced County have been between F0-F1 or EF0 tornadoes. However, it should be noted that, although unlikely, larger tornadoes could occur. Should the County be hit by an EF-3 or higher tornado, it can be extrapolated that because of its relative size and the potential size and length of a tornado's path a significant portion of the County could be impacted, resulting in property and crop damage and loss of life.

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

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

Past Occurrences

During the rainy season, the Merced planning area is prone to relatively strong thunderstorms, sometimes accompanied by high winds and tornadoes. While tornadoes do occur occasionally, most often they are of F0/EF0 intensity. The NCEI Storm Events Database does not record any F2, or F3 or anything events greater than EF0 events that have occurred in the planning area in the past. Table 4-62 Past High Wind and Tornado Events contains incident descriptions for significant historic events. In addition to the events listed in the NCEI database, there was a USDA disaster designation declared for Merced County in 2016 for "severe weather including excessive rainfall and high winds" (refer to Table 4-4).

Table 4-63 Past High Wind and Tornado Events in Merced County, 1955-2019

Hazard Type	Date	Location	Magnitude	Property Damages (\$)	Crop Damages (\$)	Deaths	Injuries
Tornado	4/18/1955	Merced County	Unknown	\$0	\$0	0	0
Thunderstorm Wind	7/6/1957	Merced County	70mph	\$0	\$0	0	0
Tornado	4/22/1967	Merced County	F1	\$0	\$0	0	0
Tornado	4/5/1975	Merced County	F0	\$25,000	\$0	0	0
Tornado	3/4/1978	Merced County	F1	\$250,000	\$0	0	1
Tornado	2/19/1986	Merced County	F0	\$25,000	\$0	0	0
Tornado	3/26/1991	Merced County	F0	\$0	\$0	0	0
Thunderstorm Wind	6/15/1995	Merced/Dos Palos	Unknown	\$50,000	\$3,000,000	0	0
Thunderstorm Wind	4/1/1996	Los Banos/Gustine	80mph	\$320,000	\$100,000	0	0
Tornado	4/1/1996	Merced	F0	\$10,000	\$0	0	0
Tornado	11/22/1996	Merced	F1	\$45,000	\$0	0	0
Tornado	11/13/1997	Los Banos	F0	\$5,000	\$0	0	0
Tornado	2/14/1998	Los Banos	F0	\$0	\$0	0	0
Funnel Cloud	3/25/1998	Atwater/Livingston/Merced	Unknown	\$0	\$0	0	0
Funnel Cloud	3/28/1998	Plainsburg	Unknown	\$0	\$0	0	0
Funnel Cloud	4/5/1998	Dos Palos/Los Banos	Unknown	\$0	\$0	0	0
Funnel Cloud	1/31/1999	Merced	Unknown	\$0	\$0	0	0
High Wind	1/10/2001	Countywide	Unknown	\$20,000	\$0	0	4
High Wind	5/2/2001	Countywide	57mph	\$75,000	\$1,960,000	0	0
High Wind	8/29/2001	Santa Nella	Unknown	\$0	\$0	0	0
High Wind	11/24/2001	Countywide	Unknown	\$0	\$0	0	0
High Wind	12/2/2001	Countywide	Unknown	\$0	\$0	0	0
High Wind	3/13/2002	Countywide	Unknown	\$0	\$0	0	0
High Wind	6/8/2002	Countywide	Unknown	\$0	\$0	0	0
High Wind	6/9/2002	Countywide	Unknown	\$0	\$0	0	0
High Wind	8/3/2002	Los Banos Muni ARPT	Unknown	\$0	\$0	0	0
Strong Wind	12/14/2002	Countywide	49mph	\$0	\$0	0	0
Strong Wind	12/16/2002	Countywide	36mph	\$5,000	\$0	0	0
Tornado	12/16/2002	Merced ARPT	F1	\$400,00	\$0	0	0
Strong Wind	12/19/2002	Countywide	46mph	\$5,000	\$0	0	0
Strong Wind	12/28/2002	Countywide	34mph	\$4,000	\$0	0	0
Funnel Cloud	5/3/2003	Atwater/Merced/Livingston	Unknown	\$0	\$0	0	0
Strong Wind	2/25/2004	Countywide	Unknown	\$0	\$0	0	0
Funnel Cloud	10/17/2004	Countywide	40mph	\$0	\$0	0	0
Strong Wind	10/19/2004	Countywide	41	\$1,000	\$0	0	0
Strong Wind	1/7/2005	Countywide	36 mph	\$10,000	\$0	0	0
High Wind	1/7/2005	Countywide	57.4 mph	\$150,000	\$150,000	0	0
Funnel Cloud	3/20/2005	Los Banos	Unknown	\$0	\$0	0	0
Strong Wind	3/22/2005	Countywide	40 mph	\$5,000	\$0	0	0

Hazard Type	Date	Location	Magnitude	Property Damages (\$)	Crop Damages (\$)	Deaths	Injuries
Tornado	4/8/2005	Ballico	F0	\$25,000	\$50,000	0	0
Funnel Cloud	4/8/2005	Gustine	Unknown	\$0	\$0	0	0
Funnel Cloud	1/18/2006	Gustine/El Nido	Unknown	\$0	\$0	0	0
Funnel Cloud	3/28/2006	Merced	Unknown	\$0	\$0	0	0
Tornado	3/28/2006	Atwater/Merced/ Merced ARPT	F0	\$25,000	\$0	0	0
Funnel Cloud	4/14/2006	Atwater	Unknown	\$0	\$0	0	0
Strong Wind	9/8/2006	Countywide	40 mph	\$1,000	\$0	0	0
Thunderstorm Wind	10/29/2007	Cregan	55 mph	\$60,000	\$0	0	0
Strong Wind	2/23/2008	Countywide	39 mph	\$0	\$12,000	0	0
Strong Wind	5/31/2008	Countywide	30 mph	\$500	\$0	0	0
Strong Wind	6/10/2008	Countywide	39 mph	\$200	\$1,000	0	0
Strong Wind	6/26/2008	Countywide	33 mph	\$1,000	\$0	0	0
Funnel Cloud	1/25/2009	Stevinson	Unknown	\$0	\$0	0	0
Tornado	2/9/2009	Merced ARPT	EF0	\$0	\$0	0	0
High Wind	1/20/2010	Countywide	59 mph	\$750,000	\$0	0	0
Strong Wind	3/6/2012	Countywide	36 mph	\$35,000	\$0	0	0
Funnel Cloud	4/12/2012	Atwater	Unknown	\$0	\$0	0	0
Funnel Cloud	3/2/2014	Dos Palos	Unknown	\$0	\$0	0	0
Strong Wind	12/11/2014	Countywide	48 mph	\$0	\$500,000	0	0
Strong Wind	3/5/2016	Countywide	35mph	\$100	\$0	0	0
Strong Wind	2/1/2017	Countywide	30 mph	\$1,000	\$0	0	0
Funnel Cloud	3/21/2017	Castle AFB	Unknown	\$0	\$0	0	0
High Wind	12/16/2017	Countywide	51 mph	\$0	\$0	0	0
Strong Wind	1/6/2019	Countywide	43 mph	\$16,000	\$0	0	0
Strong Wind	1/17/2019	Countywide	30 mph	\$1,000	\$0	0	0
Funnel Cloud	3/27/2019	Livingston	Unknown	\$0	\$0	0	0
Strong Wind	4/9/2019	Countywide	39 mph	\$5,000	\$0	0	0
Funnel Cloud	5/21/2019	Los Banos	Unknown	\$0	\$0	0	0
Funnel Cloud	11/28/2019	El Nido	Unknown	\$0	\$0	0	0
Total				\$1,925,800	\$5,773,000	0	5

Source: NCEI Storm Events Database, Notes: mph – Miles per Hour, ARPT – Airport, AFB – Airforce Base

Figure 4-32 and Figure 4-33 show the location of the past wind and tornado events in Merced County based on data from NOAA's NWS Storm Prediction Center.

Figure 4-32 Merced County Wind Events (1950 -2019)

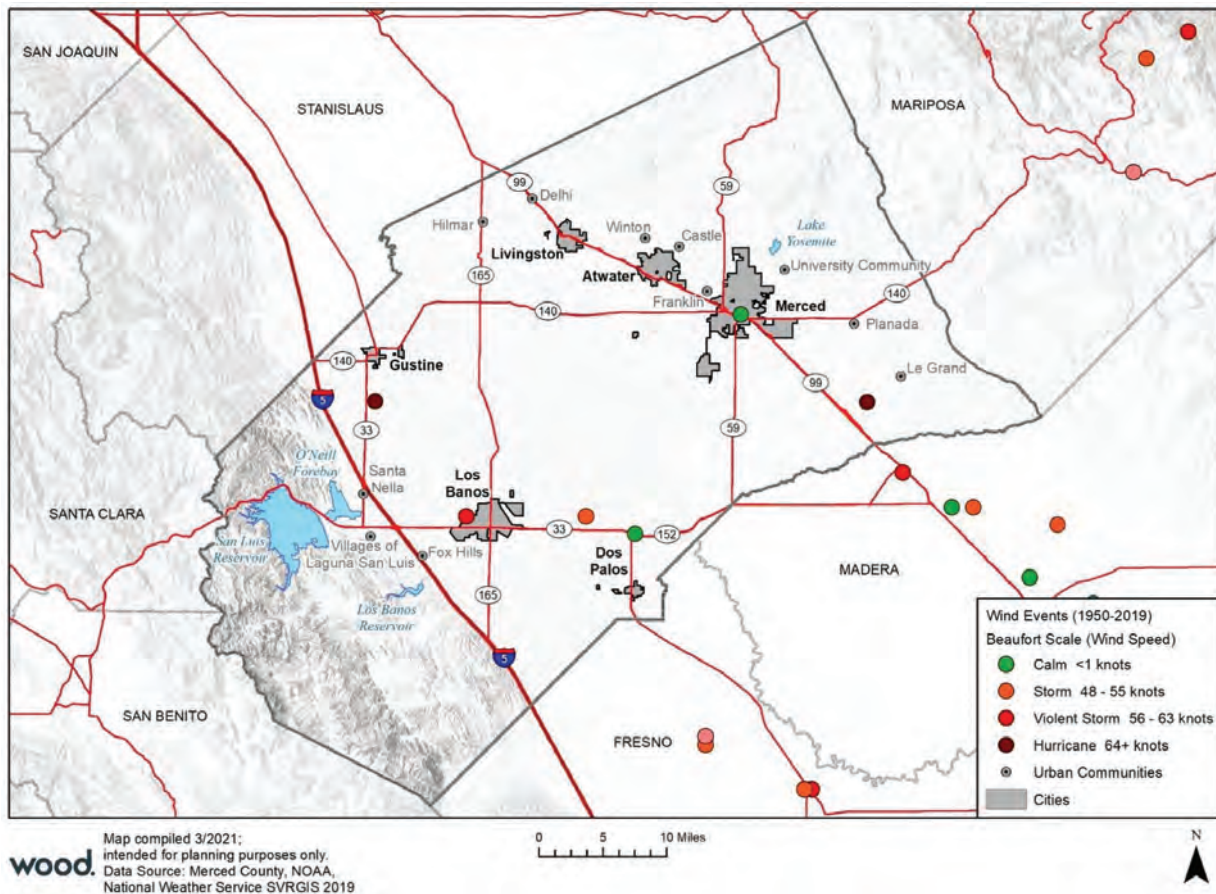
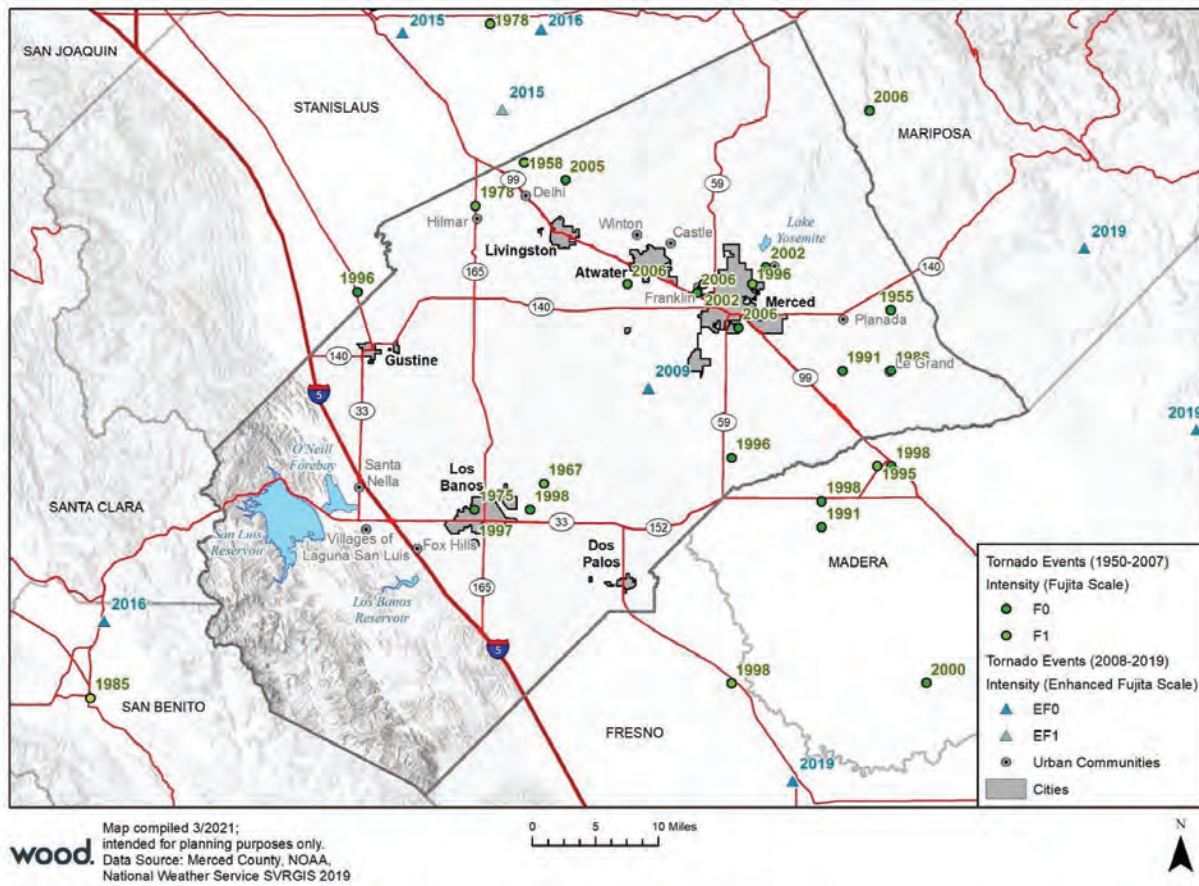


Figure 4-33 Tornado Events in Merced County, 1950 -2019



Probability of Future Occurrences

Highly Likely – Sixty-eight high wind and tornado events have occurred in Merced County over 64 years of record keeping, which equates to one high wind or tornado event every 1.1 years, on average, and a 94 percent chance of a high wind or tornado event occurring in any given year. Historical wind activity within the planning area indicates that the area will likely continue to experience high wind during thunderstorm events with a potential of the formation of funnel clouds and low intensity tornadoes during adverse weather conditions. The actual risk to the County is dependent on the nature and location of any given thunderstorm or tornado event.

Climate Change Considerations

There presently is not enough data or research to quantify the magnitude of change that climate change may have related to tornado frequency and intensity. NASA's Earth Observatory has conducted studies that aim to understand the interaction between climate change and tornadoes. Based on these studies meteorologists are unsure why some thunderstorms generate tornadoes and others don't, beyond knowing that they require a certain type of wind shear. Tornadoes spawn from approximately one percent of thunderstorms, usually supercell thunderstorms that are in a wind shear environment that promotes rotation. Some studies show a potential for a decrease in wind shear in mid-latitude areas. Because of uncertainty with the influence of climate change on tornadoes, future updates to the mitigation plan should include the latest research on how the tornado hazard frequency and severity could change. The level of significance of this hazard should be revisited over time.

As for wind, studies referenced in California's Fourth Climate Assessment indicated that extreme fire weather, particularly in the form of hot and dry winds, can strongly influence shrub-land fire regimes. Strong winds have also been now associated with severe forest fires in California meaning climate change impacts on wind patterns may also affect forest health and wildfire susceptibility. Lastly, other ongoing research compiled in the recent climate assessment has resulted in different conclusions on the effect of climate change on wind regimes, particularly extreme wind events, such as the Santa Ana and Diablo winds that created some of the most devastating wildfires (California Natural Resources Agency 2018a). At this time, these changing factors are not well understood and are still being incorporated into state and regional research and risk analysis.

Vulnerability Assessment

General Property

General damages are both direct (what the wind event physically destroys) and indirect, which focuses on additional costs, damages and losses attributed to secondary hazards spawned by the event, or due to the damages caused by the wind event. Depending on the magnitude of the wind events as well as the size of the tornado and its path, a tornado is capable of damaging and eventually destroying almost anything. Construction practices and building codes can help maximize the resistance of the structures to damage.

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

Downed trees caused by a wind event are a common occurrence in the County. Falling trees can cause significant damage to property and put people at risk. Due to multiple years of drought in the County, many trees in the area have been impacted making them more susceptible to blow-down during wind events.

People

Community members are the most vulnerable to high wind and tornado events. The availability of sheltered locations such as basements, buildings constructed using tornado-resistant materials and methods, and public storm shelters, all reduce the exposure of the population. However, there are also segments of the population that are especially exposed to the indirect impacts of high winds and tornadoes, particularly the loss of electrical power. According to the data obtained from emPower.com, a website maintained by the U.S. Department of Health and Human Services, 4%, or 1,412 of the 36,689 of the Medicare beneficiaries in the County rely on medical equipment that is dependent on electricity in order to live independently. These populations include the elderly or disabled, especially those with medical needs and treatments dependent on electricity. Nursing homes, community-based residential facilities, special needs housing facilities, and isolated communities are also vulnerable because of life support needs if electrical outages are prolonged, since backup power generally operates only minimal functions for a short period of time.

Following the unprecedented 2018 wildfire season in California, PG&E announced it will be conducting PSPS when there are high winds and dry conditions and generally a heightened fire risk forecasted. The outages could last several days, and PG&E has suggested customers be prepared for outages that could last longer than 48 hours. A majority of Merced County could be affected by the power outages.

Critical Facilities

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

In an effort to mitigate the impacts of PSPS, the State of California has allocated PSPS Resiliency funds for counties, cities, tribes and state agencies to "procure fixed, long-term emergency electrical generation equipment, develop continuity plans, risk assessments for critical infrastructure, post event reports, and public education material or supplies to prepare of electric disruption" (Cal OES 2021). In fiscal year 2019-20 Merced County was allocated \$422,987 from the PSPS Resiliency Allocation to counties, to purchase and install generators at County fire stations, backup generators and lighting infrastructure for the Merced County Operations Areas and purchase a battery-powered backup Public Safety Answering Point for all dispatch centers within the Merced County Operational Area.

Economy

Winds typically don't have long-term impacts on the economy, although wind does have an impact on the agriculture economy in the county. As shown in Table 4-63, wind events have been a leading cause of crop loss in the past three years (2007 – 2019), resulting in over \$2 million in loss payments from the USDA and more than 3,000 acres lost to high wind events. Merced County experiences an estimated \$187,255 annualized loss due to crop damages from excessive wind events.

Table 4-64 Crops Loss Due to High Wind, Risk Management Agency Crop Indemnity Reports, 2007-2019

Year	Net Determined Acres	Indemnity Amount
2007	372.4	\$97,945
2008	327.02	\$130,399
2012	32.4	\$2,159
2013	1,624.8	\$1,267,860
2014	176	\$171,649
2015	301.9	\$75,625
2016	7.4	\$11,792
2017	398.68	\$303,600
2019	298	\$186,034
Total	3,539	\$2,247,063

Source: USDA RMA

Historic, Cultural and Natural Resources

High winds and tornadoes can cause massive damage to the natural environment, uprooting trees and other debris. This is part of a natural process, however, and the environment will return to its original state in time.

Future Development

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

Risk Summary

- Between 1955 and 2019 there were a combined 68 high wind (36) and tornado (32) events in the County.
- Wind and tornado events have resulted in \$1,925,800 in property damages. The most damaging event took place on January 20, 2010 with 59 mph wind causing \$750,000 in property damages.
- Excessive wind has caused 3,539 acres to be lost and \$2,247,063 crop loss payment made by the USDA to farmers in the County.
- PSPS pose a risk to individuals in the County who depend on electricity to live independently. Four percent of Medicare Beneficiaries in the County are electricity dependent.
- **Related Hazards:** Extreme heat, Heavy Rain, Agriculture/Pest and Crop Disease, Wildfire

Table 4-65 Hazard Risk Summary – High Wind/Tornado

Jurisdiction	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Extensive	Highly Likely	Critical	High
City of Atwater	Extensive	Highly Likely	Critical	High
City of Dos Palos	Extensive	Highly Likely	Critical	High
City of Gustine	Extensive	Highly Likely	Limited	Medium
City of Livingston	Extensive	Highly Likely	Limited	Medium
City of Los Banos	Extensive	Highly Likely	Limited	Medium
City of Merced	Extensive	Highly Likely	Limited	Medium

4.2.11 Subsidence

Hazard/Problem Description

Land subsidence is defined as the vertical sinking of the land over natural or manmade underground voids. Subsidence is common in several areas of California, usually as a result of groundwater pumping, peat loss, or oil and gas extraction. Fluctuations in the level of underground water caused by pumping or by injecting fluids into the earth can initiate sinking to fill the empty space previously occupied by water or soluble minerals. Weight, including surface developments such as roads, reservoirs, and buildings, and manmade vibrations from such activities as blasting and heavy truck or train traffic can accelerate the natural processes of subsidence, or induce subsidence over manmade voids.

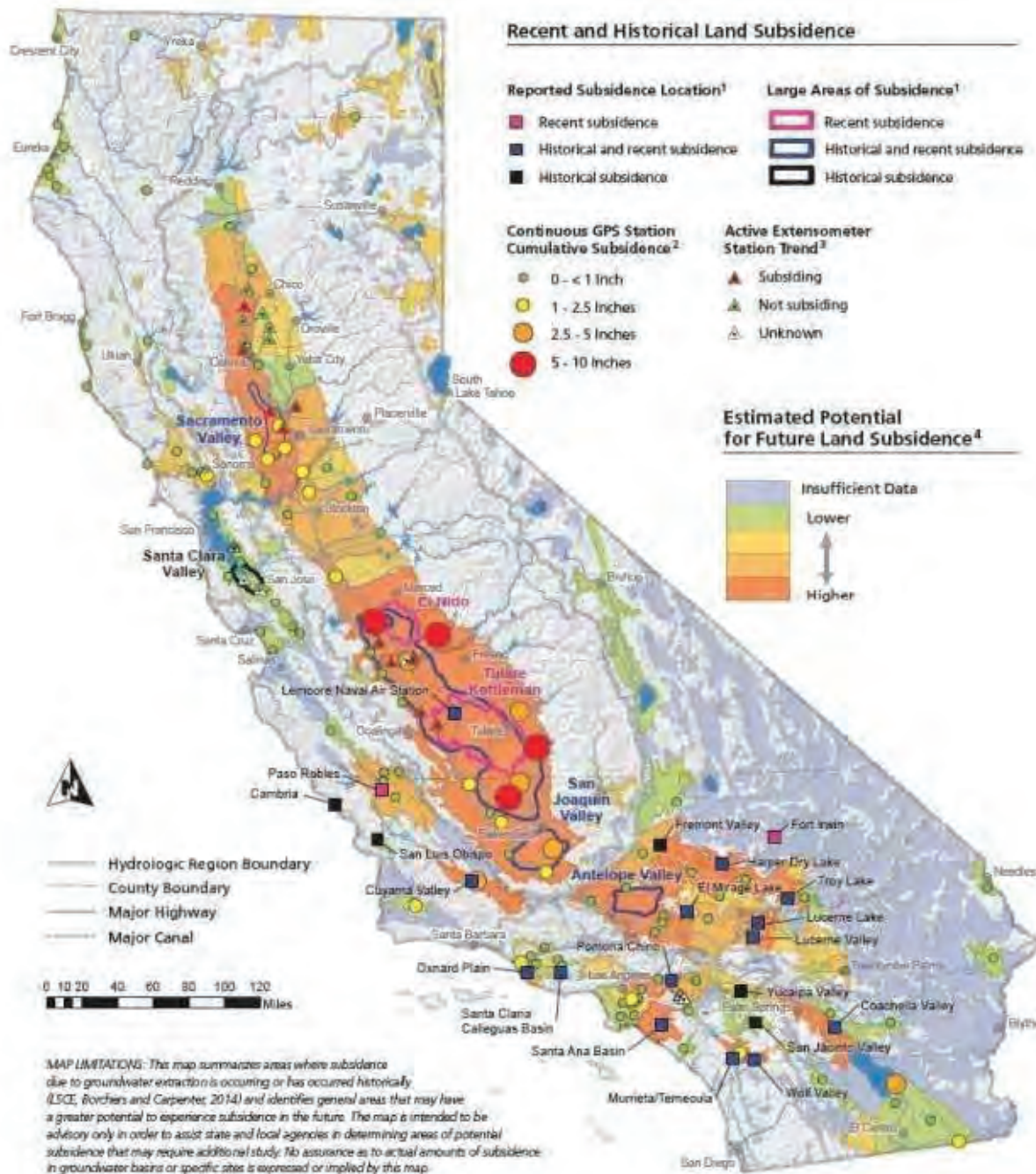
The 2018 California SHMP profiles subsidence as a secondary impact of drought. Through reduced availability of surface water, groundwater pumping in order to meet water needs. According to a study published by Yale Environmental Review, approximately 1 million people in the San Joaquin Valley rely on groundwater pumping for drinking water, and thousands of farmers rely on groundwater to irrigate crops. While groundwater pumping occurs in both drought and non-drought years to support urban, rural, and agricultural water needs, the 2018 California State HMP notes that it is greatly increased during dry years. Land subsidence due to groundwater pumping can permanently damage or collapse underground aquifers, increase flood risk in low-lying areas, and pose hazards to buildings, infrastructure, and water storage facilities.

Subsidence can result in serious, localized structural damage to buildings, roads, irrigation ditches, canals, streams, underground utilities, and pipelines. It can disrupt and alter the flow of surface or underground water. The consequences of improper use of land subject to ground subsidence can be excessive economic losses, including the high costs of repair and maintenance for buildings, irrigation works, highways, utilities, and other structures. This results in direct economic losses to citizens as well as indirect economic losses through increased taxes and decreased property values.

Geographic Area

Figure 4-34 below shows areas statewide that have a recent history of subsidence or are known to be at an increased risk of subsidence. Most studies and concern about land subsidence in California have focused on the Santa Clara Valley, San Joaquin Valley, Sacramento Valley, Antelope Valley, Coachella Valley, and Mojave River Basin Areas.

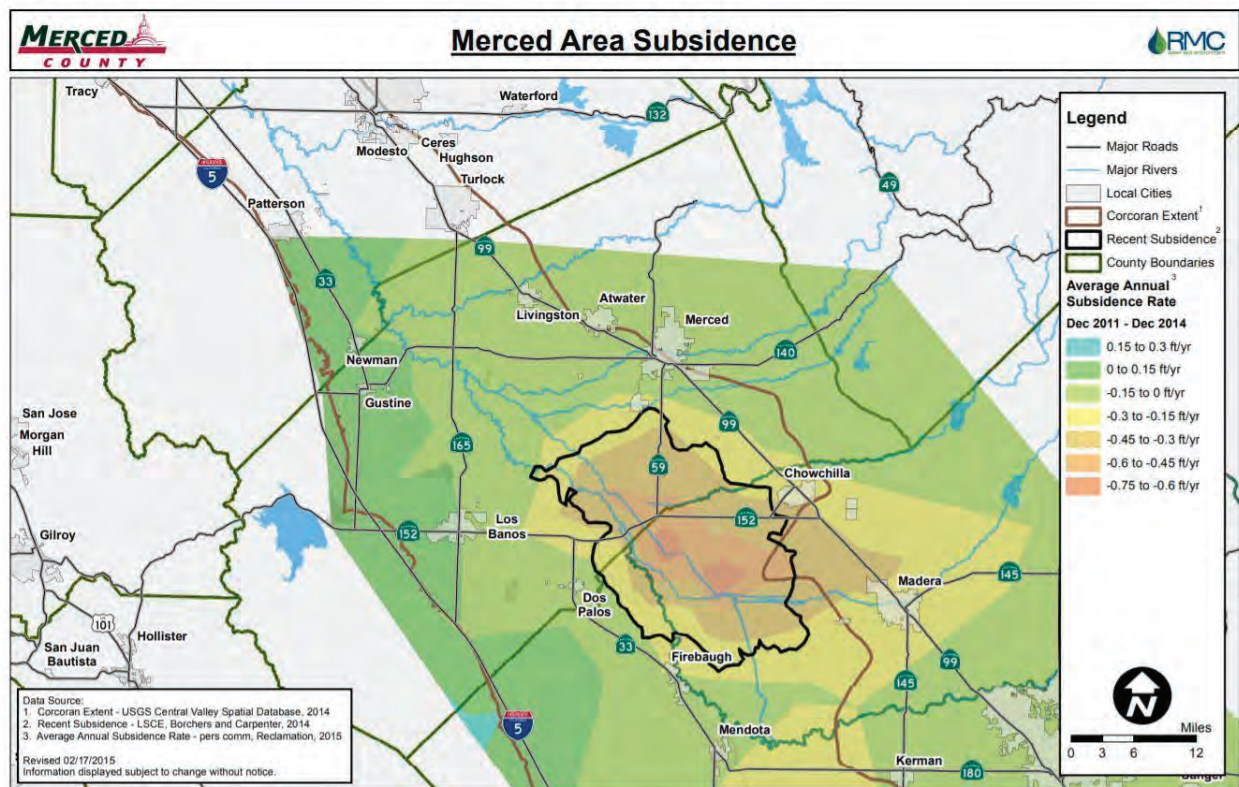
Figure 4-34 Historic Land Subsidence in California



Source: California DWR, November 2014 Public Update for Drought Response

The Merced Subbasin GSA has a focused map of subsidence in the vicinity of Merced County, shown in Figure 4-35 below. This agency was created for the purpose of forming a joint powers agency that will be the GSA for a portion of the Merced Groundwater Subbasin. The Merced Subbasin GSA developed and adopted the Merced Groundwater Sustainability Plan in December 2019. The implementation of plan will address the SGMA requirements and achieve the sustainability goals outlined in SGMA, in addition to positive impacts to future subsidence in the County.

Figure 4-35 Merced County Area Subsidence



Source: Merced County

Extent (Magnitude/Severity)

A lack of data makes it difficult to predict the magnitude of future land subsidence incidents in Merced County. As shown in Figure 4-35 above, most of the documented land subsidence in the county has been of 0.5 feet or less per year. Much of this subsidence is continuous and occurs gradually over a vast area of the county. However, that can still be enough to cause structural issues. Sudden and localized subsidence events, such as sinkholes, can cause damage to building foundations, roadways, and utilities. Such events have been documented in nearby Fresno and Madera counties, where sinkholes or sudden subsidence has damaged and closed roads. Ongoing displacements of as much as 12" per year have been documented in other parts of the state. As areas of the county continue to gradually sink, the impacts on infrastructure may become more apparent.

Previous Occurrences

While actual effects of subsidence are visible throughout the County, research on the hazard produced thus far has not produced records of any specific events. Some areas of the County have subsided 10-15 feet over the past 50 years according to the HMPT.

Probability of Future Occurrences

Land subsidence has been a recurring issue in Merced County for decades and can be expected to continue in the future. The frequency of future land subsidence incidents in the county will largely be dependent on the mitigation actions and pumping regulations initiated by the state, the county, and local regulations. Based on past trends of gradual subsidence throughout the entire San Joaquin Valley and the

continued dependence on groundwater pumping, it can be assumed that subsidence will continue in the future, with increased rates of subsidence coinciding with drought years.

Climate Change Considerations

The most likely impact that climate change will have on land subsidence risk is the potential for extended and severe drought, which could likely result in more groundwater pumping and human-induced subsidence. During periods of drought, water levels may be drawn too low, which results in an irreversible compaction of aquifers. The water cannot recharge the layers, causing permanent subsidence and diminishment of groundwater storage capacity.

Vulnerability Assessment

General Property

The lack of detailed data on land subsidence in Merced County makes it difficult to quantify past or potential future losses. Most subsidence instances result in relatively minor damage and settling of buildings. But in some cases, subsidence can result in serious structural damage to buildings, roads, irrigation ditches, underground utilities, and pipelines, potentially resulting in the complete loss of the structure. Subsidence can also disrupt and alter the flow of surface or underground water, as well as reducing the future capacity of aquifers.

People

This hazard typically results in property damage, not risk to human life. In the event of a sudden sinkhole, it would be possible for people to sustain injuries if they were walking or driving and were caught in the sinkhole.

Critical Facilities and Infrastructure

Linear infrastructure (roads, buried pipelines) tends to have the most risk to land subsidence. Statewide, subsidence has caused damage to dams and levees, canals, roads and bridges, water and sewer lines, pipelines, well casings, and aircraft runways, in addition to a variety of buildings and other structures. Highways 59 and 152 traverse areas of historic subsidence in the County. The threat to the California Aqueduct has been identified as a significant concern for the state. Evidence of the gradual impacts of subsidence on infrastructure in the San Joaquin Valley can be seen in Figure 4-36 below. This image was taken from the California Water Foundations Summary Report on Land Subsidence from Groundwater Use in California. The bridge shown is over the Outside Canal north of Mendota, California. While it is partially submerged in this image, the bridge used to have canal inspections by the Central California Irrigation District staff conducted from a boat passing under the bridge.

Figure 4-36 Evidence of Gradual Land Subsidence, Partially Submerged Russell Avenue Bridge, Mendota, CA



Economy

Damage resulting from land subsidence can cause direct economic losses in the form of needed structural repairs to affected buildings and facilities. It can also result in indirect losses, such as from increased taxes and decreased property values. Subsidence may impact tourism and shipping industries if transportation routes are affected.

Historic, Cultural, and Natural Resources

Historic and cultural facilities are just as susceptible to subsidence related damage as other structures. However, there is not sufficient data to identify specific historical or cultural facilities at increased risk from this hazard.

Groundwater pumping can cause significant impacts to underground water resources, and the resulting subsidence events may further disrupt and alter the flow of surface or underground water, in a cyclical pattern of environmental degradation. Furthermore, soil compaction resulting from subsidence can permanently reduce aquifer capacity, impacting water supplies long into the future.

Future Development

The areas of the county which have experience the greatest historic rates of subsidence are largely in the middle of the county, which is occupied by the Merced National Wildlife Refuge, San Luis National Wildlife Refuge, and Great Valley Grasslands State Park. As such, future development of these areas will be significantly restricted, and growth will be limited. While vulnerability to this hazard is not anticipated to increase with new development, increased water pumping resulting from the demand of new development has the potential to increase the frequency and severity of subsidence. This could be

especially important in Los Banos, given that area has higher subsidence potential. Increased efforts to monitor and manage groundwater pumping, increased accuracy of mapping, and emphasis on appropriate grading and ground compaction during development will help alleviate vulnerability for future development in unknown areas of risk.

Risk Summary

While a significant portion of Merced County is at risk from ongoing land subsidence, the gradual nature of this hazard makes the overall significance of this hazard low.

- The gradual nature of land subsidence incidents limits their overall impact, in terms of property damage, at the county level.
- The entire San Joaquin Valley is vulnerable to land subsidence, and Merced County is vulnerable due to its dependence on agriculture and groundwater pumping.
- There is a shortage of data on specific occurrence of this hazard in Merced County. Most studies on land subsidence in California have focused on the Santa Clara Valley, San Joaquin Valley, Sacramento Valley, Antelope Valley, Coachella Valley, and Mojave River Basin Areas, however there is not extensive information on individual subsidence events.
- Increased drought conditions resulting from climate change has the potential to result in more groundwater pumping, which could lead to more human-induced subsidence; groundwater sustainability planning and management could help offset future subsidence.
- Land subsidence can alter the flow of surface or underground water, an impact that may not be noticed until long after the fact.
- **Related Hazards:** Drought

Table 4-66 Hazard Risk Summary – Subsidence

Jurisdiction	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Extensive	Likely	Negligible	Low
City of Atwater	Limited	Occasional	Negligible	Low
City of Dos Palos	Limited	Occasional	Negligible	Low
City of Gustine	Limited	Unlikely	Negligible	Low
City of Livingston	Limited	Occasional	Negligible	Low
City of Los Banos	Limited	Likely	Negligible	Low
City of Merced	Limited	Occasional	Negligible	Low

4.2.12 Wildfire

Hazard/Problem Description

A wildfire is an uncontrolled fire spreading through vegetative fuels, posing danger and destruction to property and watersheds. While wildfires are often the direct result of lightning strikes, they can be caused by downed powerlines or mechanical equipment or are the result of human activities like landscape debris burns, carelessness, or arson. Wildfires often start in undeveloped areas and public land areas, such as state and federal lands, but can spread to urban areas where structures and other human development are more concentrated. The predominant dangers from wildfires are:

- Injury or loss of life to people in the affected area; and
- The destruction of vegetation, property, wildlife.

Communities throughout California are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural cycle of the ecosystem. Wildfire risk is predominantly associated with wildland-urban interface areas, a general term that applies to development adjacent to landscapes that support wildfire. However, significant wildfires can also occur in heavily populated areas.

Merced County is exposed to a variety of wildfire hazard conditions that varies based on fuels, topography, weather, and human behavior. CAL FIRE, as required by government code 51181, has undertaken a statewide program to map areas of potential wildfire severity, and to describe the potential for wildfires to occur in a given area; the resulting Fire Hazard Severity Zones are shown in Figure 4-37 below.

It should be noted that fires are also an important natural component of Merced County's ecosystem. Wildlands need to burn periodically to naturally maintain viable environments. Fuel maintenance (controlled burns, mowing, cattle grazing, and other means) is a necessary replacement to uncontrolled wildland fires because of threats to human habitation. Development patterns in rural lands can reduce the ability to manage fuel and defend "values at risk".

Generally, there are three major factors that sustain wildfires and predict a given area's potential to burn. These factors are fuel, topography, and weather.

- **Fuel**—Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Also, to be considered as a fuel source are manmade structures, such as homes and other associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Fuel is the only factor that can be modified by humans. The main fuel types in Merced County are crops and grasses, while there are also brush and pine fuels present in some areas in the southwest of the county.
- **Topography**—An area's terrain and slopes affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement and types of vegetation throughout a hillside can also contribute to increased fire activity on slopes.
- **Weather**—Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out fuels that feed wildfires, creating a situation where fuel will more readily ignite and burn more intensely. Thus, during periods of drought, the threat of wildfire increases. Wind is the most influential weather factor of the three and its influence can increase rates of spread regardless of temperature and relative humidity.

Geographic Area

Both urban and wildland fires conditions exist in Merced County which increases the chances for damage to property, loss of life and/or injury. In the wildland-urban interface, where development has expanded into rural, higher risk areas, fires can result in major losses of property and structures. In most of Merced County, the California Department of Forestry and Fire Protection (CAL FIRE) ranks fuel loading as low. Fuels are mainly crops and grasses. In the southwest corner, there are some brush, pine, and grass fuels, which are ranked as moderate fuel hazards, primarily in the area west of Interstate 5.

Generally, fire season in Merced County extends from early spring to late fall. Onset can happen suddenly due to lightning or human caused factors and wildfires can last from a few hours to a few months, but the likely hood of a large and damaging fire lasting for months in Merced County is not likely. Secondary effects from wildfire include increased erosion, destabilized slopes, degraded air and water quality, and economic impacts from burned landscapes. Urban fires primarily involve the uncontrolled burning of residential, commercial and/or industrial structures generally caused by human activities.

The California Department of Forestry and Fire Protection's Fire and Resource Assessment Program (FRAP) assesses the amount and extent of California's forests and rangelands, analyzes their conditions and identifies alternative management and policy guidelines.

CAL FIRE identifies areas that are at high risk of damage from wildfire based primarily on three factors:

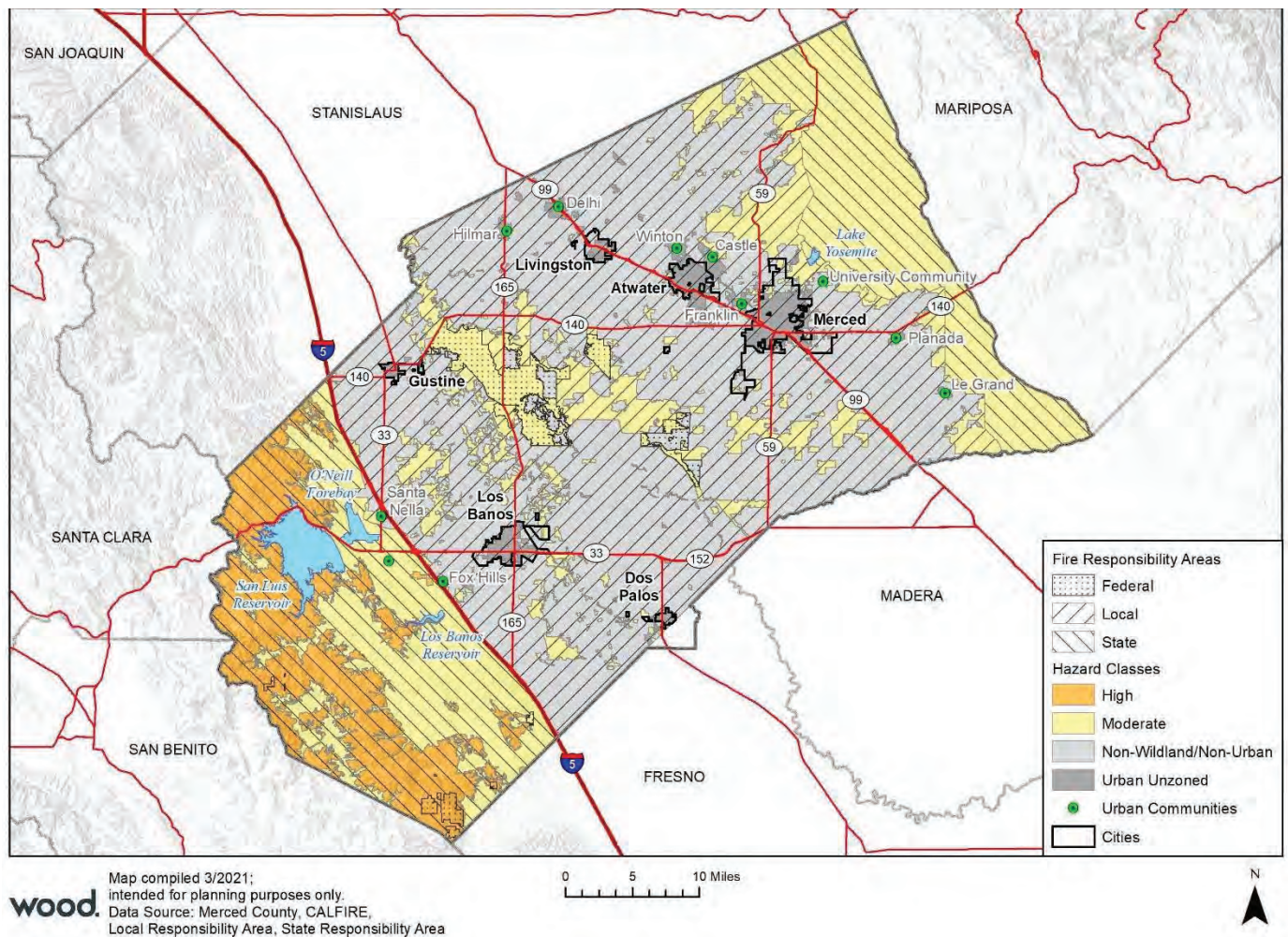
- Ranking Fuel Hazards = ranking vegetation types by their potential fire behavior during a wildfire.
- Assessing the Probability of Fire = the annual likelihood that a large damaging wildfire would occur in a particular vegetation type.
- Defining Areas of Suitable Housing Density that Would Create Wildland-Urban Interface Fire Protection Strategy Situations = areas of intermingled wildland fuels and urban environments that are in the vicinity of fire threats.

Population density and the presence of structures are not currently used to determine the fire hazard severity for a particular region, although they do have a significant impact on fire behavior.

Based on the above criteria, CAL FIRE maps Fire Hazard Severity Zones for each county as "Very High," "High," or "Moderate". As shown below in Figure 4-37, there are no areas in Merced County classified as Very High and the areas ranked High are primarily located west of Interstate 5. These areas exhibit the combination of vegetative fuel and topography that contribute to an increased fire hazard potential. The fact that an area is in a Moderate Hazard designation does not mean it cannot experience a damaging fire. It only means that the probability is reduced, generally because the number of days a year that the area has "fire weather" is less.

The Fire Hazard Severity Zones (FHSZ) spatial dataset was explicitly developed for adopting new ignition-resistant building code standards and adopted by the California Building Commission in 2007. It is constructed to describe the nature and probability of fire exposure to structures, including those lands that are highly urbanized, but in close proximity to open wildlands. It is broken into Federal Responsibility Areas, State Responsibility Areas, and Local Responsibility Areas shown below.

Figure 4-37 Merced County Federal, State, and Local Responsibility Severity Zones



CAL FIRE has also designated the following Merced County communities as being at increased risk from wildfires (<https://osfm.fire.ca.gov/divisions/wildfire-planning-engineering/fire-plan/communities-at-risk/>):

- Dos Palos
- Gustine
- Los Banos
- South Dos Palos

Some unincorporated communities located within the county are not confronted with a high wildfire risk, due primarily to the dominant type of vegetation in those areas. The low-growing native grasses and shrubs found in these communities present a minimal vegetative fuel source and a corresponding low wildfire risk. In addition, the topography of those areas is mainly level and well developed in both residential and agricultural land uses.

Extent (Magnitude/Severity)

Vegetation (or fuel) plays a major role in fire behavior and shaping fire hazard potential. Vegetation distribution throughout the county varies by location and topography, with dramatic differences observed between the western, central, and eastern portions of the county. For instance, fire behavior in brush fuel

types produces higher flame lengths than that in grassland, although spread rates are typically slower. Fire behavior in forests is variable, depending on surface fuel conditions and the presence of ladder fuels.

Fuel loading in developed areas susceptible to wildfire becomes even more complex. The introduction of some ornamental plantings as landscaping and groundcover can dramatically increase the fire loading of a neighborhood. Gazebos, fencing, patios, decks and even the structures themselves add even more fuel. Once structures become involved in fire, the problem compounds as embers cast out thousands of feet onto combustible roofs well removed from the wildland area.

Steep terrain also plays a key role in the rate at which wildfires spread, as fires will normally burn much faster uphill. Generally, when the gradient of a slope doubles, the rate of spread of a fire will also double. Steep topography also channels air flow, thereby creating erratic wind patterns. Fire suppression in steep areas is also complicated by limited accessibility, and the effectiveness of firefighters and equipment are hampered by lack of access roads.

Another factor that can increase the severity of wildfires in the county is areas with high percentages of dead trees, as discussed in subsection 4.3.15 Agricultural Pests and Disease.

The Fire Rating System defined in Table 4-66 describes the characteristics and potential intensity of fires, including the effect on the ability to manage and suppress fires. Fire conditions up through Class 5 are possible in Merced County, primarily in the unincorporated areas in the far east and west of the county.

Table 4-67 Fire Danger Rating System

Rating	Basic Description	Detailed Description
CLASS 1: Low Danger (L) COLOR CODE: Green	fires not easily started	Fuels do not ignite readily from small firebrands. Fires in open or cured grassland may burn freely a few hours after rain, but wood fires spread slowly by creeping or smoldering and burn in irregular fingers. There is little danger of spotting.
CLASS 2: Moderate Danger (M) COLOR CODE: Blue	fires start easily and spread at a moderate rate	Fires can start from most accidental causes. Fires in open cured grassland will burn briskly and spread rapidly on windy days. Woods fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel – especially draped fuel -- may burn hot. Short-distance spotting may occur but is not persistent. Fires are not likely to become serious and control is relatively easy.
CLASS 3: High Danger (H) COLOR CODE: Yellow	fires start easily and spread at a rapid rate	All fine dead fuels ignite readily, and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly, and short-distance spotting is common. High-intensity burning may develop on slopes or in concentrations of fine fuel. Fires may become serious and their control difficult, unless they are hit hard and fast while small.
CLASS 4: Very High Danger (VH) COLOR CODE: Orange	fires start very easily and spread at a very fast rate	Fires start easily from all causes and immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high-intensity characteristics – such as long-distance spotting – and fire whirlwinds, when they burn into heavier fuels. Direct attack at the head of such fires is rarely possible after they have been burning more than a few minutes.

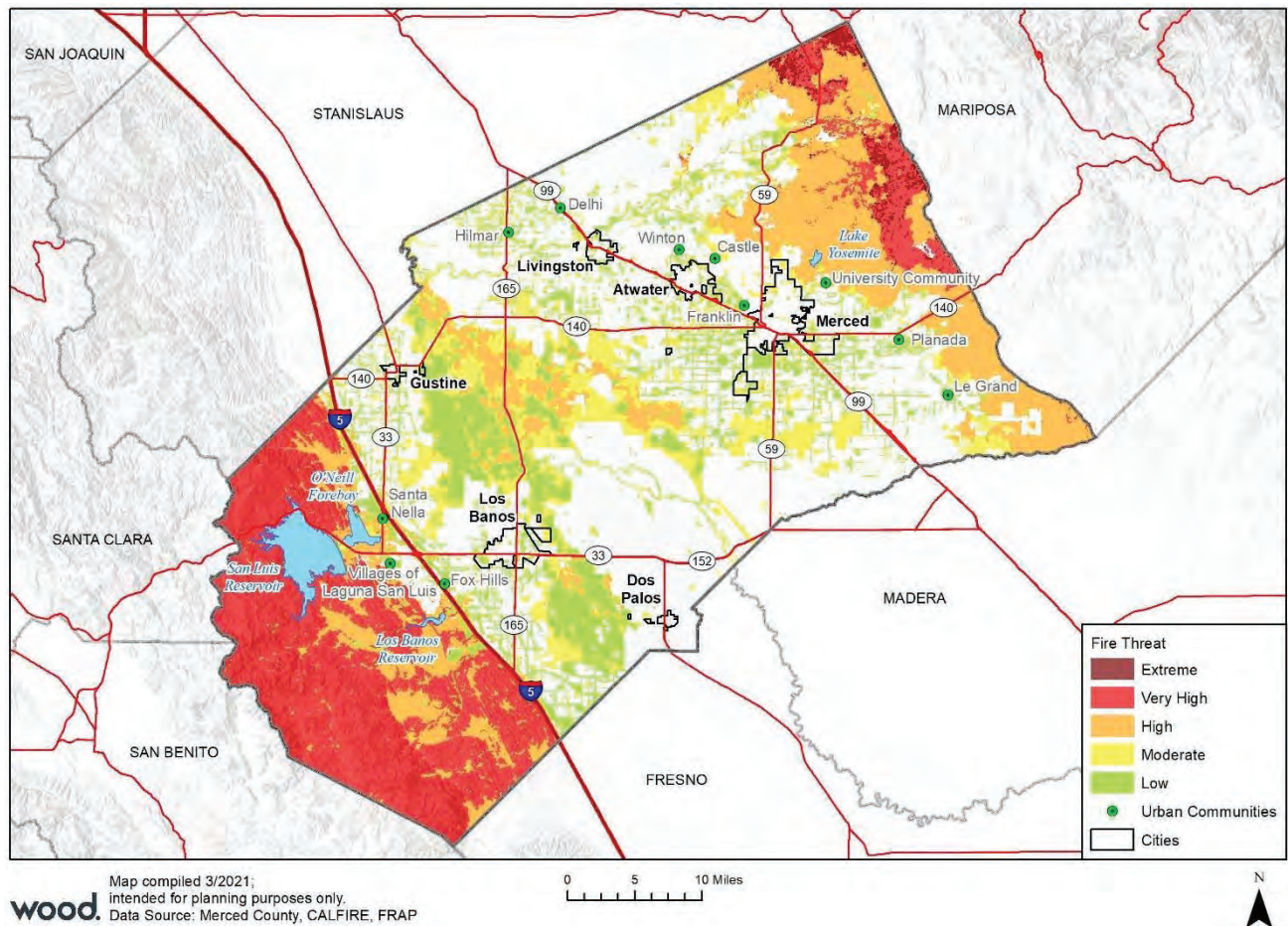
Rating	Basic Description	Detailed Description
CLASS 5: Extreme (E) COLOR CODE: Red	fire situation is explosive and can result in extensive property damage	Fires under extreme conditions start quickly, spread furiously and burn intensely. All fires are potentially serious. Development into high-intensity burning will usually be faster and occur from smaller fires than in the Very High Danger class (4). Direct attack is rarely possible and may be dangerous, except immediately after ignition. Fires that develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions, the only effective and safe control action is on the flanks, until the weather changes or the fuel supply lessens.

Source: <http://www.wfas.net>

Major wildland fires can completely destroy ground cover. If heavy rains follow a major fire, flash floods, heavy erosion, land subsidence and mudflows can occur. After a wildland fire passes through an area, the land is laid bare of its protective vegetation cover and is susceptible to excessive runoff and erosion from winter storms. The intense heat from the fire can also cause a chemical reaction in the soil that makes it less porous, and the fire can destroy the root systems of shrubs and grasses that aid in stabilizing slope material. These cascading effects can have ruinous impacts on people, structures, infrastructure, and agriculture.

Fire threat provides a measure of fuel conditions and fire potential in the ecosystem, representing the relative likelihood of “damaging” or difficult to control wildfire occurring for a given area. Fire Threat is not a risk assessment by itself but can be used to assess the potential for impacts on various assets and values susceptible to fire. Impacts are more likely to occur and/or be of increased severity for the higher threat classes. Fire threat is a combination of two factors: 1) fire probability, or the likelihood of a given area burning, and 2) potential fire behavior (hazard). These two factors are combined to create five threat classes ranging from low to extreme. Figure 4-38 below shows the wildfire threat areas throughout Merced County.

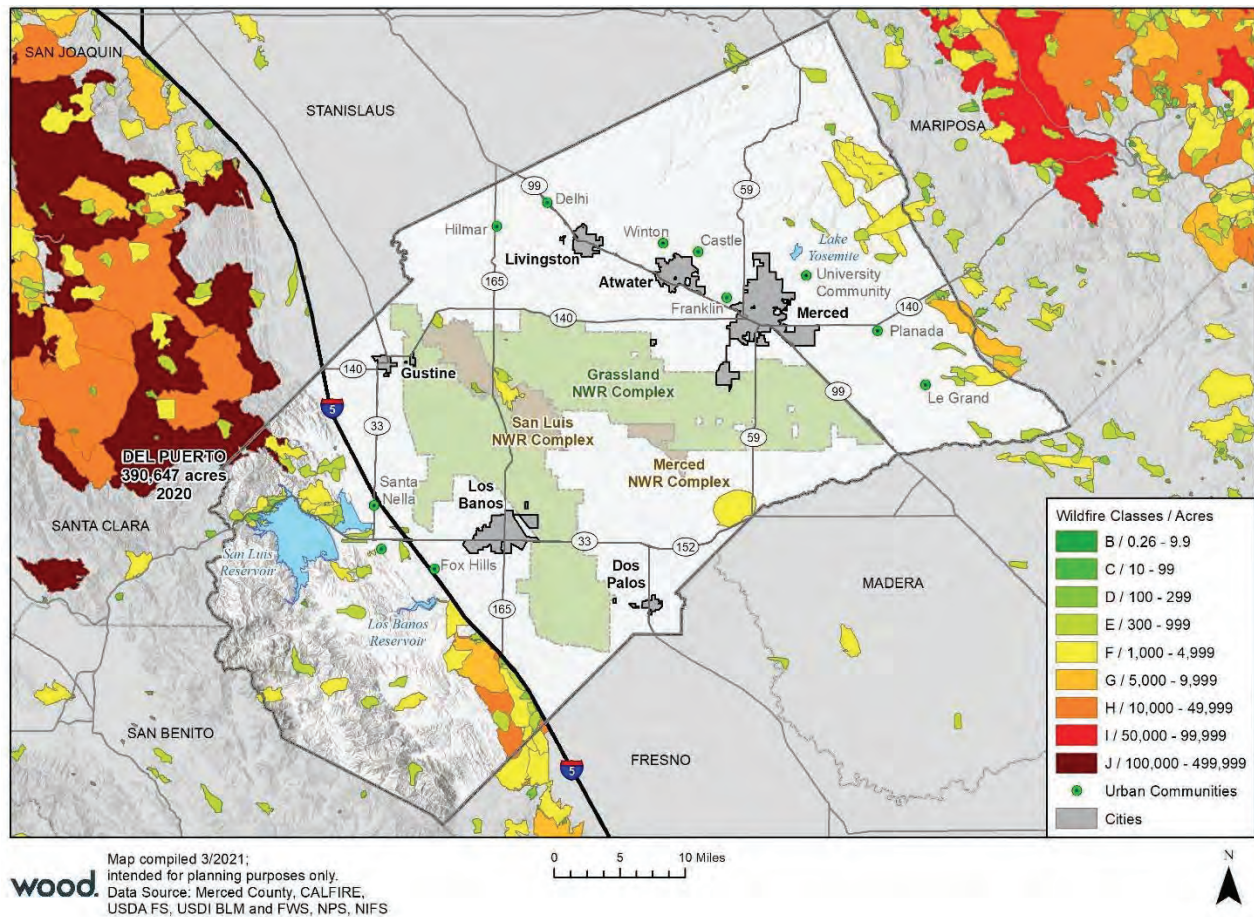
Figure 4-38 Merced County Wildfire Threat Areas



Previous Occurrences

There have not been any state or federal disaster declarations in Merced County related to wildfire in the past. The Planning Team noted that although there are many fire starts, the fuels are “flashy” and fires are usually quickly put out. Despite this, there have been 101 wildfires recorded in the county from 1950-2018 totaling 110,893 acres burned. This is an average of over 1,500 acres burned every year. In 2020, a portion of the SCU Lightning Complex Fire, which is the 3rd largest fire by acres burned in state history, extended into Merced County, burning approximately 3,800 acres in the planning area. As stated above, most fires are relatively small compared to the state as a whole, the highest number of acres burned in the county was 19,131 during the 1996 Mercy fire. The county’s fire history from 1911-2020 is illustrated in Figure 4-39.

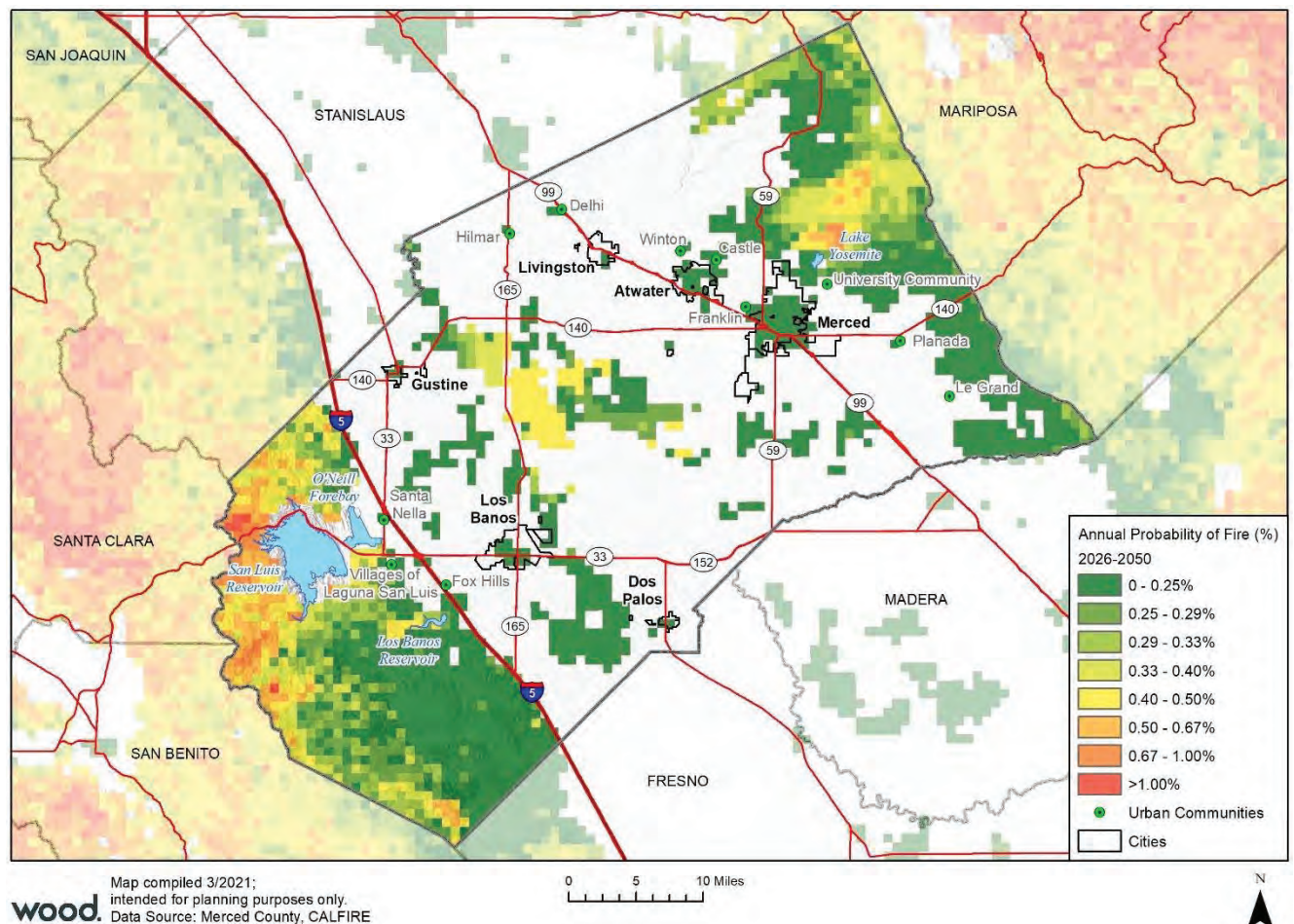
Figure 4-39 Merced County Fire History, 1911-2020



Probability of Future Occurrences

Fire starts are highly likely during each fire season; though, they rarely result in large-scale wildfires in Merced County. Information obtained from the CAL FIRE Redbook lists multiple fires, the largest in the most recent past consumed approximately 3,800 acres. Based on climate and weather in Merced County and the fuels, topography, and a past fire history which indicates an average of 1.5 wildfires per year, it is likely that fires will continue to occur in the future. Figure 4-40 below shows the annual probability for wildfire in Merced County from 2026-2040, based on CAL FIRE GIS mapping.

Figure 4-40 Merced County Annual Probability of Fire, 2026-2050



Climate Change Considerations

According to the 2018 California SHMP, climate change has the potential to impact the frequency, size, and severity of the wildfire hazard statewide. Increasing temperatures may intensify wildfire threat and susceptibility to more frequent wildfires in the county.

Exactly how climate change will affect total precipitation is not clear, but models suggest that there is a tendency for wetter conditions in the northern part of the state and drier conditions in the south (California Natural Resources Agency 2018a). Forests are also sensitive to variable precipitation events, as the 2012-2017 drought contributed to widespread tree mortality as warmer temperatures stressed trees and made them more susceptible to pests and pathogens (California Natural Resources Agency 2018). Studies noted in California's Fourth Assessment report note climate change impacts on wind patterns may strongly affect forests, potentially serving as a trigger mechanism for conversion of forest to other types of vegetation (California Natural Resources Agency 2018).

Current scientific models expect all of California will be affected by increased numbers of forest fires with added intensity due to longer warmer seasons, reduced distribution of biodiversity, lack of moisture, changes in ecosystems, drought impacts (e.g. pest diseases and continued spread of invasive species), and other impacts in coming years. The extending of the wildfire season into winter months, coinciding with seasonal high wind patterns, has contributed to severe fires in recent years. Southern California

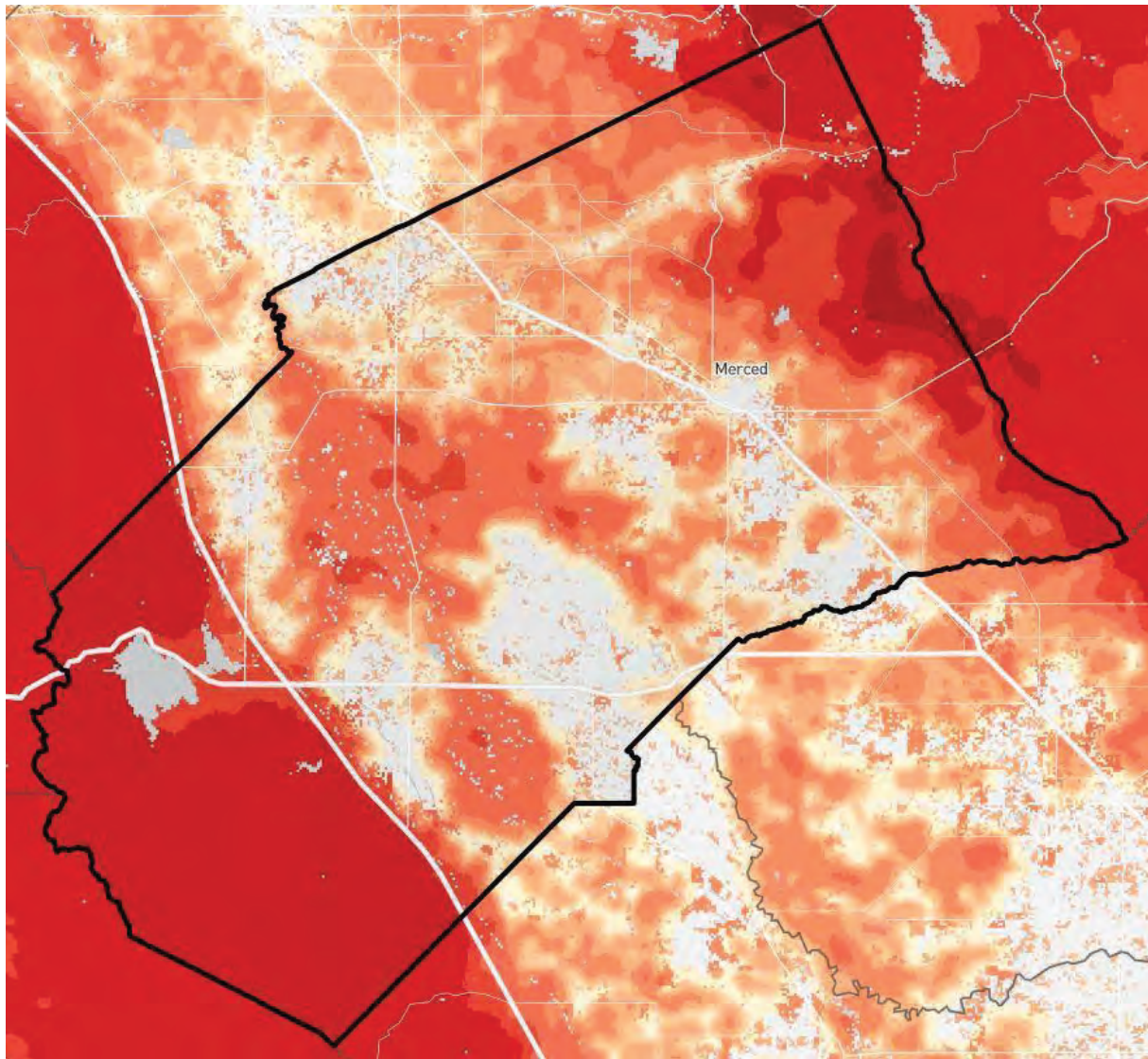
experienced 29 wildfires in December of 2017 alone, and the deadliest and most destructive fire in California history, the Camp Fire, happened in November of 2018.

Vulnerability Assessment

Merced County vulnerability to wildfires varies, with some areas of the planning area being at greater risk than others as described further in this section. Generally, this hazard is a medium concern. High fuel loads in some areas of the planning area along with geographical and topographical features create the potential for both natural and human caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, low relative humidity, and periodic winds, can result in frequent and sometimes catastrophic fires. Even the relatively flat central parts of the county are not immune to fire; hot and sometimes windy weather combined with dry vegetation and a denser population can result in an increase in the number of ignitions.

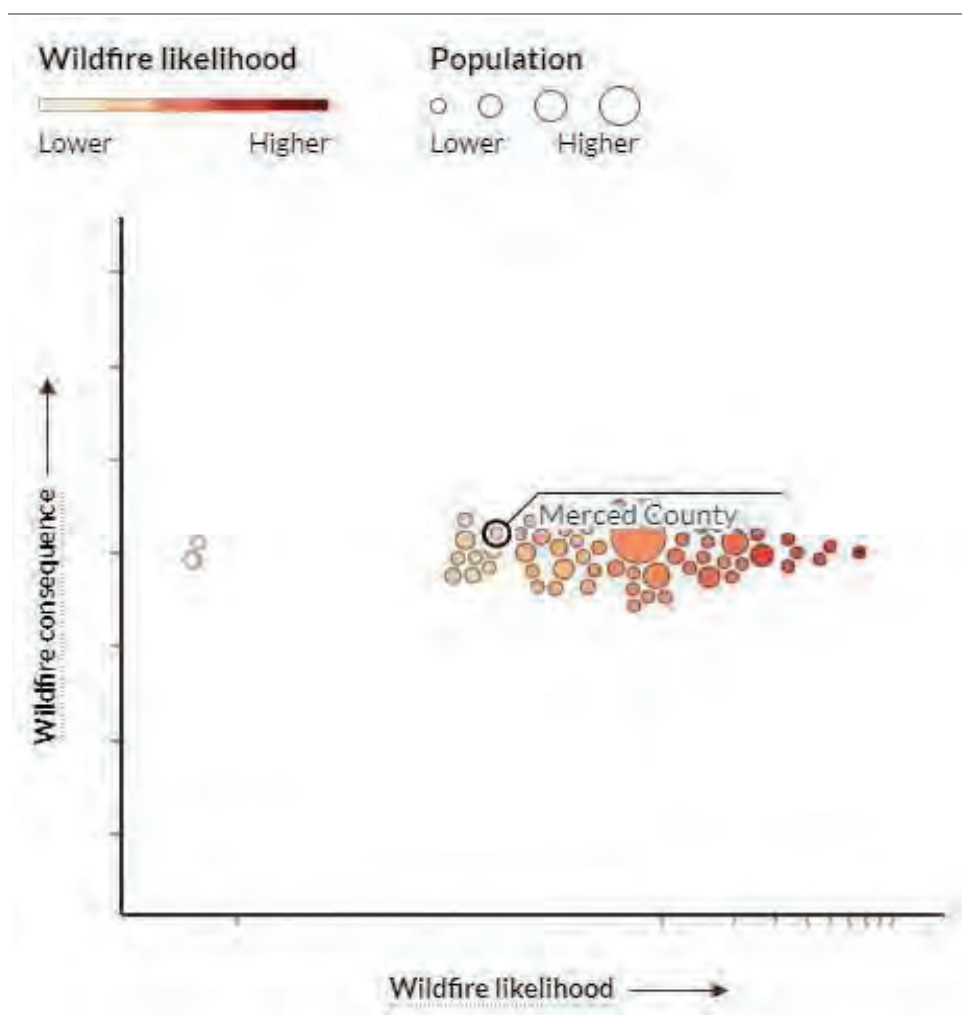
Figure 4-41 through Figure 4-44 below are the result of a nationwide risk study from the United States Forest Service. These figures provide a perspective of wildfire risk and vulnerability compared to other CA counties. Populated areas in Merced County have, on average, greater risk to homes than 14% of counties in California. Populated areas in Merced County have, on average, greater wildfire likelihood than 18% of counties in California.

Figure 4-41 Merced County Wildfire Likelihood



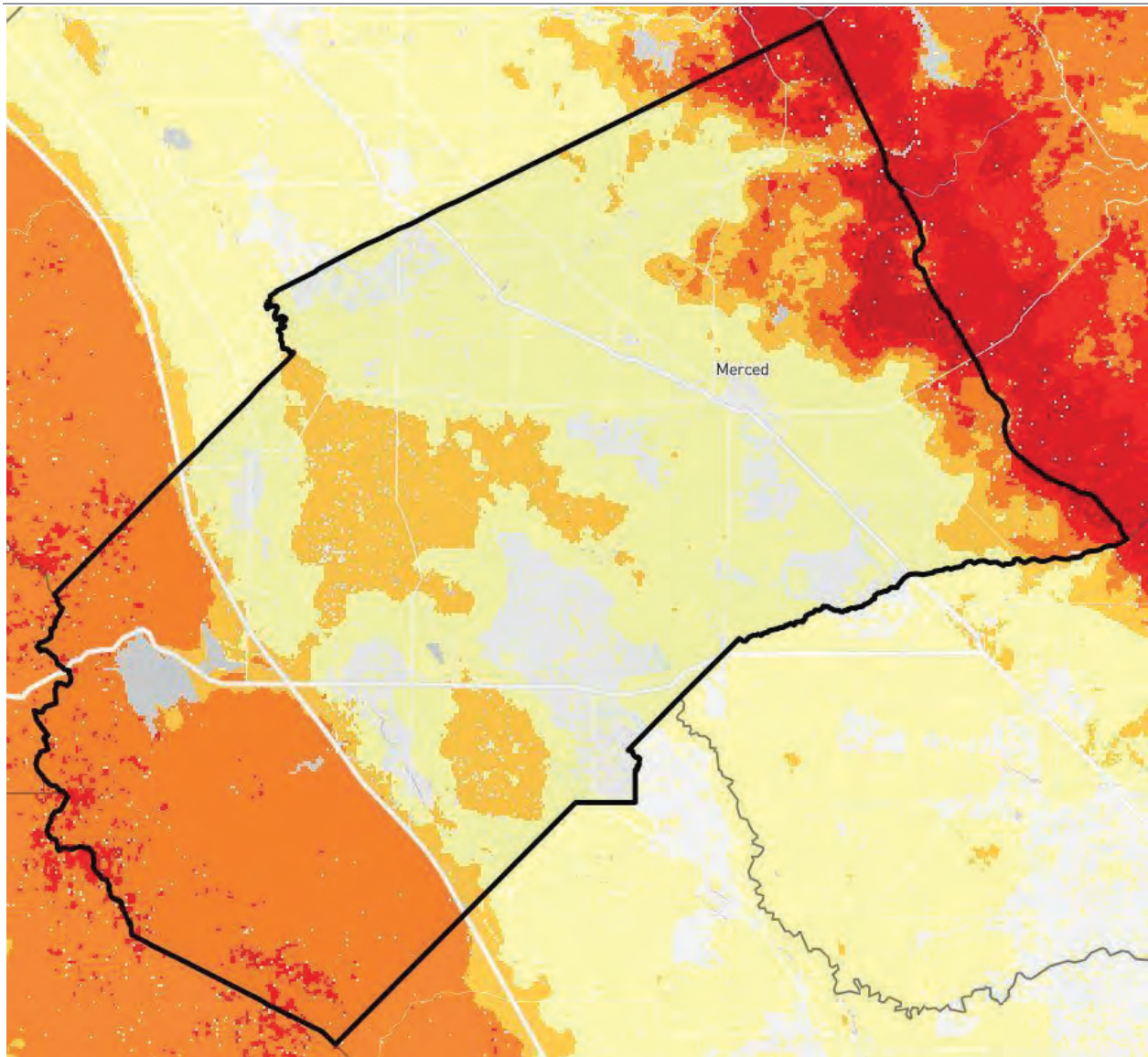
Source: USFS

Figure 4-42 Merced County Wildfire Likelihood Compared to California Counties



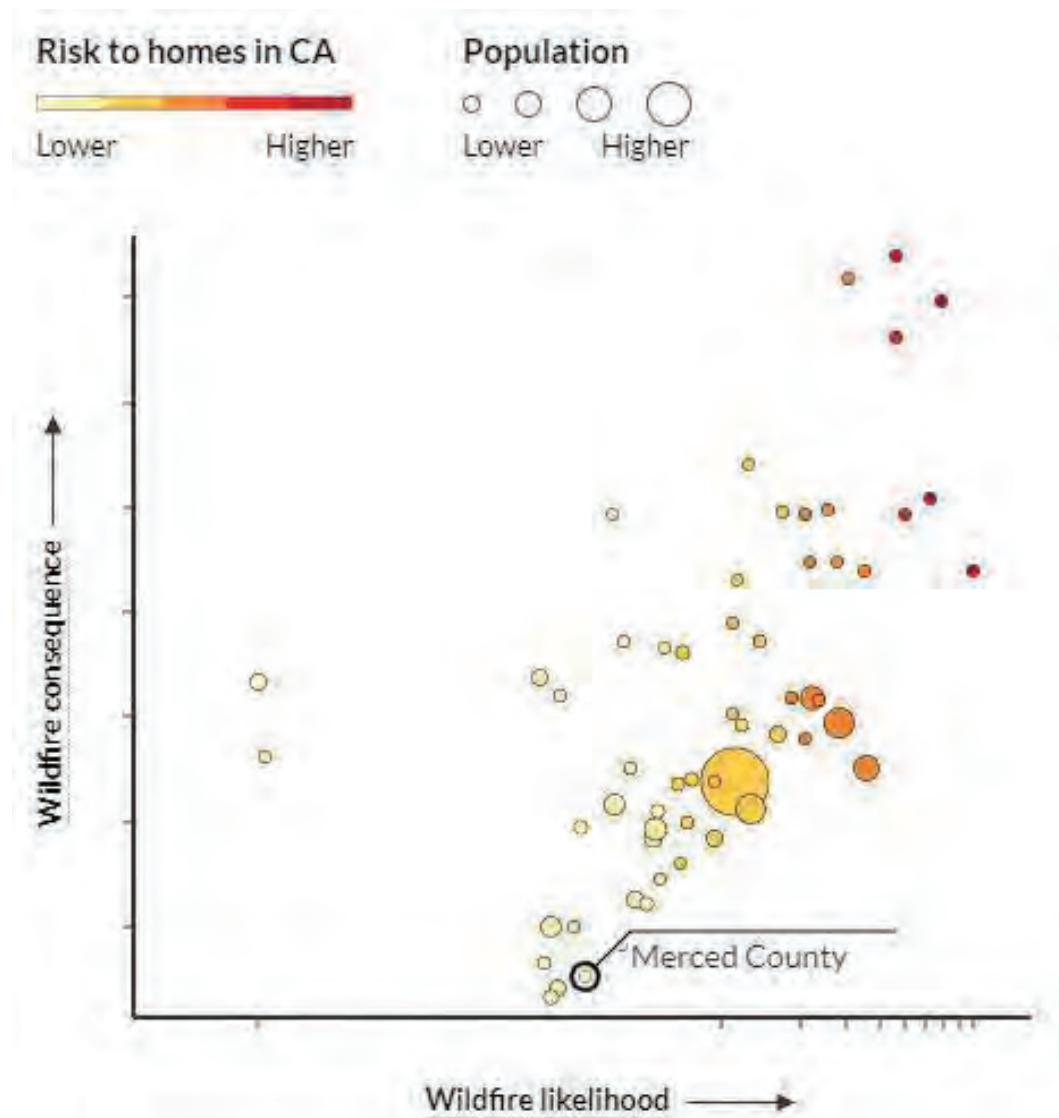
Source: USFS

Figure 4-43 Merced County Wildfire Risk to Homes



Source: USFS

Figure 4-44 Merced County Wildfire Risk to Homes Compared to California Counties



Source: USFS

General Property

The potential impacts of wildfire on property include crop loss, injury and death of livestock and pets, and damage to infrastructure, homes and other buildings located throughout the wildfire risk area.

GIS was used to intersect the parcel boundaries with a master address point layer to obtain the number of buildings per parcel. Only parcels with improvement values greater than zero were used in the analysis, this method assumes that improved parcels have a structure of some type. This data was then overlaid on the Fire Threat Layer. For the purposes of this analysis, the wildfire hazard zone that intersected the address point was assigned as the hazard zone for the entire parcel. It was assumed that every parcel with an improved value greater than zero was developed in some way, thus only improved parcels and their values were analyzed.

An analysis of the value of those parcels – the improvement value plus estimated value of building contents – quantifies the potential losses from wildfires by severity zones. The results show that \$3.7 billion worth of property and approximately 8,500 structures are exposed to fire risk countywide. The

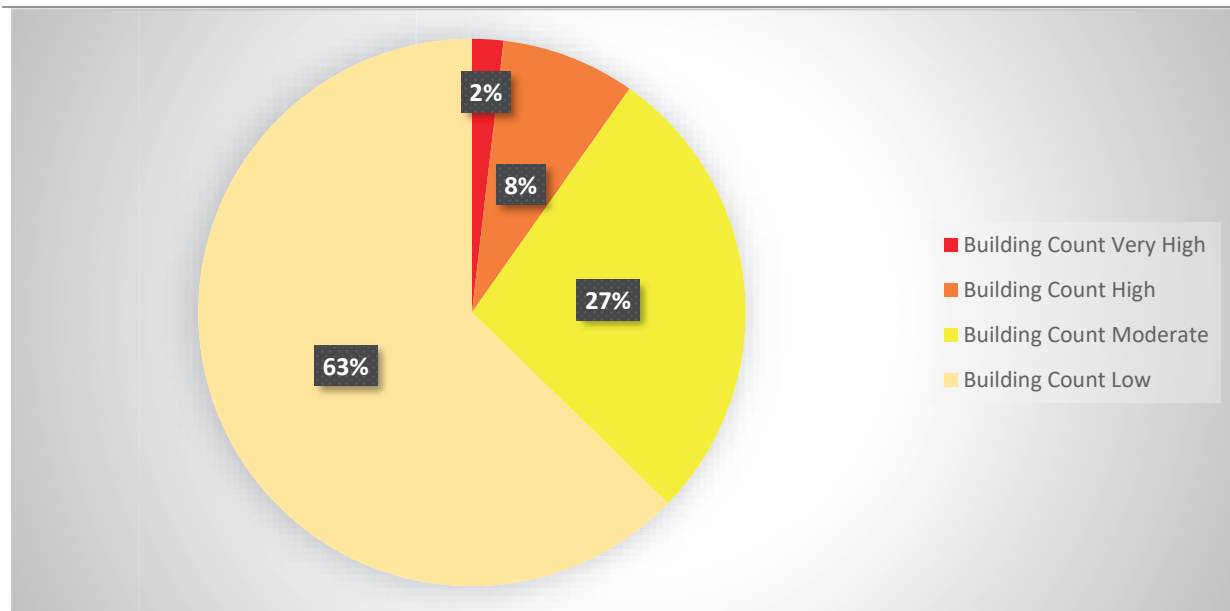
majority of these buildings are in moderate to low hazard areas. The unincorporated areas and the City of Los Banos make up the majority of this risk. Residential properties constitute more than half of both the number of parcels and the projected losses. The total values shown in these tables include both structure value and contents and can be used as an estimate of potential losses since wildfires typically result in a total loss.

Table 4-68 Wildfire Hazard Exposure –Property Summary by Jurisdiction and Fire Threat Zone

Jurisdiction	Building Count Very High	Building Count High	Building Count Moderate	Building Count Low	Total Building Count	Improved Value	Estimated Content Value	Total Value
Atwater	0	1	276	303	580	\$158,646,509	\$82,890,947	\$241,537,456
Gustine	0	0	57	97	154	\$26,104,098	\$13,904,591	\$40,008,689
Livingston	0	0	59	171	230	\$91,308,401	\$67,612,796	\$158,921,197
Los Banos	0	2	198	976	1,176	\$328,297,798	\$178,953,729	\$507,251,527
Merced	0	1	257	364	622	\$156,504,212	\$99,657,587	\$256,161,799
Unincorporated	108	462	1,605	3,659	5,834	\$1,373,680,176	\$1,148,731,537	\$2,522,411,713
Total	108	466	2,452	5,570	8,596	\$2,134,541,194	\$1,591,751,186	\$3,726,292,380

Source: CAL FIRE, Merced County Assessor, Wood GIS analysis

Figure 4-45 Unincorporated Area Buildings in Fire Threat Classes



Source: CAL FIRE, Merced County Assessor, Wood GIS analysis

People

Wildland fires result in a high risk for personal injury, loss of life to inhabitants of the fire area and firefighters, and losses of structures and personal property. Wildfires in or near the WUI frequently require emergency evacuation and sheltering, often for many days. As is shown in Table 4-68 below, approximately 17,364 people in Merced County reside in FHSZ. This figure was derived by taking the total number of residential structures identified in the FHSZs and multiplying them by the average household size in the county based off of 2019 U.S. Census Bureau estimates.

Table 4-69 Population at Risk to Fire Threat

Jurisdiction	Population
Atwater	1,787
Gustine	399
Livingston	756
Los Banos	4,115
Merced	1,837
Unincorporated	8,469
Total	17,364

Source: Merced County, HIFLD, CAL FIRE, FRAP, U.S. Census Bureau, Wood GIS Analysis

Other indirect impacts from wildfires on people are related to dense smoke from fires within the region. Wildfires in the past three years have decreased the air quality throughout Merced County. Dense smoke poses a risk to both people with compromised health as well as those considered healthy. A study from the University of California San Diego found that wildfire smoke is more harmful to respiratory health in humans than pollution from cars (NPR 2021). Studies have also shown an increase in ambulance calls, hospital visits and an increase of people experiencing respiratory or cardiac emergencies (NPR 2020).

Critical Facilities and Infrastructure

Critical facilities are those community components that are most needed to withstand the impacts of disaster, as previously described in the Assets section. Wildfire impacts to critical facilities can include structural damage or destruction, risk to persons located within facilities, disruption of transportation, shipping, and evacuation operations, and interruption of facility operations and critical functions.

Critical facilities and infrastructure also create an increased risk for the occurrence of wildfires. Overhead electric transmission lines have been known to spark wildfires. According to data from the California Public Utilities Commission, the state's three largest utility companies collectively reported 2,009 ignitions statewide between 2014-2017, including at least 50 in Merced County. Most of these instances were small, less than one acre in size, however these fires can grow rapidly under the right fire conditions. One such example is California's deadliest wildfire, the 2018 Camp Fire in Northern California. Identifying critical facilities and infrastructure and mitigating their potential risks is important both for maintaining the county's resilience and for reducing the potential impacts of wildfire. The locations of critical facilities identified by HIFLD throughout the county are summarized by their exposure the various wildfire threat levels in Table 4-69 through Table 4-72 below.

Table 4-70 Critical Facilities Within the Low Wildfire Threat by Jurisdiction and FEMA Lifeline

Jurisdiction	Communications	Energy	Food, Water, Shelter	Hazardous Material	Health and Medical	Safety and Security	Transportation	Total
Atwater	1	2	1	-	-	1	1	6
Dos Palos	-	-	-	-	-	-	-	0
Gustine	-	-	-	-	-	1	1	2
Livingston	2	-	-	-	-	-	-	2

Jurisdiction	Communications	Energy	Food, Water, Shelter	Hazardous Material	Health and Medical	Safety and Security	Transportation	Total
Los Banos	-	-	1	-	-	2	-	3
Merced	-	-	1	2	-	1	4	8
Unincorporated	20	18	2	3	-	17	156	216
Total	23	20	5	5	0	22	162	237

Source: Merced County, HIFLD, CAL FIRE, FRAP, Wood GIS Analysis

Table 4-71 Critical Facilities Within the Moderate Wildfire Threat by Jurisdiction and FEMA Lifeline

Jurisdiction	Communications	Energy	Food, Water, Shelter	Hazardous Material	Health and Medical	Safety and Security	Transportation	Total
Atwater	-	-	-	-	-	-	2	2
Dos Palos	-	-	-	-	-	-	-	0
Gustine	-	-	-	-	-	1	-	1
Livingston	-	-	-	-	-	-	-	0
Los Banos	-	-	-	-	-	-	-	0
Merced	-	-	1	-	-	1	1	3
Unincorporated	10	10	-	-	-	-	26	46
Total	10	10	1	0	0	2	29	52

Source: Merced County, HIFLD, CAL FIRE, FRAP, Wood GIS Analysis

Table 4-72 Critical Facilities Within the High Wildfire Threat by Jurisdiction and FEMA Lifeline

Jurisdiction	Communications	Energy	Food, Water, Shelter	Hazardous Material	Health and Medical	Safety and Security	Transportation	Total
Atwater	-	-	-	-	-	-	-	0
Dos Palos	-	-	-	-	-	-	-	0
Gustine	-	-	-	-	-	-	-	0
Livingston	-	-	-	-	-	-	-	0
Los Banos	-	-	-	-	-	-	-	0
Merced	-	-	-	-	-	-	-	0
Unincorporated	17	26	1	-	-	1	24	69

Jurisdiction	Communications	Energy	Food, Water, Shelter	Hazardous Material	Health and Medical	Safety and Security	Transportation	Total
Total	17	26	1	0	0	1	24	69

Source: Merced County, HIFLD, CAL FIRE, FRAP, Wood GIS Analysis

Table 4-73 Merced County Critical Facilities Within the Very High Wildfire Threat by Jurisdiction and FEMA Lifeline

Jurisdiction	Communications	Energy	Food, Water, Shelter	Hazardous Material	Health and Medical	Safety and Security	Transportation	Total
Atwater	-	-	-	-	-	-	-	0
Dos Palos	-	-	-	-	-	-	-	0
Gustine	-	-	-	-	-	-	-	0
Livingston	-	-	-	-	-	-	-	0
Los Banos	-	-	-	-	-	-	-	0
Merced	-	-	-	-	-	-	-	0
Unincorporated	5	115	-	-	-	-	4	124
Total	5	115	0	0	0	0	4	124

Source: Merced County, HIFLD, CAL FIRE, FRAP, Wood GIS Analysis

According to the analysis conducted, there are over 200 critical facilities exposed to at least a moderate wildfire threat area. The highest rates of exposure to wildfire threat areas are facilities in the Energy and Transportation Lifeline categories, both of which are crucial for response and evacuations in the event of a significant fire.

Economy

The economic impacts of wildfire include loss of property, direct agricultural sector job loss, secondary economic losses to businesses in or near wildland resources like parks and national forests, and loss of public access to recreational resources. Fire suppression may also require increased cost to local and state government for water acquisition and delivery, especially during periods of drought when water resources are scarce.

Effects on agriculture can be significant, which makes up a large portion of Merced County's economy. In addition to the obvious impacts on crops and animals, wildland fire can have damaging effects on soil and water that will impact agriculture for an extended period of time.

Historic, Cultural, and Natural Resources

The County has 15 sites listed on the NRHP, and 28 listed on the California Register of Historical Resources. Since these structures are sensitive in nature and may not have been built according to the latest building codes due to their age, it is expected that they might be at risk of wildfires (e.g. because of their potential inability to withstand significant heat). Most of these structures are located in the Cities of

Merced and Los Banos, which are at lower risk to wildfire than unincorporated areas of the county. However, parks and open spaces, particularly in the foothills in the eastern edge of the county, could also be at risk of a wildfire. This area is the region's gateway to Yosemite National Park, which is a significant historic, cultural, and natural resource for the entire state of California.

Future Development

Any population increases in the Planning Area will continue to make wildfire vulnerability a growing issue, especially as future development expands into higher fire risk areas. These risks can however be managed with strong land use regulations and building code requirements, and with policies established in the Health and Safety Element of the 2030 General Plan. For example, policies requiring fire-resistant vegetation, clustered development, and vegetation clear zones in areas with high and extreme fire hazard.

Risk Summary

The overall significance of wildfire in Merced County is **Medium**. These events are recurring in nature and can cause significant damage, loss of life, and disruption to critical infrastructure.

- The county experiences an average of one wildfire every 1.5 years and an average of 1,500 acres burned per year. As impacts of climate change such as increased temperatures and prolonged drought conditions continue in coming years, this frequency and intensity may increase.
- Powerlines and vehicle or equipment use present a significant source of ignitions.
- **Effects on people:** Past wildfires in the county have not resulted in a large number of fatalities; however, significant evacuations and sheltering have been required in past events.
- **Effects on property:** Wildfires can destroy homes, businesses, and critical infrastructure. \$3.7 billion worth of property in the County is located in a Fire Threat Zone.
- **Effects on critical facilities and infrastructure:** Wildfires can disrupt access to, or even destroy critical facilities and infrastructure.
- **Effects on economy:** Wildfires impacts can include loss of property, direct agricultural sector job loss, secondary economic losses to businesses, and loss of public access to recreational resources.
- **Effects on Historic, Cultural, and Natural Resources:** Wildfire can significantly impact water and air quality, even at great distances from the area burning. Damage to agriculture, natural resource areas, and habitats are very likely during a wildfire.
- **Related Hazards:** Drought, Agricultural Pest Infestation and Plant Disease, Landslide and Debris Flow.

Table 4-74 Hazard Summary - Wildfire

Jurisdiction	Geographic Extent	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Significant	Likely	Limited	Medium
City of Atwater	Significant	Highly Likely	Negligible	Medium
City of Dos Palos	Limited	Highly Likely	Negligible	Medium
City of Gustine	Limited	Occasional	Critical	Low
City of Livingston	Limited	Occasional	Negligible	Low
City of Los Banos	Significant	Highly Likely	Negligible	Medium
City of Merced	Limited	Highly Likely	Negligible	Medium

4.2.13 Hazardous Materials Incidents

Hazard/Problem Definition

Generally, a hazardous material is a substance or combination of substances which, because of quantity, concentration, or physical, chemical, or infectious characteristics, may either cause or significantly contribute to, an increase in mortality or an increase in serious, irreversible, or incapacitating reversible, illness. Hazardous materials may also pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Hazardous material incidents can occur while a hazardous substance is stored at a fixed facility, or while the substance is being transported along a road corridor or railroad line or via an enclosed pipeline or other linear infrastructure.

The U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration all have responsibilities relating to the transportation, storage, and use of hazardous materials and waste. The Right to Know Network (RTK NET), maintained by the EPA's National Response Center, is a primary source of information on the use and storage of hazardous materials, as well as data regarding spills and releases. The California Environmental Protection Agency and Department of Toxic Substances Control are authorized by the U.S. EPA to enforce and implement federal hazardous materials laws and regulations within the state. At the local level, Merced County's Department of Public Health, Division of Environmental Health is the approved CUPA responsible for administration of permitting, inspections, and enforcement for hazardous waste and hazardous materials programs. The CUPA administers the Hazardous Material Business Plan (HMBPs), California Accidental Release Prevention (Cal-ARP) program, and the Aboveground Storage Act, as well as permitting and inspection activities for hazardous waste generators, and onsite hazardous waste treatment facilities, and underground storage tanks.

Hazardous materials can be divided into the following classes:

- Explosives
- Compressed gases: flammable, non-flammable compressed, poisonous
- Flammable liquids: flammable (flashpoint below 141 degrees Fahrenheit), combustible (flashpoint from 141 - 200 degrees)
- Flammable solids: spontaneously combustible, dangerous when wet
- Oxidizers and organic peroxides
- Toxic materials: poisonous material, infectious agents
- Radioactive material
- Corrosive material: destruction of human skin, corrodes steel

It is also common to see hazardous materials releases as escalating incidents resulting from other hazards such as floods, wildfires, and earthquakes. The release of hazardous materials can greatly complicate or even eclipse the response to the natural hazards disaster that caused the spill.

The Safety Element of the Merced County General Plan contains goals, policies, and implementation measures pertaining to hazardous materials, including radioactive materials and pesticides. Merced County also has an Emergency Operations Plan which contains provisions to address hazardous materials incidents, such as establishing a Hazardous Materials Unit Leader within the Operations Section and to establish response operations in the event of an incident involving hazardous materials (Merced County Emergency Operations Plan 2017).

Geographic Area

Hazmat incidents can occur at a fixed facility or during transportation.

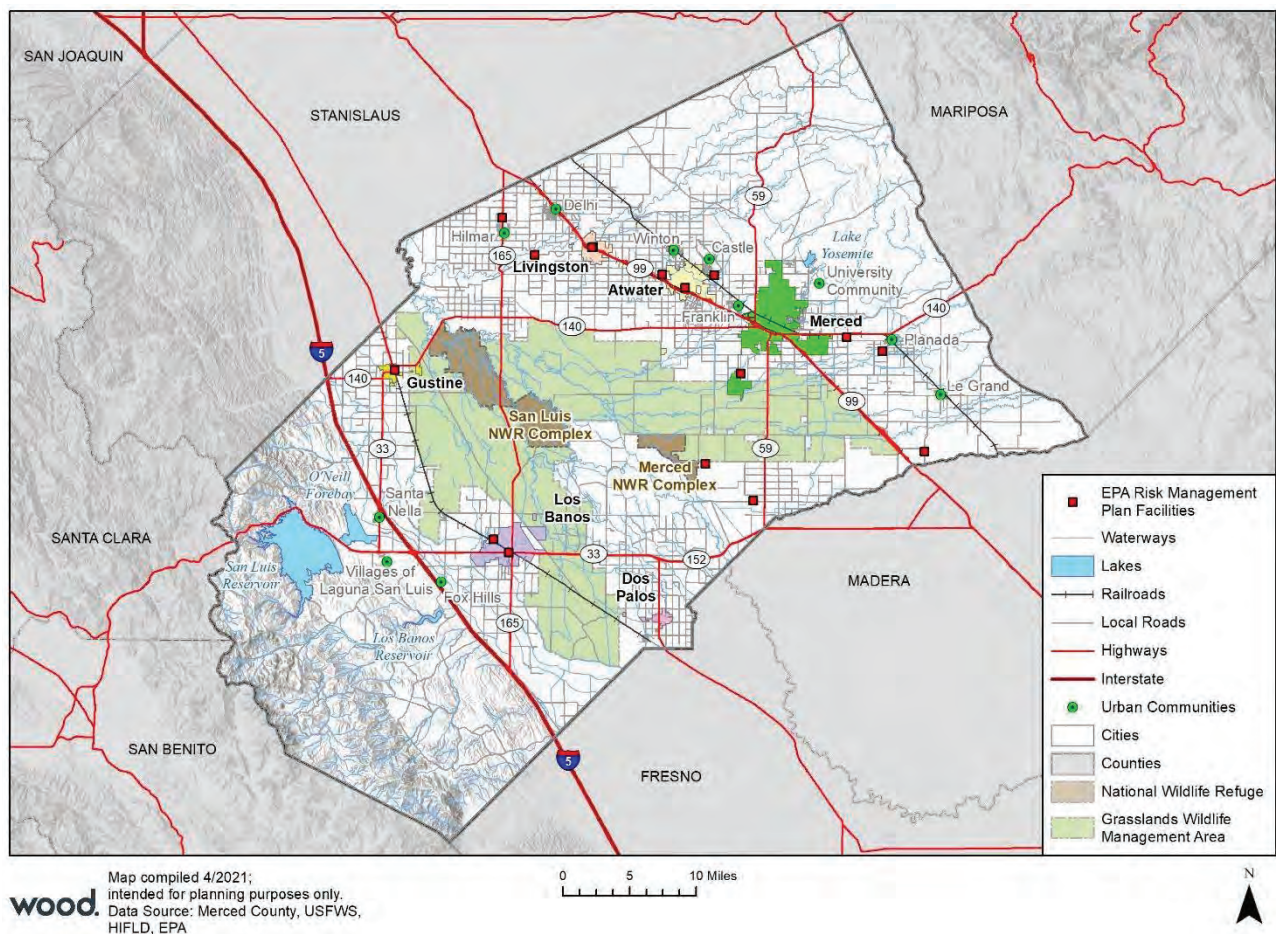
Fixed Facilities

Hazardous materials facilities are identified and mapped by the counties they are located in, along with the types of materials stored there; facilities generally are located in and around developed areas. The Merced County Office of Emergency Services administers the Emergency Planning and Community Right-to-Know program for the planning area. Under Chapter 6.95 of the California Health and Safety Code and the Federal Resource Conservation and Recovery Act, any business storing quantities of hazardous materials greater than 55 gallons of liquid, 500 pounds of solid or 200 cubic feet of some compressed gases must file a HMBP annually that establishes incident prevention measures, hazardous material handling protocols and emergency response and evacuation procedures.

The EPA requires facilities containing certain extremely hazardous substances to generate Risk Management Plans (RMPs) and resubmit these plans every five years. According to the RTK NET, as of April 2021 there are 16 RMP facilities located in the County, as shown below in Figure 4-46.

The California Accidental Release Prevention Program (CalARP) is a statewide initiative to reduce the likelihood and severity of consequences of extremely hazardous materials releases. CalARP requires certain facilities (referred to as "stationary sources") which handle specified chemicals (termed "regulated substances") to take specified actions to proactively prevent and prepare for chemical accidents. Because the CalARP program is implemented at the local government level by the CUPAs, they can work directly with regulated facilities.

Figure 4-46 RMP Identified Hazardous Materials Facilities in Merced County



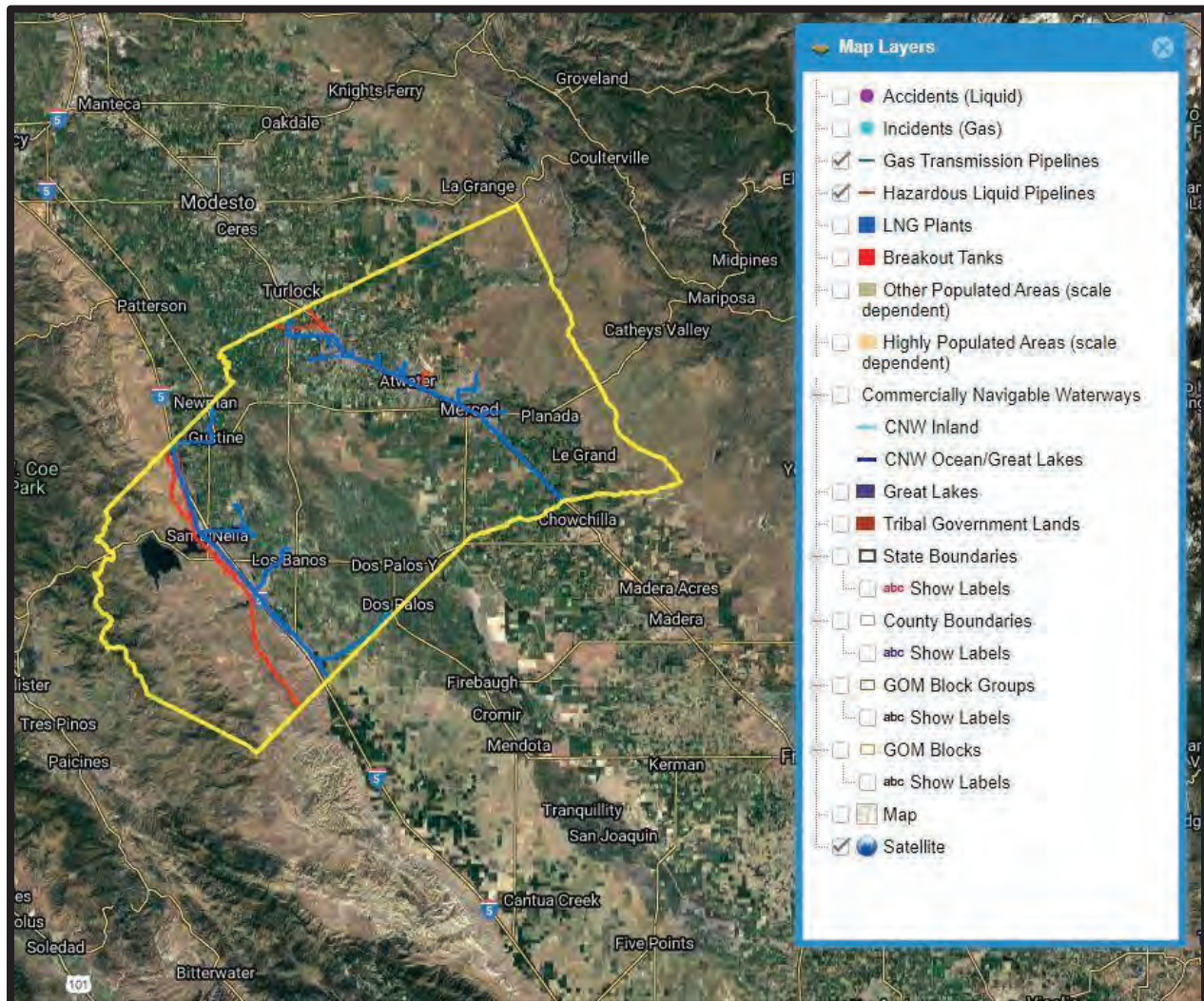
Transportation

In transit, hazardous materials generally follow major transportation routes, including road, rail and pipelines, creating a risk area immediately adjacent to these routes. The county's transportation network, primarily Interstate 5, and State Highways 33, 59, 99, 140, 152, and 165, all have the potential for hazardous material incidents. Railroad lines and airports may also transport hazardous materials. The Hazardous Materials and Waste section of the Merced County General Plan Health and Safety Element establishes policies requiring that the transportation of all hazardous materials through the county be coordinated with the CHP (Merced County General Plan, 2013).

Hazardous materials releases can also result from natural disasters, such as floods or earthquakes that may cause containment systems to fail or affect transportation infrastructure. In summary, hazardous material incidents have the potential to occur in business and industrial areas (where fixed facilities are located) and along transportation corridors. Hazardous material incidents can also occur in agricultural areas; these types of facilities typically use pesticides, fertilizers, and other agricultural chemicals that are harmful to people and the environment. For example, agricultural pesticides and fertilizers are often transported daily around the planning area. Illegal drug operations and dumping sites have also been known to pose a hazardous materials threat.

Lastly, information provided by the National Pipeline Mapping System (NPMS) indicate several pipelines conveying gas or hazardous liquids cross the planning area, these are shown in Figure 4-47 and primarily travel north-south in the vicinity of Interstate 5 and Highway 99. Pipelines ruptures can result in major spills, or even explosions like the ones in San Bruno in 2010, and Fresno in 2015.

Figure 4-47 National Pipeline Mapping System, Merced County Pipelines



Extent (Magnitude/Severity)

Hazardous materials come in the form of explosives, flammable and combustible substances, poisons and radioactive materials. Hazards can occur during production, manufacturing, storage, transportation, use, or disposal. Impacts from hazardous materials releases can include:

- Fatalities
- Injury
- Evacuations
- Property damage
- Animal fatalities (livestock, fish & wildlife)
- Air pollution
- Surface or ground water pollution/contamination
- Interruption of commerce and transportation

Numerous factors influence the impacts of a hazardous materials release, including the type and quantity of material, location of release, method of release, weather conditions, and time of day. This makes it

difficult to predict precise impacts. The impact to life and property from any given release depends primarily on:

- The type and quantity of material released.
- The human act(s) or unintended event(s) necessary to cause the hazard to occur.
- The length of time the hazard is present in the area.
- The tendency of a hazard, or that of its effects, to either expand, contract, or remain confined in time, magnitude, and space.
- Characteristics of the location and its physical environment that can either magnify or reduce the effects of a hazard.

CalFire notes several additional factors that can contribute to the impact of hazardous materials releases from a fixed facility or transportation incident:

- Solid, liquid, and/or gaseous hazardous materials can be released from fixed or mobile containers either accidentally or on purpose.
- The resulting release can last for hours or for days.
- The substances released may be corrosive or otherwise damaging over time, and they may cause an explosion and/or fire.
- Contamination may be carried out of the incident area by people, vehicles, water, and/or wind.
- Weather conditions will directly affect how the hazard develops.
- The micrometeorological effects of buildings and terrain can alter travel and duration of agents.
- Shielding in the form of sheltering in place can protect people and property from harmful effects.
- Noncompliance with fire and building codes as well as failure to maintain existing fire protection and containment features can substantially increase the damage from a hazardous materials release.

The release or spill of hazardous materials can also require different emergency responses depending on the amount, type, and location of the spill incident.

As noted above, the County contains a number of facilities that store and use significant quantities of hazardous materials. Additionally, a variety of hazardous materials are transported through the County by highway, rail, and pipelines, all of which are potentially vulnerable to accidental spills. Consequences can vary depending on whether the spill affects a populated area versus an unpopulated but environmentally sensitive area.

Potential losses can vary greatly for hazardous material incidents. For even a small incident, there are cleanup and disposal costs. In a larger scale incident, cleanup can be extensive and protracted. There can also be deaths or injuries requiring doctor's visits and hospitalization, disabling chronic injuries, soil and water contamination can occur, necessitating costly remediation. Evacuations can disrupt home and business activities. Large-scale incidents can easily reach \$1 million or more in direct damages, with clean-ups that can last for years.

Previous Occurrences

Merced County experiences multiple hazardous materials incidents every year. The vast majority of these incidents are minor with very localized impacts.

Table 4-74 breaks down 973 hazardous materials incidents reported to the California OES Warning Center from 2006 through 2021 based on location; this works out to an average of approximately 65 incidents per year. Even this total likely excludes a large number of unreported minor spills. 380 of these incidents occurred in transit, 381 occurred at a fixed location, and the remaining 211 had no location specified.

These hazardous material spills consisted of varying quantities of chemicals, petroleum, gasoline, sewage, and other materials. While the number of incidents can vary considerably from year to year, the average

number of hazardous materials spills or accidents in the County has trended upwards over the past 15 years. This is in line with the statewide trend, which has seen hazardous materials incidents increase by 30 percent during the same time period.

These incidents include both transportation and fixed facility incidents. This list in no way captures all hazardous material spills within the County, only those that were significant enough to be reported to Cal OES. The data indicates that hazardous materials incidents can occur across the county with a greater frequency in the more developed areas.

Table 4-75 Hazardous Materials Incidents in Merced County by Location, 2006-2021

Location	Incidents	Location	Incidents
Merced	281	Delhi	15
Unknown	183	Winton	14
Atwater	81	EL Nido	11
Santa Nella	70	Le Grand	11
Unincorporated	67	Dos Palos	10
Los Banos	62	Planada	10
Livingston	55	Stevinson	9
Hilmar	36	Snelling	5
Gustine	29	Cressey	4
Ballico	17	Tuttle	1

Source: CalOES Spill Release Reporting

The vast majority of these hazardous materials incidents have only minimal life safety impacts. One event in July 2019 resulted in one death and nine hospitalizations after a chemical spill in Los Banos.

Another database maintained by the U.S. Coast Guard reports 205 incidents recorded in Merced County, with 13 of them resulting in confirmed injuries from 1998 to 2013, with 32 individuals injured. There have also been 7 confirmed fatalities in the county from 2000 to 2019. Some incidents may also result in temporary evacuations, closures of transportation routes, or damage to facilities. This translates to roughly 6% of incidents resulting in injuries and 3% resulting in a fatality.

The Toxic Release Inventory (TRI) is a resource for learning about toxic chemical releases and pollution prevention activities by industrial and federal facilities. Section 313 of the Emergency Planning and Community Right-to-Know Act created the TRI program. According to the TRI database, there were 13 facilities within the County in 2019 that have collectively produced or managed approximately 9.6 million pounds of waste (US EPA 2021). These facilities dispose, treat, recover, and recycle various types of waste and chemicals and ultimately “release” the waste or chemicals into the air or water, or some form of land disposal.

Probability of Future Occurrences

Highly Likely - As discussed above, the County experiences an average of 65 hazardous materials incidents per year, with various degrees of impact; there is effectively a 100 percent chance that the County will see a hazardous materials incident in any given year. However, hazardous materials incidents that cause deaths, injuries, or evacuations are far rarer, occurring in between 3 and 6% of occurrences on average. These can occur at any time and with little predictability given the presence of major transportation routes in throughout the County.

Climate Change Considerations

There are no known effects of climate change on human caused hazards, such as hazardous material incidents. However, it is possible that an increase in other hazards, such as severe storms and fire events may increase the likelihood of an accidental hazardous materials release.

Vulnerability Assessment

General Property

The impact of a fixed hazardous facility, such as a chemical processing facility is typically localized to the property where the incident occurs. The impact of a small spill (i.e. liquid spill) may also be limited to the extent of the spill and remediated if needed. A blanket answer for potential impacts is hard to quantify, as different chemicals may present different impacts and issues. Property within a half mile in either direction of designated hazardous materials routes are at increased risk of impacts. While cleanup costs from major spills can be significant, they do not typically cause significant long-term impacts to property.

People

Hazardous materials incidents can cause injuries, hospitalizations, and even fatalities to people nearby. People living near hazardous facilities and along transportation routes may be at a higher risk of exposure, particularly those living or working downstream and downwind from such facilities. For example, a toxic spill or a release of an airborne chemical near a populated area can lead to significant evacuations and have a high potential for loss of life.

In addition to the immediate health impacts of releases, a handful of studies have found long-term health impacts such as increased incidence of certain cancers and birth defects among people living near certain chemical facilities. However there has not been sufficient research done on the subject to allow detailed analysis.

Social Vulnerability

While hazardous material incidents could take place anywhere across the County and may be unpredictable, those living near HazMat facilities or along transportation routes that additionally happen to be socially vulnerable communities would be of highest concern. Based on a combination of the SoVI data presented and discussed in subsection 4.2.1 and the presence of major transportation routes and EPA or CalARP regulated facilities the most vulnerable populations include Merced, Atwater, and Livingston. In addition, agricultural farm workers are most vulnerable to pesticide exposure and other hazardous material incidents associated with the agricultural operation.

Critical Facilities and Infrastructure

Impacts of hazardous material incidents on critical facilities are most often limited to the area or facility where they occurred, such as at a transit station, airport, fire station, hospital, or railroad. However, they can cause long-term traffic delays and road closures resulting in major delays in the movement of goods and services. These incidents would be more severe if they result in traffic delays on road closures on any of the designated truck routes or hazardous materials routes in the County. These impacts can spread beyond the planning area to affect neighboring counties, or vice-versa. While cleanup costs from major spills can be significant, they do not typically cause significant long-term impacts to critical facilities.

Economy

The primary economic impact of hazardous material incidents result in lost business, delayed deliveries, property damage, and potential contamination. Large and publicized hazardous material-related events can deter tourists and recreationists too. If incidents occur along major transportation corridors, they can

temporarily close routes and result in traffic delays. Economic effects from major transportation corridor closures can be significant.

Historic, Cultural, and Natural Resources

Hazardous material incidents may affect a small area at a regulated facility or cover a large area outside such a facility. Widespread effects occur when hazards contaminate the groundwater and eventually the municipal water supply, or they migrate to a major waterway or aquifer. Impacts on wildlife and natural resources can also be significant. These types of widespread events may be more likely to occur during a transportation incident, such as a pipeline spill, and can have far reaching and devastating impacts on the natural environment and habitats if they occurred near one of the several wildlife refuges in Merced County.

Future Development

The amount of hazardous materials that are stored, used, and transported across the County are inferred to continue to increase over the next five years based on regional growth trends. As discussed previously, the number of hazardous materials incidents in the County has generally been increasing year to year for the last 15 years and is likely to continue to increase. Future development is also expected to increase the number of people potentially exposed to the impacts of hazardous materials incidents.

Risk Summary

The overall significance of hazardous materials incidents in Merced County is Medium. These incidents occur frequently with little to no warning, both at fixed sites and along transportation routes throughout the County. The possibility of a major spill impacting a major populated area exists; historically the impacts of these incidents on the County as a whole have been fairly limited.

- Over the past 15 years, the County experienced an average of 65 hazardous materials incidents per year. This number has generally been trending higher in recent years. Incidents that caused death or injuries were far rarer.
- Of the 972 hazardous material incidents over the past 15 years, 39 percent were transportation related, 39 percent occurred at fixed facilities; the remaining 22 percent have an unreported location.
- Several pipelines conveying gas or hazardous liquids cross the County, as shown in the NPMS.
- Hazardous materials releases can complicate response to and recovery from natural disasters such as floods and earthquakes.
- Hazardous Materials incidents can cause injuries and fatalities, as well as long-term health problems like increased cancer risks.
- Impacted properties can require cleanup, but the effects are usually localized to the site of the release.
- Extended road closures can result in economic losses and impact tourism.
- Impacted facilities and infrastructure can require cleanup, but the effects are usually localized to the site of the release.
- **Related Hazards** include Earthquake, Flood, Fire.

Table 4-76 Hazard Summary – Hazardous Materials Incidents

Jurisdiction	Geographic Extent	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Limited	Highly Likely	Negligible	Low
City of Atwater	Limited	Occasional	Negligible	Medium
City of Dos Palos	Limited	Occasional	Negligible	Medium
City of Gustine	Significant	Unlikely	Critical	Low
City of Livingston	Limited	Occasional	Negligible	Medium
City of Los Banos	Significant	Likely	Critical	Medium
City of Merced	Limited	Likely	Negligible	Medium

4.2.14 Cyber Attack

Hazard Problem/Definition

The 2018 California SHMP defines cyber attacks as “attempts by cyber criminals to attack a government, organization, or private party by damaging or disrupting a computer or computer network, or by or stealing data from a computer or computer network for malicious use.” Cyber-attacks use malicious code to alter computer operations or data. The vulnerability of computer systems to attacks is a growing concern as people and institutions become more dependent upon networked technologies. The Federal Bureau of Investigation reports that, “cyber intrusions are becoming more commonplace, more dangerous, and more sophisticated,” with implications for private- and public-sector networks. Cyber threats can take many forms, including:

Phishing attacks: Phishing attacks are fraudulent communications that appear to come from legitimate sources. Phishing attacks typically come through email but may come through text messages as well. Phishing may also be considered a type of social engineering meant to exploit employees into paying fake invoices, providing passwords, or sending sensitive information.

Malware attacks: Malware is malicious code that may infect a computer system. Malware typically gains a foothold when a user visits an unsafe site, downloads untrusted software, or may be downloaded in conjunction with a phishing attack. Malware can remain undetected for years and spread across an entire network.

Ransomware: Ransomware typically blocks access to a jurisdiction’s/agency’s/ business’ data by encrypting it. Perpetrators will ask for a ransom to provide the security key and decrypt the data, although many ransomware victims never get their data back even after paying the ransom.

Distributed Denial of Service (DDoS) attack: Perhaps the most common type of cyber attack, a DDoS attack seeks to overwhelm a network and causes it to either be inaccessible or shut down. A DDoS typically uses other infected systems and internet connected devices to “request” information from a specific network or server that is not configured or powerful enough to handle the traffic.

Data breach: Hackers gaining access to large amounts of personal, sensitive, or confidential information has become increasingly common in recent years. In addition to networked systems, data breaches can occur due to the mishandling of external drives.

Critical Infrastructure/SCADA System attack: There have been recent critical infrastructure Supervisory Control and Data Acquisition (SCADA) system attacks aimed at taking down lifelines such as power plants and wastewater facilities. These attacks typically combine a form of phishing, malware, or other social engineering mechanisms to gain access to the system.

The 2018 California SHMP states: “Nationally, cybersecurity incidents such as financial fraud and government database breaches have increased from 5,503 in 2006 to 67,168 in 2014.” This is more than a 1200% increase in occurrence over just an 8-year period. As this trend continues and society and government functions become ever more technologically dependent, this hazard is of increasing concern.

In one recent attempt to combat this threat, the State of California adopted Senate Bill 327 in September of 2018. This bill seeks to improve information privacy, specifically pertaining to connected devices. Existing laws in California require businesses to take all reasonable steps to dispose of customer records within their custody containing personal information and also require businesses that own, license, or maintain personal information about a California resident to implement and maintain reasonable security procedures. SB 327, which went into effect January 1, 2020 further requires the manufacturer of connected devices to equip the device with a reasonable security feature to protect user information (Senate Bill 327).

Geographic Area

Cyber attacks can and have occurred in every location regardless of geography, demographics, and security posture. Incidents may involve a single location or multiple geographic areas. A disruption can have far reaching effects beyond the location of the targeted system; disruptions that occur far outside the state can still impact people, businesses, and institutions within the county. All of Merced County is potentially susceptible to cyber attacks, making the geographic extent **significant**.

Extent (Magnitude/Severity)

There is no universally accepted scale to explain the severity of cyber attacks. The strength of a DDoS attack is often explained in terms of a data transmission rate. One of the largest DDoS disruptions ever, the October 21, 2016 Dyn attack, peaked at 1.2 terabytes per second and impacted some of the internet's most popular sites that included Amazon, Netflix, PayPal, Twitter, and several news organizations.

Data breaches are often described in terms of the number of records or identities exposed. The Privacy Rights Clearinghouse, a nonprofit organization based in San Diego, maintains a database of data breaches in the United States. The largest data breach ever reported occurred in August 2013, when hackers gained access to all three billion Yahoo accounts. This incident is associated with California in the Privacy Rights Clearinghouse database as the company is headquartered in Sunnyvale, California. As the location of the headquarters of many large tech businesses and server farms, California as a state is potentially a greater target for cyber attacks. There have been many other instances in the state where millions of records have been breached.

Ransomware attacks are typically described in terms of the amount of ransom requested, or by the amount of time and money spent to recover from the attack. One report from cybersecurity firm Emsisoft estimates the average successful ransomware attack costs \$81 million and can take organizations 287 days to recover. Overall, the potential magnitude of a cyber attack can be seen as limited due to the lack of deaths and injuries, but the economic costs can be significant.

Previous Occurrences

The cybersecurity firm Symantec reports there were a total of 1,209 data breaches worldwide in 2016. While the number of breaches has remained relatively steady, the average number of identities stolen has increased to almost one million per incident. The report also found that one in every 131 emails contained malware, and the company's software blocked an average of 229,000 web attacks every day.

California is by far the state with the highest number of data breaches. The Privacy Rights Clearinghouse database lists 1,338 data breaches against systems located in California, totaling over 5.7 billion impacted records; however, it is difficult to know how many of those affected Merced County residents. Attacks happening outside of the state can also impact local businesses, personal identifiable information, and credit card information.

A 2017 study found ransomware payments over a two-year period totaled more than \$16 million. Even if a victim is perfectly prepared with full offline data backups, recovery from a sophisticated ransomware attack typically costs far more than the demanded ransom. However, according to a 2016 study by Kaspersky Lab, roughly one in five ransomware victims who pay their attackers never recover their data.

Recent years have seen an increase in ransomware attacks, particularly against local government systems. The City of Atlanta was hit by a major ransomware attack in 2018, recovery from which wound up costing a reported \$2.6 million, significantly more than the \$52,000 ransom demand. A similar attack against the City of Baltimore in 2019 affected the city government's email, voicemail, property tax portal, water bill, and parking ticket payment systems, and delayed more than 1,000 pending home sales. In March 2019,

Orange County, North Carolina was attacked with a ransomware virus, causing slowdowns and service problems at key public offices such as the Register of Deeds, the Sheriff's Office, and county libraries. The attack impacted a variety of county services, including disrupting the county's capability to process real estate closings, issue marriage licenses, process fees or permits, process housing vouchers, and verify tax bills. Each of these past events are examples of the range of risks posed to county and municipal governments by various cyber attacks.

Reports of successful attacks against SCADA systems are less common. In February 2021, a hacker gained system access to a water treatment plant in Oldsmar, Florida and increased the levels of sodium hydroxide to dangerous levels; however, this change was immediately detected by plant staff and corrected.

A large, sophisticated malware attack, known as Olympic Destroyer, was launched against the 2018 Winter Olympics in PyeongChang, South Korea. The attack initially took down servers, email, Wi-Fi, and ticketing systems, which could have severely disrupted the games. Fortunately, the organizing committee had a robust cybersecurity group that was able to quickly restore most functions.

Probability of Future Occurrences

Small-scale cyber attacks such as DDoS attacks occur daily, but most have negligible impacts at the local or regional level. Data breaches are also extremely common, but again most have only minor impacts on government services.

Perhaps of greatest concern to Merced County are ransomware attacks, which are becoming increasingly common. It is difficult to predict the odds of Merced County being hit with a successful ransomware attack in any given year, but it is safe to say it is likely to be attacked in the coming years.

The possibility of a larger disruption affecting systems within the County is a constant threat, but it is difficult to quantify the exact probability due to such highly variable factors as the type of attack and intent of the attacker. Major attacks specifically targeting systems or infrastructure in the County cannot be ruled out.

Climate Change Considerations

There are no known effects of climate induced impacts on cyber attacks.

Vulnerability Assessment

The impact of a cyber attack can vary depending on the type of attack and the intent of the malicious actor. Though a cyber disruption can have limited impacts within a system's own operations, it may cause cascading impacts.

General Property

The vast majority of cyber attacks affect only data and computer systems and have minimal impact on general property.

People

Injuries or fatalities from cyber attacks would generally only be possible from a major cyber terrorist attack against critical infrastructure, such as potable water treatment and delivery systems. If such an event would occur it could indirectly impact the customers served by water utility. More likely impacts to the public are financial losses and an inability to access systems such as public websites and permitting sites. Indirect impacts could include interruptions to traffic control systems or other infrastructure

Data breaches and subsequent identity thefts can have huge impacts on the public. The Internet Crime Complaint Center (IC3) estimates that identity theft alone resulted in \$2.7 billion in losses to businesses and \$149 million in losses to individuals.

According to the Cyber & Infrastructure Security Agency (CISA), cyber risks to 9-1-1 systems can have "severe impacts, including loss of life or property; job disruption for affected network users; and financial costs for the misuse of data and subsequent resolution." CISA also compiled a recent list of attacks on 9-1-1 systems including a DDoS in Arizona, unauthorized access with stolen credentials in Canada, a network outage in New York, and a ransomware attack in Baltimore.

Critical Facilities and Infrastructure

While the vast majority of cyber attacks affect only data and computer systems, sophisticated attacks against utilities and infrastructure sites have occurred. Such attacks typically target the SCADA systems of critical infrastructure, which can potentially result in system failures on a scale equal with natural disasters. Facilities and infrastructure, such as the electrical grid, could become unusable as a result of a cyber attack. A cyber attack took down the power grid in Ukraine in 2015, leaving over 230,000 people without power. Agencies that rely on electronic backup of critical files are also vulnerable.

The delivery of services can be impacted since governments rely to a great extent upon electronic delivery of services. Most agencies rely on server backups, electronic backups, and remote options for Continuity of Operations or the Continuity of Government. Many departments in the participating jurisdictions have the option to move to a paper method including permitting, DMV services, payments to and from the county, and payroll. However, access to documents on the network, OneDrive access, and other operations that require collaboration across the County will be significantly impacted.

Loss of government servers due to a cyber attack could affect the ability of responders to do their jobs. Cyber attacks can interfere with emergency response communications, access to mobile data terminals, and access to critical preplans and response documents.

The delivery of services can be impacted since governments rely, to a great extent, upon electronic delivery of services. An attack could raise questions regarding the security of using electronic systems for government services.

Economy

Economic impacts from a cyber attack can be debilitating. The cyber attack in 2018 that took down the City of Atlanta cost at least \$2.5 million in contractor costs and an estimated \$9.5 million additional funds to bring everything back online. The attack in Atlanta took "more than a third of the 424 software programs offline" and recovery lasted more than 6 months. A 2018 cyber attack on the Colorado Department of Transportation cost an estimated \$1.5 million. None of these statistics take into account the economic losses to businesses and ongoing IT configuration to mitigate from a future cyber attack.

Historic, Cultural, and Natural Resources

The vast majority of cyber incidents have little-to-no impact on historic, cultural or natural resources. A major cyber terrorism attack could potentially impact the environment by triggering a release of a hazardous materials, or by causing an accident involving hazardous materials by disrupting traffic control devices.

Future Development

Changes in development have no impact to the threat, vulnerability, and consequences of a cyber attack. Cyber attacks can and have targeted small and large jurisdictions, multi-billion-dollar companies, small

mom-and-pop shops, and individual citizens. The decentralized nature of the internet and data centers means that the cyber threat is shared by all, regardless of new construction and changes in development.

Risk Summary

The overall significance of cyber attacks in Merced County is Medium. These incidents occur frequently, with California being the state with by far the most reported incidents. The possibility of an attack of any scale impacting the County is almost certain.

- There have been 1,338 data breaches statewide over a 14-year period, averaging approximately 96 incidents per year.
- Nationwide the increase in cyber attacks has been dramatic year over year. As this trend continues it is safe to assume there is a threat to Merced County.
- Injuries and fatalities to people are unlikely, unless in a widescale attack that affected infrastructure and resulted in indirect impacts on communities. People may also be impacted financially.
- The vast majority of attacks do not affect property.
- Economic impacts from a cyber attack can be debilitating, sometimes costing local governments millions of dollars.
- The vast majority of attacks target only computer systems, however sophisticated attacks against utilities and infrastructure, such as electrical grids, have occurred.

Table 4-77 Hazard Summary – Cyber Attack

Jurisdiction	Geographic Extent	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Significant	Likely	Critical	Medium
City of Atwater	Limited	Occasional	Negligible	Medium
City of Dos Palos	Limited	Occasional	Negligible	Medium
City of Gustine	Limited	Unlikely	Limited	Low
City of Livingston	Limited	Occasional	Negligible	Medium
City of Los Banos	Significant	Likely	Negligible	Medium
City of Merced	Limited	Occasional	Negligible	Low

4.2.15 Agricultural Pests and Disease

Hazard/ Problem Description

Located in the Central San Joaquin Valley, Merced County's farming and agricultural industry is ranked as the top agriculture-producing county in California and the country. Agriculture is the dominant land use in Merced County, accounting for more than 90% of all land. According to the Merced County Department of Agriculture, agriculture grossed more than 3 billion dollars in 2019. Top commodities since 2018 included milk, almonds, and cattle (see table below).

Table 4-78 Top 15 Commodities in Merced County in 2018

Rank	Change since 2017	Crop	2019 Value	Top 15 Share
1	--	Milk	\$905,116,000	31.3%
2	--	Almonds	\$421,254,000	14.6%
3	Increase	Cattle and Calves	\$297,451,000	10.3%
4	Decrease	Chickens	\$294,633,000	10.2%
5	--	Sweet Potatoes	\$234,946,000	8.1%
6	--	Tomatoes	\$126,790,000	4.4%
7	--	Silage – Corn	\$108,077,000	3.7%
8	Increase	All Nursery Products	\$84,515,000	2.9%
9	Decrease	Hay – Alfalfa	\$69,943,000	2.4%
10	Decrease	Eggs, Chicken	\$64,668,000	2.2%
11	Increase	Misc. Vegetables	\$60,709,000	2.1%
12	--	Grapes – Wine	\$56,748,000	2.0%
13	Decrease	Cotton – Pima	\$45,799,000	1.6%
14	--	Turkeys	\$43,490,000	1.5%
15	Increase	Pollination	\$41,284,000	1.4%
Top 15 Total			\$2,890,875,000	

Source: 2019 Report on Agriculture

Agricultural pests and pathogens (insects, fungi, bacteria, viruses and invasive plants) cause injury or severe destruction to crops or livestock. From exotic fruit flies to noxious weeds, California's agriculture can be impacted by a wide variety of invasive pests and pathogens. These pests pose significant threats to the state's agricultural crops, farm workers, economy, food supply and native habitat. They can also result in increases in food prices for consumers. The number of invasive pests and pathogens newly detected in California and the rest of the United States has increased at alarming rates in recent years, and that trend is projected to continue into the future. Insect pests and diseases, such as bark beetles and Sudden Oak Death in trees can also destroy forests and oak woodland habitat located along the eastern and western perimeters of Merced County, which can in turn increase the fuel load and lead to greater fire risk. Agricultural disasters could also occur due to severe weather events, such as extreme heat, freeze cycles, and heavy rainfall and these hazards are covered under subsections 4.3.6 through 4.3.10. Drought events are covered under subsection 4.3.2.

The California Food and Agricultural Code mandates pest prevention programs to prevent the introduction and spread of pests in California. These include the Pest Exclusion Program, Pest Detection Program, Pierce's Disease Control Program, and Federal Phytosanitary Certificate Program. Target pests are listed in Table 4-70, but also include dairy, livestock, and poultry pests and diseases, such as *Mycobacterium bovis* and pathogenic avian influenzas. Animal agriculture, such as dairy farms also result in copious amounts of manure, which contain zoonotic pathogens, which are viruses, bacteria, and parasites of animal origin that cause disease in humans.

Table 4-79 Target Pests in Merced County

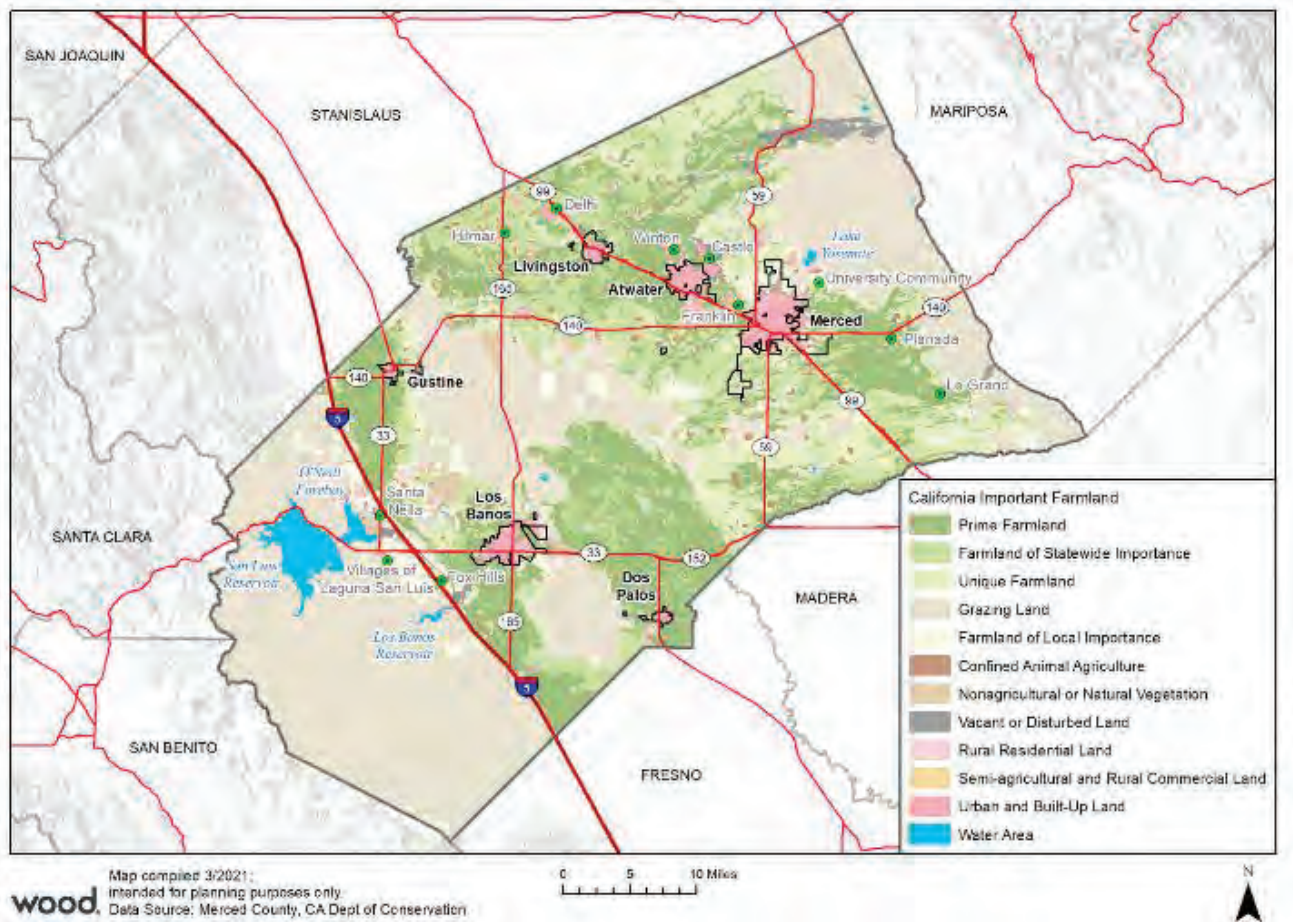
Target Pest	Insect Hosts	Traps Placed
Asian Citrus Psyllid	Citrus	620
European Pine Shoot Moth	Pine Trees	3
Glassy-Winged Sharpshooter	Nurseries/Urban Areas	392
Light Brown Apple Moth	Ornamental	288
Melon Fruit Fly	Vegetable Gardens	95
Oriental Fruit Fly	Fruit Trees	320
European Corn Borer	Corn	5
Gypsy Moth	Shade Trees	107
Japanese Beetle	Turf, Rose	100
Mediterranean Fruit Fly	Fruit Trees	320
Mexican Fruit Fly	Fruit Trees	169
Sweet Potato Weevil	Sweet Potatoes	120

Source: 2019 Report on Agriculture

Geographic Area

According to the 2017 Census for Agriculture, Merced County contains almost 1 million agricultural acres. Cropland accounts for 58% of agricultural land, while pastureland accounts for 38%. There are approximately 2,337 farms (as of 2017) in the County.

Figure 4-48 Merced County Important Farmland



Extent (Magnitude/Severity)

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

Another large factor that may influence crop yield is the spread of invasive plants, which may compete with crops for resources and in some cases also introduce pests. According to California Invasive Plant Council (Cal-IPC), invasive plants cost California \$82 million every year in control, monitoring and outreach; estimated actual impacts can reach into the billions. Based on the USDA's RMA Crop Indemnity Reports, between 2007 and 2019 (no losses were reported in 2020), there were 734.6 acres lost due to plant disease and insects and \$256,962 indemnity payments made.

Past Occurrences

Based on information from the USDA, Merced County received several USDA disaster declarations since 1950 (see Table 4-3 above). All the declarations were associated with flood, drought or severe weather events, and most recently, the COVID-19 pandemic. None were related to agricultural disease.

Probability of Future Occurrences

While probability of future occurrence is usually calculated based on past experience, different pests have different recidivism rates across the County. Based on past occurrences, pests and invasive species will continue to present a constant threat to the County and its jurisdictions.

Climate Change Considerations

California's Fourth Climate Change Assessment (2018) notes that "climate change impacts terrestrial ecosystems and wildlife in multiple ways, including invasion by exotic species, prevalence of wildlife disease, and loss of native habitats." Changing climate conditions can impact viable living areas of species and cause migration; shift the spread of pests and disease northward by changing habitat temperatures and making previously undesirable habitats welcoming for new species and lengthen habitable seasons (CNRA 2018a). Longer growing seasons may also allow agricultural pests to persist longer, which can increase the severity of infestations on agricultural operations. Further, weather events have become more numerous and more severe. Changes in weather patterns can also have dramatic impacts on the ecosystem, including agriculture systems, and more severe impacts can be expected into the future.

Vulnerability Assessment

General Property

Agricultural losses occur on an annual basis and are usually associated with severe weather events, including heavy rains, floods, hail, freeze, and drought. The State of California Multi-Hazard Mitigation Plan attributes most of the agricultural disasters statewide to drought, freeze, and insect infestations. Other agricultural hazards include fires, crop and livestock disease, noxious weeds, and contamination of animal food and water supplies.

Infestation of agriculture pests could impact crop yields, potential destroying whole fields. Between 2015 and 2018, the RMA paid no indemnities due to damage from insects but paid \$22,900 in indemnities due to damage from crop disease.

People

A widespread infestation of livestock and crops could severely impact the economic base of the County and its communities employed by the agriculture industry. According to the USDA 2017 Census of Agriculture, Merced County has 2,337 farms, which is a -6% change from the previous census in 2012. While agricultural production in the County can enhance the economy and improve human health and ensure stable food prices in California and the U.S., certain habitats established for irrigation and agricultural output can also threaten human health by increasing the risk of vector-borne diseases (e.g. mosquitos, etc.). Rural communities, residing closest to these agricultural operations may also be most vulnerable to these diseases, as livestock pathogens are capable of infecting host species, which may include wildlife and human.

Jobs could be negatively impacted during an agriculture emergency; jobs tangentially tied to the agriculture industry could also be affected. According to "The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment", rising temperatures and drought conditions due to climate change could also lead to increases in the occurrence and transport of pathogens in agricultural environments, which will increase the risk of food contamination and direct human exposure to pathogens and toxins (SGCRP 2016). In turn, this will increase health risks and require greater vigilance in food safety practices and regulation.

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

Social Vulnerability

Based on the SoVI data presented and discussed in subsection 4.2.1, the areas with the highest level of social vulnerability in the County are in the western and southeastern portion of the County, as well as some of the incorporated jurisdictions including Merced and Los Banos. These communities as well as those working in the agricultural sector would likely be impacted by the effects of agricultural hazards.

Critical Facilities

Critical facilities assessed in this plan would not be directly impacted by agricultural pests or diseases; however, the food and agriculture industry is considered critical infrastructure in Merced County and California. Impacts to this infrastructure, such as farms, dairy operations, and processing facilities would have debilitating effects of food security, the economy, and public health and safety. Merced County farms and ranches, and the associated food processing facilities would be directly impacted economically by long-term disruptions in the food supply associated with crop losses due to agricultural pests and disease.

Economy

According to the University of California's Center for Invasive Species Research, it has been estimated in California alone that invasive pests cost the state at least \$3 billion per year. Nationally, it is estimated that invasive species cost the U.S. \$138 billion per year. Economic impacts include both prevention, response and recovery costs. Given the contribution of agriculture to the local economy pest impacts could be significant. The value of agricultural commodities noted at the beginning of this hazard profile is \$2,890,875,000. Based on that a hypothetical loss of 5% to due to agricultural pest or disease would equate to approximately \$144M.

Historic, Cultural and Natural Resources

Invasive species typically harm native species through predation, habitat degradation and competition for shared resources; they can outcompete native species out of natural habitats and are a leading cause of population decline and extinction in animals.

Tree mortality raises the wildfire threat in healthy forests, increasing the vulnerability, strength, speed and destruction of fires in the area.

Future Development

Most likely, good development practices in the future would not have an impact on Merced County's vulnerability to agricultural pests, plant diseases, marine invasive species or tree mortality.

Risk Summary

- Merced County's farming and agricultural industry is ranked as the top agriculture-producing county in California and the country.
- Agriculture is the dominant land use in Merced County, accounting for more than 90% of all land, or almost 1 million acres.
- Invasive plants cost California \$82 million every year in control, monitoring and outreach.
- Based on USDA disaster declarations since 1950, none were related to agricultural pests or disease.
- Changes in weather patterns can have dramatic impacts on the ecosystem, including agriculture systems, and more severe impacts associated with agricultural pests and disease can be expected into the future.
- Changing climate conditions can shift the spread of pests and disease northward by changing habitat temperatures and making previously undesirable habitats welcoming for new species through longer growing seasons. This may increase the severity of pest infestations on agricultural operations.

- **Related hazards:** Drought

Table 4-80 Risk Summary – Agricultural Pests, and Disease

Jurisdiction	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Extensive	Likely	Critical	Medium
City of Atwater	Extensive	Likely	Critical	Medium
City of Dos Palos	Extensive	Likely	Critical	Medium
City of Gustine	Extensive	Likely	Critical	Medium
City of Livingston	Extensive	Likely	Critical	Medium
City of Los Banos	Extensive	Likely	Critical	Medium
City of Merced	Extensive	Likely	Critical	Medium

4.2.16 Pandemics/Epidemics

Hazard/Problem Description

A pandemic can be defined as a disease that attacks a large population across great geographic distances. Pandemics are larger than epidemics in terms of geographic area and number of people affected. Epidemics tend to occur seasonally and affect much smaller areas. Pandemics, on the other hand, are most often caused by new subtypes of viruses or bacteria for which humans have little or no natural resistance. Consequently, pandemics typically result in more deaths, social disruption, and economic loss than epidemics.

There are three conditions that trigger a pandemic declaration:

1. A new virus subtype must emerge that has not previously circulated in humans (and therefore there is no pre-existing immunity),
2. This new subtype must be able to cause disease in humans, and
3. The virus must be easily transmissible from human-to-human.

Since March 2020, Merced County, the nation, and the world are dealing with the COVID-19 pandemic (caused by the SARS-CoV-2 virus), confirming that pandemic is a key public health hazard in the planning area. This hazard risk assessment includes an analysis of pandemic risk across Merced County and an analysis of the impacts of the hazards profiled in this plan on public health.

Unlike seasonal flu, a pandemic has much greater potential for loss of life and significant social disruption due to higher rates of transmission and more severe health impacts. The SARS-CoV-2 virus has a much higher rate of transmission than the seasonal flu, primarily by airborne transmission of droplets/bodily fluid. Common symptoms include fever, cough, fatigue, shortness of breath or breathing difficulties, and loss of smell and taste. While most people have mild symptoms, some people develop acute respiratory distress syndrome with roughly one in five requiring hospitalization in the United States and a fatality rate between 1 to 2 percent. Because the virus can be transmitted by people who are asymptomatic, and due to the presence of several variants of SARS-CoV-2, containing the spread has been a significant challenge across the globe.

Geographic Area

Pandemics occur not only on a county or state level, but on a national and global scale. It is likely that most communities in Merced County would be affected, either directly or by secondary impacts. Some indirect consequences may be the diversion of resources that may be otherwise available.

Merced County has reported 31,009 cases and 448 deaths from COVID-19 as of April 11, 2021. According to the Merced County Public Health COVID-19 dashboard, the City of Merced has the highest number of cases (approximately 11,100 as of April 12, 2021, and the City of LeGrand Planada and City of Hilmar have the lowest number of cases in the 700-800 range) as of April 9, 2021. This is likely because cities like Merced have higher populations and municipal areas relative to other cities within the county, and COVID-19 is transmitted primarily from human-to-human contact.

Another example of a human health hazard that is endemic to Merced County is Valley Fever, or "cocci" which is a known, but poorly understood secondary effect of drought conditions, and possibly a combination of wind and drought events followed by a rainy season. Valley Fever is an infection caused by a fungus (*Coccidioides immitis*) that lives in soil and dirt and in areas with low rainfall, high summer temperatures, and moderate winter temperatures. Valley Fever is primarily a disease of the lungs that is common in the southwestern United States and northwestern Mexico. Valley Fever derives its name from

its discovery in the San Joaquin Valley of California. While the extent of Valley Fever varies from southwestern United States, northern Mexico, and some parts of Central and South America, the known endemic area in California include portions of the Sacramento Valley, all of the San Joaquin Valley, and desert regions and southern portions of California. Individuals are likely to be affected by Valley Fever if they live in an area where the cocci fungus is prevalent.

Extent (Magnitude/Severity)

The magnitude of a public health emergency will range significantly depending on the transmissivity and mortality rate of the virus. For example, pandemic influenza is easily transmitted from person-to-person, however advances in medical technologies have greatly reduced the number of deaths caused by influenza over time.

Today, a much larger percentage of the world's population is clustered in cities, making them ideal breeding grounds for epidemics. Additionally, the explosive growth in air travel means the virus could spread around the globe within hours. Under such conditions, there may be very warning little time for counties, states, and countries to prepare. Most experts believe we will have just one to six months between the time that a dangerous new influenza strain is identified and the time that outbreaks begin to occur in the United States. Outbreaks are expected to occur simultaneously throughout much of the nation, preventing shifts in human and material resources that normally occur with other natural disasters. These and many other aspects make pandemics unlike any other public health emergency or community disaster. Pandemics typically last for several months to 1-2 years and have even longer lasting effects on the economy and communities.

As described by the World Health Organization (WHO), the Pandemic Intervals Framework is a six-phased approach to defining the progression of a pandemic. This framework is used to guide pandemic planning and provides recommendations for risk assessment, decision making, and action. These intervals provide a common method to describe pandemic activity which can inform public health actions. The duration of each pandemic interval might vary depending on the characteristics of the virus and the public health response.

The six-phase approach was designed for the easy incorporation of recommendations into existing national and local preparedness and response plans. Phases 1 through 3 correlate with preparedness in the pre-pandemic interval, including capacity development and response planning activities, while Phases 4 through 6 signal the need for response and mitigation efforts during the pandemic interval. Phase 6 was reached in the County during the 2020 COVID outbreak.

Pre-Pandemic Interval

Phase 1 is the natural state in which influenza viruses circulate continuously among animals but do not affect humans.

Phase 2 involves cases of animal influenza that have circulated among domesticated or wild animals and have caused specific cases of infection among humans.

Phase 3 represents the mutation of the animal influenza virus in humans so that it can be transmitted to other humans under certain circumstances (usually very close contact between individuals). At this point, small clusters of infection have occurred.

Pandemic Interval

Phase 4 involves community-wide outbreaks as the virus continues to mutate and become more easily transmitted between people (for example, transmission through the air).

Phase 5 represents human-to-human transmission of the virus in at least two countries.

Phase 6 is the pandemic phase, characterized by community-level influenza outbreaks.

Past Occurrences

- Since the early 1900s, five lethal pandemics have swept the globe:
- **1918-1919 Spanish Flu:** The Spanish Flu was the most severe pandemic in recent history. The number of deaths was estimated to be 50-100 million worldwide and 675,000 in the United States. Its primary victims were mostly young, healthy adults. At one point, more than 10 percent of the American workforce was bedridden.
- **1957-1958 Asian Flu:** The 1957 Asian Flu pandemic killed 1 to 2 million people worldwide, including about 70,000 people in the United States, mostly the elderly and chronically ill. Fortunately, the virus was quickly identified, and vaccine production began in May 1957.
- **1968-1969 H3N2 Hong Kong Flu:** The 1968 Hong Kong Flu pandemic killed 34,000 Americans. Again, the elderly were more severely affected. This pandemic peaked during school holidays in December, limiting student-related infections, which may have kept the number of infections down. Also, people infected by the Asian Flu ten years earlier may have gained some resistance to the new virus.
- **2009-2010 H1N1 Swine Flu:** This influenza pandemic emerged from Mexico in early 2009 and was declared a public health emergency in the U.S. on April 26. By June, approximately 18,000 cases had been reported in the U.S. and the virus had spread to 74 countries. Most cases were fairly mild, with symptoms similar to the seasonal flu, but there were cases of severe disease requiring hospitalization and a number of deaths. The CDC estimates that 43-89 million people were infected worldwide, with an estimated 8,870 to 18,300 H1N1 related deaths, including 12,469 deaths in the United States.
- **2020-Ongoing COVID-19:** The COVID-19 or novel coronavirus outbreak began in December 2019 and was declared a pandemic in March of 2020. As of April 11, 2021, over 136 million cases and approximately 2.9 million deaths have been reported globally, according to the WHO. Within the U.S. as of April 11, 2021, over 30 million cases and over 555,000 deaths have been reported. Merced County has reported 31,009 cases so far resulting in 448 deaths. COVID-19 vaccines are currently being administered and thus far almost 15% of Merced County adults (18 years or older) have been fully vaccinated. It will take several months for the entire population to receive a vaccine and achieve herd immunity; additionally, due to the uncertainty in the transmission of several variants of the SARS-CoV-2 virus, the pandemic is expected to continue through 2021.

Probability of Future Occurrences

Even before the COVID-19 pandemic began, most public health experts considered another major pandemic to be inevitable. However, there is no definite way to predict when the next pandemic might occur. Some indicators will be present, but not every new virus turns into a pandemic. Based on the five pandemics that have affected the United States in roughly the last 100 years, a pandemic occurs on average roughly every 20 years.

Climate Change Considerations

Additional research is needed to determine the effects of climate change on the frequency and duration of epidemics and pandemics. Climate change may influence vector-borne disease transmission, although the direction of the effects (increased or decreased incidence) will be location- and disease-specific. The intensity and extent of certain diseases is projected to increase. According to the WHO, there has been research development into the linkages between climate and infectious disease transmission that examine the associations between climate variability and infectious disease occurrence, early indicators of emerging infectious disease impacts of climate change and using predictive models to estimate the future burden of infectious disease under different climate change scenarios (WHO 2003). In summary, future

risks associated with climate change are difficult to predict, but changes in infectious disease transmission patterns are likely consequences of climate change. Climate change can impact when and where pathogens appear, particularly related to temperature and rainfall patterns.

Ongoing efforts to reduce greenhouse gas emissions, building climate resiliency, and creating robust public health campaigns to prevent or prepare for possible increased vector-borne diseases may help to reduce the impacts of climate change on pandemics.

Vulnerability Assessment

Preparing for, responding to, and recovering from a pandemic requires a strategy that includes a holistic suite of public health activities designed to lessen the impact on morbidity and mortality. These activities include education, vaccination, prophylaxis, isolation/quarantine, a robust contact tracing program, and the closure of public facilities. In addition, clear, concise communication with the public and with other agencies remains a critical component, as does the ability of the involved agencies to achieve collaboration and coordination. By their very nature, most pandemics, once started, will not be stopped until they have run their course. This course can be shortened and weakened by a number of factors, with vaccination being the most effective method for protecting the population. Pandemic plans describe strategies of preparedness, response, and recovery to attempt to decrease illnesses and deaths during the pandemic period to manageable levels (i.e., that do not overwhelm the critical infrastructures of the State), and to promote community resiliency and rapid recovery.

General Property

For the most part, property itself is not generally impacted by a human disease epidemic or pandemic. However, as concerns about contamination increase, property may be quarantined or destroyed as a precaution against spreading illness. Additionally, traditional sheltering facilities including homeless shelters or temporary facilities set up to support displaced persons due to an evacuation or other reason due to a simultaneous disaster occurring cannot be done in a congregate setting. This requires additional planning considerations or use of facilities that allow for non-congregate shelter settings, which may require an approval of a request to FEMA for non-congregate sheltering, and may have an increased cost (such as the use of individual hotel rooms) as opposed to traditional congregate sheltering facilities.

People

Pandemics have the ability to affect large segments of the population for long periods of time. The number of hospitalizations and deaths will depend on the virulence of the virus. Risk groups cannot be predicted with certainty; the elderly, people with underlying medical conditions, and young children are usually at higher risk due to their higher exposure rates from schools, but as discussed above this is not always true for all infectious agents. People without health coverage or access to good medical care are also likely to be more adversely affected. Mental health of the public could also be impacted depending on the length of the event and public health guidance on prevention.

As previously described in the Past Events section above, the COVID-19 pandemic has resulted in over 555,000 deaths in the U.S. alone (448 in Merced County). In addition to the direct impacts, the pandemic has completely disrupted life for many people. Most large gatherings have had to be cancelled, and many schools have closed. Sheltering in place and social distancing have been highly encouraged and, in some places, mandated, leaving some individuals isolated for months.

Social Vulnerability

Preparing for, responding to, and recovering from a pandemic requires a strategy that includes a holistic suite of public health activities designed to lessen the impact on morbidity and mortality. These activities include education, vaccination, prophylaxis, isolation/quarantine, a robust contact tracing program, and

the closure of public facilities. In addition, clear, concise communication with the public and with other agencies remains a critical component, as does the ability of the involved agencies to achieve collaboration and coordination. By their very nature, most pandemics, once started, will not be stopped until they have run their course. This course can be shortened and weakened by a number of factors, with vaccination being the most effective method for protecting the population. Pandemic plans describe strategies of preparedness, response, and recovery to attempt to decrease illnesses and deaths during the pandemic period to manageable levels (i.e., that do not overwhelm the critical infrastructures of the State), and to promote community resiliency and rapid recovery.

Critical Facilities

In the event of a pandemic, especially one with high transmission rates and mortality rates such as COVID-19, community lifelines, such as healthcare facilities, like hospitals will be heavily affected and may be overwhelmed due to limited number of beds, doctor and medical staff, laboratory testing capacity, and possible personal protective equipment (PPE) shortages. Indirect impacts can also result in these facilities being temporarily offline due to testing or other precautionary monitoring and downed systems. Further, outbreaks in small cities and counties may cause medical facilities to reach capacity very quickly. Other critical facilities and infrastructure are not directly affected by a pandemic but may have difficulty maintaining operations and maintenance activities due to a significantly decreased workforce. Schools may also be forced to close.

Economy

Pandemics can have extensive economic impacts, as evidenced by the COVID-19 pandemic and associated restrictions on social gatherings. Social distancing requirements have affected nearly every segment of the local and national economy, most notably the restaurant and hospitality industries. Additionally, tourism may be impacted in affected areas. As a result, the unemployment rate can increase, which also occurred in 2020 due to the COVID-19 pandemic. Other economic impacts including varying disruptions in the food supply chains and other essential medical services.

Historic, Cultural and Natural Resources

Impacts to these resources are typically minimal. However, reduced tourism during outbreaks could lead to additional economic impacts.

Future Development

Population growth and development contribute to pandemic exposure. Future development in and around Merced County has the potential to change how infectious diseases spread through the community and impact human health in both the short and long-term. New development may increase the number of people and facilities exposed to public health hazards and greater population concentrations (often found in special needs facilities, businesses, and school campuses) put more people at risk. During a disease outbreak those in the immediate isolation area would have little to no warning, whereas, the population further away in the dispersion path may have some time to prepare and mitigate against disease depending on the hazard, its transmission, and public notification.

Risk Summary

- Pandemics affecting the U.S. occur roughly once every 20 years but cannot be reliably predicted.
- Effects on people will vary, but a significant portion of the population could become ill, and may need to be hospitalized
- Effects on property are typically minimal, although quarantines could result in short-term closures.

- Community lifelines, such as healthcare facilities, like hospitals will be impacted and may be overwhelmed and have difficulty maintaining operations due to bed availability, medical staffing shortages, and lack of PPE and other supplies.
- Lost productivity due to illness and potential business closures could potentially have severe economic impacts, such as increased unemployment rates in the County. Social distancing requirements and fear of public gatherings could also significantly reduce in person commerce.
- The hazard is considered high significance across all participating jurisdictions.
- Ongoing mitigation activities should focus on disease prevention, especially during flu season. This includes, but is not limited to, pre-season community outreach campaigns to educate the public about risks and available support; establishing convenient vaccination centers; reaching out to vulnerable populations and care givers; and issuing advisories and warnings.

Table 4-81 Hazard Risk Summary – Pandemics/Epidemics

Jurisdiction	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Merced County	Extensive	Occasional	Catastrophic	High
City of Atwater	Extensive	Occasional	Catastrophic	High
City of Dos Palos	Extensive	Occasional	Critical	Medium
City of Gustine	Extensive	Occasional	Catastrophic	High
City of Livingston	Extensive	Occasional	Catastrophic	High
City of Los Banos	Extensive	Occasional	Catastrophic	High
City of Merced	Extensive	Occasional	Critical	Medium

5 MITIGATION STRATEGY

Requirement §201.6(c)(3):

[The plan shall include the following:] A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.

This section describes the mitigation strategy process and mitigation action plan for the Merced County MJHMP. It describes how the County and participating jurisdictions met the requirements for the following from the 10-step planning process:

- Planning Step 6: Set Goals
- Planning Step 7: Review Possible Activities
- Planning Step 8: Draft an Action Plan

The mitigation strategy reflects the results of the collaborative work of the HMPT. Subsection 5.3 Mitigation Action Plan is based on the updated planning process, risk assessment, capability assessment, goal setting, and the identification of mitigation actions. Taking all of these into consideration, the HMPT developed the following overall mitigation strategy:

- **Communicate** the hazard information collected and analyzed through this planning process as well as HMPT success stories so that the community better understands what can happen where and what they themselves can do to be better prepared.
- **Implement** the action plan recommendations of this plan.
- **Use** existing rules, regulations, policies, and procedures already in existence. Given the flood hazard in the planning area, an emphasis should be placed on continued compliance with the NFIP.
- **Monitor** multi-objective management opportunities so that funding opportunities may be shared and packaged, and broader constituent support may be garnered.

5.1 Mitigation Goals and Objectives

§201.6(c)(3)(i)

[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Up to this point in the planning process, the HMPT has organized resources, assessed hazards and risks, and documented mitigation capabilities. The resulting goals, objectives, and mitigation actions were developed based on these tasks. The HMPT held a series of meetings and exercises designed to achieve a collaborative, updated mitigation strategy as described further throughout this section.

Over a series of meetings during the 2021 update process the HMPT reviewed the results of the hazard identification, vulnerability assessment, and capability assessment update. This analysis of the risk assessment identified areas where improvements could be made and provided the framework for the HMPT to update planning goals and objectives and the ultimate mitigation strategy for the Merced County planning area.

Goals were defined for the purpose of this mitigation plan as broad-based public policy statements that:

- Represent basic desires of the community;

- Encompass all aspects of community, public and private;
- Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;
- Are future-oriented, in that they are achievable in the future; and
- Are time-independent, in that they are not scheduled events.

Goals are stated without regard to implementation. Implementation cost, schedule, and means are not considered. Goals are defined before considering how to accomplish them so that they are not dependent on the means of achievement. Goal statements form the basis for objectives and actions that will be used as means to achieve the goals. Objectives define strategies to attain the goals and are more specific and measurable.

During the 2021 plan update process, HMPT members review the existing goals and objectives as well the goals and objectives from 2018 State of California Hazard Mitigation Plan and from the 2014 City of Merced LHMP. Through a brainstorming process at their third meeting, the HMPT identified a variety of possible goals and then came to a consensus on seven main sets of goals and objectives. Goals 4, 5 and 6 are new to 2021 plan update; other revisions included removing the word “natural” from the goals to be more inclusive to all hazards. Following the development of goals, the HMPT also identified specific objectives to achieve each goal. Goals and objectives are listed below, but are not prioritized:

- **Goal 1: Reduce the potential for loss of life and injury from hazards**
 - Assist vulnerable populations from the impacts of severe weather by organizing a mechanism for outreach.
 - Educate property owners by increasing wildfire awareness and measures for reducing risks
 - Identify opportunities to reduce losses associated with High Hazard potential dams
- **Goal 2: Minimize or reduce damage to property.**
 - Minimize growth and development in hazard areas
 - Adopt and enforce building codes
 - Educate property owners by increasing wildfire awareness and measures for reducing risks
 - Identify opportunities to reduce losses associated with High Hazard potential dams
- **Goal 3: Build resiliency and redundancy to maintain essential services, lifelines, facilities, and infrastructure.**
 - Ensure protection and enhancement of key emergency access routes
 - Protect critical facilities and infrastructure to minimize loss of critical services
 - Seek funding sources and partners for future mitigation activities
 - Improve organizational capabilities to address health and safety issues in mitigation and response
- **Goal 4: Minimize impacts of hazards to agriculture and the economies of communities.**
 - Encourage water conservation measures among urban, rural, and agricultural users
 - Increase water storage to mitigate flooding and drought
 - Strengthen disaster resistance and resiliency of major employers
 - Develop plans for post-disaster recovery
- **Goal 5: Protect and leverage natural and beneficial mitigation functions of the environment.**
 - Encourage the use of drought tolerant or xeriscaping practices into landscape ordinances
 - Incorporate defensible space in landscaping of new and existing development
- **Goal 6: Promote hazard mitigation as an integrated policy.**

- Promote hazard mitigation as integrated policy among communities in the county and with the region and state
 - Incorporate flood mitigation into local planning by adoption of post-disaster recovery ordinance based on a plan to regulate repair activity
 - Continue to improve enforcement of existing standards and regulations
- **Goal 7: Increase public awareness of hazards.**
 - Promote education and awareness about natural hazards risk, mitigation, and preparedness to citizens, public agencies, elected officials, nonprofit organizations, and businesses
 - Develop water saving education program
 - Increase communication regarding hazard mitigation among communities in the county

5.1.1 Continued Compliance with the 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. 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.

Merced County, Atwater, Dos Palos, Livingston, Los Banos and Merced participate in the NFIP. Structures permitted or built in the county before 1979 when the County, Atwater and Merced joined the NFIP (1978 for Dos Palos and Livingston and 1998 for Los Banos) are called “pre-FIRM” structures, and structures built afterwards are called “post-FIRM.” Post-FIRM structures built in compliance with the floodplain regulations are mitigated to withstand floods up through the 100-year event. The insurance rate is different for the two types of structures, as pre-FIRM structures are at higher risk of flooding. The effective date for the current countywide FIRM is December 2, 2008. The County and participating jurisdictions are currently in good standing with the provisions of the NFIP. Compliance is monitored by FEMA regional staff. Maintaining compliance with the NFIP is an important component of flood mitigation and risk reduction.

The City of Gustine is not a participant in the NFIP and has been sanctioned since December 2, 2009. This means that residents are not able to obtain flood insurance from the NFIP. The City has minimal flood risk and the effective FEMA flood hazard mapping does not show any Special Flood Hazard Area (SFHA) or 1% annual chance flooding within city limits. This has been the reason for not joining the NFIP, but as part of this plan update the City will revisit the cost and benefit of joining, including working with CA DWR and FEMA to understand the implications of the sanction designation. Refer to the mitigation strategy in

Section 5 for more information on specific mitigation actions related to addressing the sanction designation.

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 Merced County and all NFIP participating jurisdictions including Atwater, Dos Palos, Livingston, Los Banos and Merced. 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.

5.2 Identification and Analysis of Mitigation Actions

§201.6(c)(3)(ii):

[The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

In order to identify and select mitigation measures to support the mitigation goals, each hazard identified in Section 4: Hazard Identification and Risk Assessment was evaluated. The HMPT analyzed a comprehensive set of viable mitigation alternatives for both new and existing buildings and infrastructure that would support identified goals and objectives. Each HMPT member was provided with the following list of categories of mitigation measures, which originate from the NFIP CRS:

- **Prevention:** Administrative or regulatory actions or processes that influence the way land and buildings are developed and built.
- **Property protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard or remove them from the hazard area.
- **Structural:** Actions that involve the construction of structures to reduce the impact of a hazard.
- **Natural resource protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems.
- **Emergency services:** Actions that protect people and property during and immediately after a disaster or hazard event.
- **Public information/education and awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them.

At the mitigation strategy meeting the HMPT was also provided with a matrix showing examples of potential mitigation action alternatives for each of the above categories, for each of the identified hazards. The HMPT was also provided a handout that explains the categories and provided further examples. Another reference document titled "Mitigation Ideas" developed by FEMA in 2013 and FEMA's 2020 "Mitigation Action Portfolio" were distributed to the HMPT via an online link. These document lists the common alternatives for mitigation by hazard and actions funded by FEMA. The HMPT was also instructed to consider both future and existing buildings in considering possible mitigation actions. This reference provides four categories of mitigation actions that were discussed at the HMPT meeting in addition to the NFIP/CRS categories. These include:

- Plans and Regulations
- Structure and Infrastructure Projects
- Education and Awareness

- Natural systems protection

Other alternatives discussed in the webinar include the four 'A's' of mitigation:

- Alter the physical nature of the hazard
 - Such as wildfire defensible space and fuels treatments, snow fences etc.
- Avert the hazard away from people, buildings, and infrastructure
 - Can include engineered solutions, drainage, and channel improvements, floodproofing, fuel breaks
- Adapt to the hazard
 - Through land use planning, building codes and design standards, warning systems etc.
- Avoid the hazard
 - Natural systems protection, open space, acquisition, or relocation of properties out of hazardous areas

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

To facilitate the brainstorming process, the HMPT referred to a matrix of typical mitigation alternatives organized by CRS category for the hazards identified in the plan, in addition to a handout that explains the categories and provided examples. These materials are included in Appendix B. HMPT members were encouraged to develop mitigation alternatives that would protect future, as well as existing, development from hazards per the DMA 2000 regulations. A facilitated discussion then took place to examine the existing actions in the 2014 plan and analyze the other possible mitigation alternatives. With an understanding of the alternatives, a brainstorming session was conducted to generate a list of preferred mitigation actions. The result was new and updated project ideas with the intent of meeting the identified goals and mitigating identified hazards.

These new and updated project actions were expanded on during a fourth HMPT meeting scheduled to focus on the refinement and prioritization of new mitigation activities. During the fourth HMPT meeting, Wood facilitated a discussion on the draft MJHMP and any remaining information or mitigation gaps that needed to be addressed. During the fourth HMPT meeting the group also discussed opportunities for plan integration and reviewed the plan implementation and maintenance procedures.

5.2.1 Prioritization Process

Once the mitigation actions were identified, the HMPT was provided with several decision making tools, including FEMA's recommended prioritization criteria, STAPLEE, to assist in deciding why one recommended action might be more important, more effective, or more likely to be implemented than another. STAPLEE stands for the following:

- Social: Does the measure treat people fairly? (e.g., different groups, different generations) Does it consider social equity, disadvantaged communities, or vulnerable populations?
- Technical: Will it work? (Is the action technically feasible? Does it solve the problem?)
- Administrative: Is there capacity to implement and manage the project? (adequate staffing, funding, and other capabilities to implement the project?)
- Political: Who are the stakeholders? Did they get to participate? Will there be adequate political and public support for the project?
- Legal: Does the jurisdiction have the legal authority to implement the action? Is it legal? Are there liability implications?

- Economic: Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?
- Environmental: Does the action comply with environmental regulations? Will there be negative environmental consequences from the action?

In accordance with the Disaster Mitigation Act requirements, an emphasis was placed on the importance of a benefit-cost analysis in determining action priority. Other criteria used to assist in evaluating the benefit-cost of a mitigation action included:

- Does the action address hazards or areas with the highest risk?
- Does the action protect lives?
- Does the action protect infrastructure, community assets or critical facilities?
- Does the action meet multiple objectives (Multiple Objective Management)?
- What will the action cost?
- What is the timing of available funding?

The mitigation categories, multi-hazard actions, and criteria are included in Appendix D: Mitigation Categories and Alternatives.

At the mitigation strategy webinar, the HMPT reviewed and discussed the STAPLEE considerations to determine which of the identified actions were most likely to be implemented and effective. Prioritization of previous mitigation actions identified in the 2014 HMP that were carried forward in the updated plan were revisited during the fourth HMPT meeting. New actions identified in 2021 also were prioritized based on the group discussion. With the STAPLEE criteria in mind, HMPT participants were given a set of three green sticky dot stickers. The team was asked to use the dots to prioritize projects with the above criteria in mind, essentially voting on the projects. The projects with the most dots became the higher priority projects. This process provided both consensus and priority for the recommendations.

The process of identification and analysis of mitigation alternatives allowed the HMPT to come to consensus and to collectively prioritize recommended mitigation actions. During the voting process, emphasis was placed on the importance of a benefit-cost review in determining project priority; however, this was not a quantitative analysis. Benefit-cost was considered in greater detail in the development of the Mitigation Action Plan. For example, parameters were established for assigning subjective ratings (high, medium, low) to the benefits and costs of each mitigation action. Specifically, each action developed for this plan contains a description of the problem and proposed project, the entity with primary responsibility for implementation, any other alternatives considered, a cost estimate, expected project benefits, potential funding sources, and a schedule for implementation. Development of these project details for each action led to the determination of an overall high, medium, or low priority for each action.

Recognizing the limitations in prioritizing actions from multiple departments and the regulatory requirement to prioritize by benefit-cost to ensure cost-effectiveness, the HMPT decided to pursue mitigation action strategy development and implementation according to the nature and extent of damages, the level of protection and benefits each action provides, political support, project cost, available funding, and jurisdiction and department priority. This process guided the development of a prioritized action plan for Merced County and the participating jurisdictions.

Cost-effectiveness will be considered in greater detail through a formal benefit-cost analysis when seeking FEMA mitigation grant eligibility and funding (e.g. HMGP, PDM grant programs) for eligible actions associated with this plan.

5.3 Mitigation Strategy Action Plan

§201.6(c)(3)(iii)

[The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

§201.6(c)(3)(iv)

For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

This action plan was developed to present the recommendations developed by the HMPT for how the Merced County planning area can reduce the vulnerability of people, property, infrastructure, and natural and cultural resources to future disaster losses. Over time the implementation of these projects will be tracked as a measure of demonstrated progress on meeting the plan's goals.

5.3.1 Progress on Previous Mitigation Actions

A review of 2014 mitigation actions progress reports indicates that Merced County and the participating jurisdictions have been successful in implementing actions identified in the 2014 LHMP Mitigation Strategy, thus, working diligently towards meeting the 2014 plan goals. The 2014 mitigation strategy contained 36 separate mitigation actions. As of September 2021, two of these actions have been completed, three deleted and 39 actions are continuing. The table below summarizes progress implementing mitigation actions by jurisdiction. The total continuing actions column summarizes the actions from 2014 that are either still in progress, have annual implementation, or are continuing but not completed. The new actions in 2021 summarizes the number of actions that were identified during the 2021 plan update process.

Table 5-1 Mitigation Action Progress Summary by Jurisdiction

Jurisdiction	Completed	Deleted	Continue In Progress	Continue Not Started	Total Continuing Actions	New Actions in 2021	Grand Total Actions
Atwater	0	2	2	4	6	4	10
Dos Palos	NA	NA	NA	NA	NA	2	2
Gustine	NA	NA	NA	NA	NA	4	4
Livingston	0	0	2	6	8	1	9
Los Banos	0	1	7	0	7	8	15
Merced	0	0	2	8	10	1	11
Unincorporated	2	0	7	1	8	12	20
Grand Total	2	3	20	19	39	31	70

Table 5-2 indicates the details for each of the 2014 mitigation action items that have been completed or deleted.

Table 5-2 Completed and Deleted Mitigation Actions

ID	Corresponding Hazard(s)	Mitigation Action	Lead Agency	Goals	Priority	Action Status Notes
Merced County						
10	Drought	Promote Water Conservation Program	OES / CEO's Office	1,2,3	High	Completed. This program is in place and implemented regularly due to continuing challenges with drought.
11	Wildfire	Implement and Monitor Weed Abatement Program	County Fire	1,2,3	High	Completed.
City of Atwater						
7	Flood	Flood Insurance Promotion, CRS Program Implementation/Participation	Planning Department	1,2,3	High	Deleted. The City does not have enough flood insurance policies to justify joining CRS.
9	Drought	Promote Water Conservation Program	Public Works	1,2,3	High	Deleted. This program is in place and implemented regularly due to continuing challenges with drought.
City of Los Banos						
7	Flooding	Flood Insurance Promotion, CRS Program Implementation/Participation.	Planning Department	1,2,3	High	Deleted. The City does not have enough flood insurance policies to justify joining CRS.

5.3.2 Updated Action Plan

The results of the project identification and prioritization exercise from meetings 3 and 4 is summarized in Table 5-3. These projects detail specific actions for reducing future hazard-related losses within Merced County. The projects are organized by jurisdictions and include notes about the department and partners necessary to implement the project. Table 5-3 provides more details on the mitigation actions, including the mitigation action description estimated cost, potential funding sources, timeline, indication of the goal(s) that the projects primarily align with and are marked with their relative level of priority high, medium, and low. The following table also provides status/implementation notes that describe progress made on the actions so far, using the following categories, and, where applicable, notes if there were changes in the priority level from the previous plan:

- Continue - In Progress: work has begun on the project and is ongoing.
- Continue - Not completed: little or no work has been done on the project to date and the HMPT agreed to carry over the action into the updated plan.
- New in 2021: The action is new to this plan update; little to no work has been completed.

Many of these mitigation actions are intended to reduce impacts to existing development. Those that protect future development from hazards, as required per the DMA 2000 regulations, are indicated by an asterisk '*' in the action identification number. These actions include those that promote wise

development and hazard avoidance, such as building code, mapping, and zoning improvements, and continued enforcement of floodplain development regulations.

Table 5-4 provides a summary of the individual mitigation actions by jurisdiction specific to the municipalities that participated in the 2021 plan update. The timeline for implementation for each hazard mitigation action is organized into the following timeframes: ongoing, annual implementation, 1-2 years (short-term), 2-3 years (medium-term), or 3-5 years (long-term). Together with the County actions the tables provide an overview of all the mitigation actions proposed. More details can be found in the respective jurisdictional annexes.

Table 5-3 Merced County Mitigation Actions

ID	Goal(s) & Lifelines	Hazard(s) Mitigated	Description/Background/ Benefits	Lead Agency and Partners	Cost Estimate & Potential Funding	Priority	Timeline	Status/Implementation Notes
1	1,7 NA	Multi-Hazard: Dam Incident, Earthquake Flooding Severe Weather Wildfire	Countywide Public Education Program – A natural hazards education and awareness program in Merced County would be a valuable tool for sharing information with residents. Implementation ideas include sharing information online and conducting workshops. The county will partner with special districts, the cities and other entities to provide awareness and education on hazards and steps to mitigate.	OES / CEO's Office	\$100,000 Federal Grants	High	Ongoing	Continue In Progress. The 2014 HMP included four of the six incorporated cities. The 2021 plan included all 6-cities. This program will expand as a joint effort between all 6-cities.
2*	1,2,4,6 NA	Multi-Hazard: Earthquake, Flooding, Severe Weather, Wildfire	Integrate Local Hazard Mitigation Plan into Safety Element of General Plan. Recognizing the potential duplication of effort over evaluation of the same issues, efforts to update the Health and Safety Element will be conducted in coordination with the multi-hazard mitigation plan and to also ensure AB 2140 Compliance. Integration and coordination of both plans provides General Plan policy direction for development activity. Potential loss reductions in the \$1000s as any new development within the county will be considered	Community Development Agency	\$5,000 General Fund	Medium	Next General Plan review cycle	Continue In Progress. The updated 2021 plan will be incorporated by reference into the Safety Element as part of the MJHMP adoption process.

ID	Goal(s) & Lifelines	Hazard(s) Mitigated	Description/Background/ Benefits	Lead Agency and Partners	Cost Estimate & Potential Funding	Priority	Timeline	Status/Implementation Notes
			within the context of the county's Health and Safety Element.					
3	1,7 NA	Earthquake	Non-structural Earthquake Mitigation Outreach. Existing structures can be retrofitted to better withstand damage from seismic events. Outreach will include educating home and business owners about structural and non-structural retrofit techniques and how to seismically strengthen their homes and businesses. Specific techniques include secure furnishings, storage cabinets and utilities to prevent injuries and damages, such as anchoring, installing lathes, using flexible connections on gas and water lines, and bracing propane tanks and water heaters.	Environmental Health	\$100,000 Federal Grants	Medium	Ongoing	Continue In Progress. An earthquake safety flyer was created and posted on Public Health social media and the Division of Environmental Health's website.
4	1,2 NA	Earthquake	Countywide Inventory of Historic Unreinforced Masonry Buildings – Use GIS a to map and track URM's Countywide. An accurate inventory of URM Buildings with appropriate tracking will lessen time during the recovery after an EQ.	Building Department	\$100,000 Federal Grants	Medium	1-2 years	Continue – In Progress. Not Completed. The County Building Department has not tracked or kept records of URM Buildings in the unincorporated portion of Merced County.
5	1,2,6 Food, Water, Shelter	Earthquake	Periodically review building codes for updates and enhancements and ensure necessary capabilities for enforcement.	Building Department	Staff time Dept. Budget	Medium	Annual implementation	Continue – Not Started. The enforcement of building codes is standard regulatory practice.

ID	Goal(s) & Lifelines	Hazard(s) Mitigated	Description/Background/ Benefits	Lead Agency and Partners	Cost Estimate & Potential Funding	Priority	Timeline	Status/Implementation Notes
6	1,2,4 Safety and Security	Flood	Develop a Hazard Specific Flood Annex for all jurisdictions with focus on flood hazard areas as described in the Risk Assessment. The annex will address the associated risks of flooding, current and past mitigation efforts specific to the streams and localized flood areas in the county.	OES, Public Works	\$90,000 State and Federal Grants	High	1-2 years	Continue In Progress. The County EOP captures the county in its entirety. County OES is working to include all six cities.
7	1,2,7 Safety and Security	Flood	Flood Insurance Promotion Program Implementation/Participation. County staff will promote benefits of flood insurance	OES, Planning Department	Staff Time Dept. Budget	High	Annual Implementation	Continue In Progress.
8	1,2,3 Safety and Security	Flood	Identify and evaluate effectiveness of alternative detention basin flood control projects that will reduce flood flows in Black Rascal Creek at the diversion.	Public Works	\$500,000-4M. State and Federal Grants	High	1-2 years	Continue In Progress. The County has identified a preferred alternative as of 2021 but construction has not yet begun.
9	1,7 NA	Severe Weather: Wind, Extreme Temps., Tornadoes, Dense Fog	Winter Weather Preparedness Campaign. This project would add to and enhance the existing, campaigns that share information on Severe Weather Hazards: Fog, Freeze, Location of Warming Centers, Heat Related Illness, All Hazards Preparedness information, etc.; The county will work with special districts, the cities and other entities.	OES/CEO's Office	\$100,000 Federal Grants	High	Annual Implementation	Continue In Progress. This program is expanded each year utilizing various outreach strategies.
10	3 Communications	Cyber Attack	Cyber Security. Establish a risk management program to identify the risks, understand their likelihood and	OES, Jurisdictions	\$500,000-\$2,500,000 Grants,	Medium	2-3 years	New in 2021

ID	Goal(s) & Lifelines	Hazard(s) Mitigated	Description/Background/ Benefits	Lead Agency and Partners	Cost Estimate & Potential Funding	Priority	Timeline	Status/Implementation Notes
			impact. Once identified place security controls that mitigate the risks to a level considered acceptable. The risk management program will also include ongoing evaluation and assessment of cyber security risks and controls throughout the life cycle of the software. Ideas for implementation: Define the system. Identify cyber assets and their classification. Identify the electronic security perimeter protecting these assets. Conduct vulnerability assessment: Identify threats. Identify vulnerabilities. Identify security risks along with their impact and likelihood. Assess the effectiveness of existing security controls in mitigating the risks. Recommend new security controls or changes to existing security controls to mitigate the severity of the risks to a level acceptable to the organization. Continuously monitor the effectiveness of security controls. Periodically repeat this process to account for system changes and changes in the threat landscape.		General Fund			
11	4 NA	Drought	Drought Plan. Develop drought plans that outline proactive strategies that	OES	\$500,000-\$10,000,00	High	3-5 years	New in 2021

ID	Goal(s) & Lifelines	Hazard(s) Mitigated	Description/Background/ Benefits	Lead Agency and Partners	Cost Estimate & Potential Funding	Priority	Timeline	Status/Implementation Notes
			can be implemented before, during, and after drought to increase societal and environmental resiliency and enhance drought response and recovery capabilities Investigate drought monitoring, risk, and management options. Include water conservation projects that seek to reduce the nonessential use of water to conserve county water supplies. Conservation projects include establishing mandatory water restrictions within Merced County to discourage waste and incorporate treatment of recycled water for potable consumption.		0 Grants, General Fund			
12	4 Food, Water, Shelter	Drought, Flood	Groundwater Recharge and Stormwater Detention Pilot Project. A pilot project is being conducted by Eastside Water District on Merced County property in 2021 that included installation of three dry wells at the Mustang Creek Flood Detention Basin for groundwater recharge. This project will also assist in mitigating flooding from stormwater scenarios. When dry wells are installed, they will prevent erosion and localized flooding while also	OES, County Water Resources, Eastside Water District	\$500,000-\$3,000,000 Grants, General Fund	High	2-3 years	New in 2021

ID	Goal(s) & Lifelines	Hazard(s) Mitigated	Description/Background/ Benefits	Lead Agency and Partners	Cost Estimate & Potential Funding	Priority	Timeline	Status/Implementation Notes
			allowing collection and control of stormwater runoff.					
13	1,3,6 NA	Multi-Hazard: Dam Incidents, Earthquake, HazMat, Flooding, Landslide, Severe Weather Wildfire	Public Safety GIS Management. Build and enhance GIS work done in 2021 Hazard Mitigation Plan Update to help make the HMP a living document and an ongoing resource for understanding risk in Merced County.	County GIS Division, Cities, Cal OES	\$50,000 - \$75,000 Federal, state and local grants, FEMA Grants, Cal OES Funds	High	2-3 years	New in 2021
14	NA	Wildfire	Encourage and continue to establish countywide evacuation zones, sections and routes.	OES	\$50,000 - \$75,000 Federal, state and local grants, FEMA Grants, Cal OES Funds	High	2-3 years	New in 2021
15	NA	Pandemic/ Epidemic	Conduct an After Action Review for COVID-19 response to identify lessons learned and ways to mitigate impacts of future pandemics.	Public Health, OES	20,000 - \$40,000 Federal, state and local grants, FEMA	Medium	1-2 years	New in 2021

ID	Goal(s) & Lifelines	Hazard(s) Mitigated	Description/Background/ Benefits	Lead Agency and Partners	Cost Estimate & Potential Funding	Priority	Timeline	Status/Implementation Notes
					Grants, Cal OES Funds			
16	NA	Pandemic/ Epidemic	Develop a plan for a Countywide Medical Reserve Corps to provide surge capacity to mitigate impacts of pandemic/epidemics	Public Health, OES	Staff Time Dept. Budget	Medium	2-3 years	New in 2021
17	NA	Agricultural Pest & Disease	Provide public outreach through a variety of media for awareness and mitigation of various agricultural pests and disease.	Agricultural Commissioner, CDFA	Staff Time Dept. Budget	Low	2-3 years	New in 2021
18	Food, Water, Shelter	Agricultural Pest & Disease	Enhance the County's capabilities associated with the Pest Detection Program, Pest Exclusion Program, and Pest Eradication Program to mitigate agricultural pests and disease. Delimitation plan activated through AG Commissioner and CDFA jointly.	Agricultural Commissioner, CDFA	Staff Time Dept. Budget	Low	2-3 years	New in 2021
19	HazMat	Hazardous Materials	Identify and increase water management practices that reduce pesticide movement offsite to mitigate hazardous materials impacts	Environmental Health	Staff Time Dept. Budget	Low	2-3 years	New in 2021
20	NA	Hazardous Materials	Create a hazardous materials safety flyer to post on public health social media and the division of environmental health's website. Provide free classes to Merced County businesses about proper storage/handling of hazardous materials and hazardous waste.	Environmental Health	Staff Time Dept. Budget	Low	1-2 years	New in 2021

ID	Goal(s) & Lifelines	Hazard(s) Mitigated	Description/Background/ Benefits	Lead Agency and Partners	Cost Estimate & Potential Funding	Priority	Timeline	Status/Implementation Notes
21	HazMat	Hazardous Materials	Develop countywide commodity flow study to further understand the quantity and types of hazardous materials being transported through the county to provide the basis for additional mitigation actions.	Environmental Health	\$50,000 - \$175,000 Federal, state and local grants, FEMA Grants, Cal OES Funds	High	2-3 years	New in 2021

Table 5-4 Jurisdictional Mitigation Action Summary

ID	Hazard(s) Mitigated	Project Title	Lead Agency and Partners	Priority	Action Status
City of Atwater					
1	Multi-Hazard: Earthquake Flooding Severe Weather Wildfire	Participate in Countywide Public Education Program.	OES	High	Continue Not Started
2*	Multi-Hazard: Earthquake Flooding Severe Weather Wildfire	Integrate Local Hazard Mitigation Plan into Safety Element of General Plan.	Community Development Agency	Medium	Continue In Progress
3	Earthquake	Non-structural Earthquake Mitigation Outreach	Public Works	Medium	Continue Not Started
4	Earthquake	Participate in Countywide Inventory for Unreinforced Masonry Buildings	Public Works	Medium	Continue Not Started
5*	Multi-Hazard: Earthquake Flooding Landslide Severe Weather Wildfire	Periodically review building codes for updates and enhancements	Building Department	Medium	Continue Not Started
6	Drought	Promote Water Conservation Program	Public Works	High	Continue In Progress
7	Earthquake Severe Weather: General Dam Incidents	Emergency power system to protect the City of Atwater 911 Communications Center and Police Department	Police Department	High	New in 2021
8	Earthquake	Seismic Upgrade and Remodel of the Atwater Police Department Headquarters	Police Department	High	New in 2021

ID	Hazard(s) Mitigated	Project Title	Lead Agency and Partners	Priority	Action Status
9	Earthquake	Review hazards and awareness of earthquakes in a public platform and educate the public on helpful procedures in the aftermath	Police Department	High	New in 2021
10	Agricultural Pest & Disease	Public education of current seasonal threat	Community Development Agency	Low	New in 2021
City of Dos Palos					
1	Multi-Hazard	Radio upgrade for police department	Police Department	Medium	New in 2021
2	Drought	Construction of new water treatment plant with resiliency upgrades	Dept. of Utilities	High	New in 2021
City of Gustine					
1	Flooding	Develop and enhance storm water drainage improvements to reduce frequent flooding.	Public Works	High	New in 2021
2	Earthquake	Perform building-specific seismic vulnerability assessment of City-owned critical facilities constructed prior to 1980	Public Works	Medium	New in 2021
3	Drought	Develop drought plan	Public Works	High	New in 2021
4*	Flooding	Explore cost/benefit of joining the NFIP	Public Works, Development Services	Low	New in 2021
City of Livingston					
1	Multi-Hazard: Dam Incident, Earthquake Flooding Severe Weather Wildfire	Participation in Countywide Public Education Program.	OES	High	Continue Not Started

ID	Hazard(s) Mitigated	Project Title	Lead Agency and Partners	Priority	Action Status
2	Multi-Hazard: Earthquake Flooding Severe Weather Wildfire	Integrate Local Hazard Mitigation Plan into Safety Element of General Plan.	Community Development Agency	Medium	Continue Not Started
3	Earthquake	Non-structural Earthquake Mitigation Outreach	Public Works	Medium	Continue Not Started
4	Earthquake	Participate in Countywide Inventory for Unreinforced Masonry Buildings	Public Works	Medium	Continue Not Started
5	Multi-Hazard: Earthquake Flooding Landslide Severe Weather Wildfire	Periodically review buildings for update and enhancements	Building Department	Medium	Continue Not Started
6	Flooding	Flood Insurance Promotion	Planning Department	High	Continue Not Started
7	Severe Weather	Severe Weather Preparedness Campaign	Livingston Fire Department	High	Continue – in progress
8	Drought	Promote Water Conservation Program	Public Works	High	Continue In Progress
9	Flood	Upgrade storm lift station/SCADA	Public Works	High	New in 2021
City of Los Banos					
1	Multi-Hazard: Earthquake Flooding Severe Weather Wildfire	Participate in Countywide Public Education Program.	OES / CEO's Office	High	Continue – In Progress
2	Multi-Hazard: Earthquake Flooding Severe Weather Wildfire	Integrate Local Hazard Mitigation Plan into Safety Element of General Plan.	Community Development Agency	Medium	Continue – In Progress

ID	Hazard(s) Mitigated	Project Title	Lead Agency and Partners	Priority	Action Status
3	Earthquake	Non-structural Earthquake Mitigation Outreach	Public Works	Medium	Continue – In Progress
4	Earthquake	Participate in Countywide Inventory for Unreinforced Masonry Buildings	Public Works	Medium	Continue – In Progress
5	Multi-Hazard: Earthquake Flooding Severe Weather Wildfire	Periodically review building codes for updates and enhancements and ensure necessary capabilities for enforcement.	Building Department	Medium	Continue – In Progress
6	Severe Weather	Participate in Severe Weather Preparedness Campaign.	Los Banos Fire Department	High	Continue – In Progress
7	Drought	Promote Water Conservation Program	Public Works	High	Continue – In Progress
8	Wildfire	Implement and Monitor Weed Abatement Program	Los Banos Fire Department	High	New in 2021
9	Flooding, Earthquake, Wildfire	Prepare Emergency Plan for Critical Infrastructure	Public Works	High	New in 2021
10	Earthquake	Perform Building-Specific Seismic Vulnerability Assessment of City-Owned Critical Facilities	Building Department	High	New in 2021
11	Flood	Continue to Update Storm Water System Master Plan	Public Works	Medium	New in 2021
12	Flood, Earthquake, Wildfire	Prepare a Shelter and Emergency Provision Plan	Fire Department	Medium	New in 2021
13	Severe Weather	Prepare Weather Preparedness Program (Extreme Heat and Cold)	Fire Department	Medium	New in 2021
14	Drought	Promote Water Conservation	Public Works	High	New in 2021

ID	Hazard(s) Mitigated	Project Title	Lead Agency and Partners	Priority	Action Status
		Program with continued updates to Urban Water Management Plan			
15	Earthquake Flood, Wildfire	Rental Home Inspections	Fire Department/ Community Economic Development	High	New in 2021
City of Merced					
1	Flooding, Earthquake, Wildfire	Prepare an Energy Assurance Plan	Public Works	High	Continue Not Started
2	Flooding	Develop and enhance storm water drainage improvements to reduce frequent flooding	Development Services	High	Continue In Progress
3	Dam Incidents, Flooding, Earthquake, Wildfire	Create a Disaster Preparedness Program	Fire Department	High	Continue Not Started
4	Flooding	Support Merced County efforts to construct the Haystack Alternative of Black Rascal Creek	Development Services	Medium	Continue Not Started
5	Flooding	Update the City's Storm water Drainage Master Plan	Development Services	Medium	Continue In Progress
6	Dam Incidents, Flooding, Earthquake, Wildfire	Prepare a Shelter and Emergency Provision Plan	Fire Department	Medium	Continue Not Started
7	Wildfire	Prepare a Natural Area Fire Prevention Plan	Fire Department	Low	Continue Not Started
8	Earthquake	Perform building-specific, structural seismic vulnerability assessment of City-owned critical facilities	Public Works	Low	Continue Not Started

ID	Hazard(s) Mitigated	Project Title	Lead Agency and Partners	Priority	Action Status
9	Earthquake	Create a program to retrofit or upgrade unreinforced masonry buildings in Downtown Merced, or other buildings in the Plan area.	Development Services	Low	Continue Not Started
10	Earthquake and Flood	Update Fire Station 52 seismic and flood resiliency	Fire Department	Low	Continue Not Started
11	Extreme Heat	Identify and open additional cooling zones and centers within the City of Merced to provide additional capacity of vulnerable populations	Police Department	Medium	New in 2021
12	Wildfire	Enhance the weed abatement program to mitigate wildfire risk. Use GIS to identify properties where mitigation is needed. Provide notice to owners, and force clean lots and pursue cost recovery expenses.	Fire Department – Fire Prevention	High	New in 2021

6 PLAN ADOPTION, IMPLEMENTATION, AND MAINTENANCE

6.1 Adoption

DMA Requirements §201.6(c)(3):

[The local hazard mitigation plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, county commissioner, Tribal Council).

The purpose of formally adopting this plan is to secure buy-in from Merced County and the participating jurisdictions, raise awareness of the plan, and formalize the plan's implementation. The adoption of this plan completes Planning Step 9 of the 10-step planning process: Adopt the Plan. The governing board for each participating jurisdiction has adopted this Local Hazard Mitigation Plan by passing a resolution.

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. This is Planning Step 10 of the 10-step planning process. This section provides an overview of the overall strategy for plan implementation and maintenance, and outlines the method and schedule for monitoring, updating, and evaluating the plan. The section also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

6.2 Implementation

Once adopted, the plan faces the truest test of its worth: implementation. While this plan contains many worthwhile actions, the participating jurisdictions will need to decide which action(s) to undertake first. Two factors will help with making that decision: the priority assigned the actions in the planning process and funding availability. Low or no-cost actions most easily demonstrate progress toward successful plan implementation.

Implementation will be accomplished by adhering to the schedules identified for each action (see Section 5 for county mitigation actions and the annexes for local mitigation actions), and through constant, pervasive, and energetic efforts to network and highlight the multi-objective, win-win benefits of each project to the Merced County community and its stakeholders. These efforts include the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community. The three main components of implementation are:

- **Implement** the action plan recommendations of this plan;
- **Utilize** existing rules, regulations, policies and procedures already in existence; and
- **Communicate** the hazard information collected and analyzed through this planning process so that the community better understands what can happen where, and what they can do themselves to be better prepared. Also, publicize the "success stories" that are achieved through the HMPT's ongoing efforts.

During implementation of these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This will include creating and maintaining a bank of ideas on how to meet local match or participation requirements, should grants be pursued. When funding becomes available, the participating jurisdiction's will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include

special pre- and post-disaster funds, special district budgeted funds, state and federal earmarked funds, and other grant programs, including those that can serve or support multi-objective applications.

6.2.1 Role of the Hazard Mitigation Planning Team in Implementation and Maintenance

With adoption of this plan, the participating jurisdictions will be tasked with plan implementation and maintenance. The participating jurisdictions, led by the Merced County OES agree to:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters;
- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Report on plan progress and recommended changes to the Merced County Board of Supervisors and the governing boards of the other participating jurisdictions; and
- Inform and solicit input from the public.

The primary duty of the participating jurisdictions is to see the plan successfully carried out and to report to their community governing boards and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on the county website (and others as appropriate).

6.3 Maintenance and Monitoring

DMA Requirement §201.6(c)(4)(i):

[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as required or as progress, roadblocks, or changing circumstances are recognized. This section describes how public participation will be integrated throughout the plan maintenance and implementation process. It also explains how the mitigation strategies outlined in this plan will be incorporated into existing planning mechanisms and programs, such as comprehensive land use planning processes, CIP project planning and building code enforcement and implementation. The plan's format allows sections to be reviewed and updated when new data become available, resulting in a plan that will remain current and relevant.

6.3.1 Maintenance Schedule

In order to track progress and update the mitigation strategies identified in the action plan, the HMPT will revisit this plan at the following times or occurrences:

- Annually, to assess if mitigation actions/projects have been completed;
- Following a significant hazard event;
- Following a disaster declaration; or
- Any other time the HMPT sees it is prudent or necessary.

Annual Reviews: The HMPT will meet annually to assess progress on plan implementation. Merced County's OES Department will facilitate these reviews and an associated meeting. The timing of the annual meeting is recommended for the first or second quarter of each year to identify potential mitigation grants, some of which have a submittal period in the fourth quarter. A template for the annual meeting and a summary report is provided in Appendix E. Another tool developed during the 2021 process to facilitate regular review and implementation and make the plan more of a "living document" is the LHMP website that includes a GIS/map based –interactive storyboard with highlights of the risk assessment, including interactive hazard maps and a web-based method for collecting, validating, updating and maintaining critical facilities for the plan. This website is accessible from the Merced County OES homepage.

Critical Facility Database Maintenance: Moving forward the County and its municipalities will maintain the critical facility database that was prepared during the 2021 update. The County's GIS Manager will lead periodic reviews of the database and assess the need for updates, leveraging the LHMP website and Arc-GIS Experience Builder Application noted above.

Five-Year Update: This plan will be updated, approved, and adopted within a five-year cycle as per Requirement §201.6(c)(4)(i) of the Disaster Mitigation Act of 2000. Efforts to begin the update should begin no later than June 2025. The County will monitor planning grant opportunities from the CalOES and FEMA for funds to assist with the update. This may include submitting a Pre-Disaster Mitigation planning grant application. This grant should be submitted in 2024, as there is a three-year performance period to expend the funds, and there is no guarantee that the grant will be awarded when initially submitted. This allows time to resubmit the grant in subsequent years, if needed. Updates to this plan will follow the most current FEMA and CalOES planning guidance. The next plan update should be completed and reapproved by CalOES and FEMA Region VIII by September 2026.

6.3.2 Maintenance and Evaluation Process

The HMPT will continually observe the incorporation process, evaluation method, updating method, continued public participation, and completion of the action/projects to assure that the HMPT and the plan itself are performing as anticipated. By monitoring these processes, the HMPT will then be able to evaluate them at the time of the plan update, determining if any changes are needed.

The MJHMP plan update every five years provides an opportunity to determine whether there have been any significant changes in the county that may, in turn, necessitate changes in the types of mitigation actions proposed. New development in identified hazard areas, an increased exposure to hazards, the increase or decrease in capability to address hazards, and changes to federal or state legislation are examples of factors that may affect the necessary content of the MJHMP.

The plan review provides county officials with an opportunity to evaluate those actions that have been successful and to explore the possibility of documenting potential losses that were avoided due to the implementation of specific mitigation measures. The plan review also provides the opportunity to address mitigation actions that may not have been successfully implemented as assigned.

During the five-year plan update process, the following questions will be considered as criteria for assessing the effectiveness and appropriateness of the Plan:

- Do the goals address current and expected conditions?
- Are the goals and objectives consistent with changes in State and Federal policy?
- Complete status update on all mitigation projects. What strategies should be revised?
- Has the nature or magnitude of risks changed (current and expected conditions)?
- Are the current resources appropriate for implementing the LHMP?

- Are there implementation problems, such as technical, political, legal or coordination issues with other agencies?
- Have the outcomes occurred as expected?
- Did the county and participating agencies and other partners participate in the plan implementation process as assigned?

The County of Merced is committed to involving the public in the continual reshaping and updating of the MJHMP, as discussed in subsection 6.3.4.

6.3.3 Incorporation into Existing Planning Mechanisms

Another important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other county and city plans and mechanisms. Where possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. This plan should also be cross-referenced when related planning mechanisms are updated. As previously stated above, mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. As described in this plan's capability assessment and jurisdictional annexes, the County and participating jurisdictions already implement policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms.

These existing mechanisms include (but are not limited to) the following:

- County and local general plans (2030 General Plan)
- Community service district area plans and master plans
- County and local emergency operations plans
- County and local ordinances
- Flood/stormwater management/master plans
- Community wildfire protection plans
- GSPs
- IRWMPs
- Stormwater Resource Plans
- Urban Water Management Plans (UWMPs)
- CIPs
- Other plans and policies outlined in the capability assessments in the jurisdictional annexes
- Other plans, regulations, and practices with a mitigation focus

HMPT members involved in the updates to the planning mechanisms will be responsible for integrating the findings and recommendations of this plan with these other plans, programs, etc., as appropriate. As an action step to ensure integration with other planning mechanisms the County Office of Emergency Services Manager or designee will discuss this topic at the annual meeting of the HMPT described above in subsection 6.3.1. The HMPT will discuss where there are opportunities to incorporate the plan into other planning mechanisms and who would be responsible for leveraging those opportunities. HMPT members representing local jurisdictions will work with their jurisdictional planning teams to integrate their identified mitigation actions into their own local plans and programs. Efforts to integrate the hazard mitigation plan into local plans, programs, and policies will be reported on at the annual HMPT plan review meeting, and a record of successful integration efforts will be kept.

Efforts should continuously be made to monitor the progress of mitigation actions implemented through these other planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this hazard mitigation plan.

Examples of a process for incorporation of the MJHMP into specific existing or upcoming planning mechanisms include:

- Each community (County, Atwater, City of Merced, Dos Palos, Gustine, Livingston, Los Banos) should adopt (by reference or incorporation) this MJHMP into the Safety Element of their General Plan(s), as encouraged by AB 2140. Evidence of such adoption (by formal, certified resolution) shall be provided to Cal OES and FEMA to become eligible or maintain eligibility for CDDA funding. Each jurisdiction has a specific mitigation action related to this process outlined in subsection 5.3.
- Reference into the State of California CVFPP.
- Incorporation into the City of Merced Emergency Operations Plan and Fire Department Strategic Plan.
- Incorporation into the City of Los Banos Emergency Operations Plan and Fire Department Strategic Plan.
- Referencing the HMP in the University of California Merced's Biosafety Manual and Emergency Operations Plan.

6.3.4 Continued Public Involvement

Continued public involvement is imperative to the overall success of the plan's implementation. Efforts will be made to involve the public in the plan maintenance, evaluation, and review process. This includes maintaining a digital version of the plan on the County OES website for public review. In addition, information on who to contact within the OES will be posted with the plan. The Merced County OES will maintain a file of comments received for reference during the next five-year update. Any revisions to the plan that may occur as a result of a disaster will also be made public and posted on the county website.

The next five-year update process also provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stories from the plan implementation and seek additional public comment. A public hearing(s) or survey to receive public comment on the plan will be held during the plan update period. When the HMPT reconvenes for the update, they will coordinate with all stakeholders participating in the planning process, including those who joined the HMPT after the initial effort, to update and revise the plan. Public notice will be posted, and public participation will be invited, at a minimum, through available website postings and press releases to the local media outlets as well as email and social media announcements.

Public involvement strategies that were used during the 2021 planning process are captured in the Outreach Strategy in Appendix F. The appendix can serve as a reference for continued public involvement over the next several years and lays the foundation for outreach associated with the next formal five-year update.

7 PLAN ADOPTION

DMA Requirement §201.6(c)(5):

[The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council).

7.1 Element E.1 Formal Adoption Documentation

Adoption by the local governing body demonstrates the community's commitment to implementing the mitigation strategy and authorizes responsible agencies to execute their actions. The final plan is not approved until Merced County and each participating jurisdiction adopts the plan and FEMA receives documentation of formal adoption by the governing body of each jurisdiction requesting approval. This plan is for Merced County, the unincorporated county, and its incorporated cities of Atwater, Livingston, Dos Palos, Gustine, Merced, and Los Banos.

Merced County and the six participating cities plan to submit this plan to the Merced County Board of Supervisors and their respective city councils upon successful completion of State and federal review and following the issuance of an Approved Pending Adoption (APA) designation from FEMA. This provides an efficient approval process if FEMA determines the MJHMP requires revisions because the County and each participating city can make these revisions prior to initiating the local plan adoption process.

Once FEMA issues APA notification, adoption by each participating jurisdiction must take place within one year for each jurisdiction to become or remain eligible for FEMA HMA program funding. Given this is a multi-jurisdictional planning process, Merced County will coordinate the adoptions of all six jurisdictions as soon as the plan receives APA status. Because each City's governing bodies have different meeting schedules, Merced County will also coordinate with each participating jurisdiction regarding the timing of their adoptions to submit adoption documentation to Cal OES and FEMA at the same time.

Once the County records and submits the adoption documentation to Cal OES and FEMA, FEMA will issue an official approval letter stating which jurisdictions have adopted and are approved and eligible for FEMA HMA program funding. The approval letter will include the expiration date five years from the date of the letter and attached to the approval letter will be a final FEMA Local Mitigation Plan Review Tool that provides feedback on the strengths of the plan, recommendations for plan improvements during future plan updates, and suggestions for implementing the mitigation strategy.

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Appendix A: Planning Team

APPENDIX A: PLANNING TEAM

Agency/Jurisdiction	Title	Name	Participating Jurisdiction	Stakeholder	Meetings ¹ Attended
Merced County					
	Purchasing Manager	Kim Nausin	X		
	Executive Office (PIO)	Mike North	X		Kick-off; Mtg. #3
	Executive Office	Alexandra Pierce	X		
	Agricultural Commissioner	David A Robinson	X		
	Assistant Agricultural Commissioner	Sean Runyon	X		Mtg. #2; Mtg. #3
	Deputy Ag Commissioner	Carrie Mitchell	X		Mtg. #2; Mtg. #4
	County Counsel	Forrest Hansen	X		
	County Counsel	Steve Maxey	X		Kick-off;
	Assistant County Counsel	Tom Ebersole	X		Kick-off;
	Assistant CIO	John Nishihama	X		Mtg. #2
Merced County Fire	Captain	Mike Perez	X		Kick-off;
Planning and Economic Development	Director	Mark Hendrickson	X		
Office of Emergency Services/Cal FIRE	Deputy Director of Administration	David Scheurich	X		Kick-off; Mtg. #2; Mtg. #3; Mtg. #4
Office of Emergency Services/Cal FIRE	OES Assistant Coordinator	Greg Padilla	X		Kick-off; Mtg. #2; Mtg. #3; Mtg. #4
Cal FIRE	Fire Chief – Madera/Mariposa/Merced Counties	Mike van Loben Sels		X	
Environmental Health	Environmental Health	Vicki Jones	X		Mtg. #2; Mtg. #3; Mtg. #4
Environmental Health	Environmental Health	Cesar Ramirez	X		Kick-off;
Environmental Health	Hazardous Materials Specialist II	Melissa Palomino	X		Kick-off;
Public Health	Director	Rebecca Nanyonjo	X		
Public Health	Assistant Public Health	Jessica Montoya-Juarez	X		
Public Health	Health Education Specialist	Jaime Arteaga	X		Mtg. #4

¹ Those that are not listed as attending a meeting participated in the planning process in other ways such as emails, phone calls and face-to-face meetings with the County Project Manager and consultants.

Agency/Jurisdiction	Title	Name	Participating Jurisdiction	Stakeholder	Meetings ¹ Attended
Emergency Medical Services	EMS Coordinator	Tim Williams	X		
Emergency Medical Services	County EMS	Jim Clark	X		
GIS	Manager	Gene Barrera	X		Kick-off; Mtg. #2; Mtg. #3
Public Works	Director	Dana Hertfelder	X		Mtg. #4
Public Works	Assistant Director	Mike Stephenson	X		Mtg. #2; Mtg. #3; Mtg. #4
Public Works	Administrative Eng.	Oscar Ortiz	X		Mtg. #4
IT		Rob Kuhlemeir			Mtg. #2; Mtg. #3
Fire	Division Chief/Deputy Director of Operations – County OES	Mark Pimental	X		Mtg. #4
Office of Education	Superintendent	Steve Tietjen	X		
Office of Education	PIO	Nathan Quevaedo	X		Kick-off;
RIGGS Ambulance	Administrative Supervisor	Dave Murphy		X	
Westside Ambulance	Chief of Ambulance Operations	Michael Courtney		X	
Municipalities					
City of Atwater	Acting Police Chief	Cliff Battles	X		Mtg. #3
City of Atwater	City Manager	Lori Waterman	X		
City of Atwater / CAL FIRE	Battalion Chief	Bobby Ayuso	X		Mtg. #3; Mtg. #4
City of Atwater	Executive to the City Manager	Janell Martin	X		Mtg. #3
City of Atwater	Public Works Director	Greg Thompson	X		
City of Atwater	Public Works Superintendent	Justin Vinson	X		
City of Atwater	Police Chief	Mike Salvador	X		Mtg. #3; Mtg. #4
City of Atwater	Admin Assistant II	Christina Thurman	X		Mtg. #3
City of Dos Palos	City Manager	Darrell Fonseca	X		
City of Dos Palos	Police Chief-Designated Emergency Manager for Dos Palos	Richard McEachin	X		Mtg. #4
City of Dos Palos	Interim Police Chief	Cliff Battles	X		
City of Dos Palos	Fire Marshal	Dewayne Jones	X		

Agency/Jurisdiction	Title	Name	Participating Jurisdiction	Stakeholder	Meetings ¹ Attended
City of Gustine	City Manager	Douglas Dunford	X		
City of Gustine	Public Information Officer	Jami Westervelt	X		
City of Gustine	Police Chief - Designated Emergency Manager for Gustine	Jim Markel	X		
City of Gustine	Fire Chief	Pat Berrellii	X		Mtg. #2
City of Gustine	Police Department	Ruben Chavez	X		Kick-off; Mtg. #2, Mtg. #3
City of Livingston	City Manager	Jose Antonio Ramirez	X		
City of Livingston	Police Chief - Designated Emergency Manager for Livingston	John Markle	X		
City of Livingston	Public Works	Anthony Chavarria	X		
City of Livingston	Administrative Analyst - Public Works	Adabel Pirita	X		Mtg. #3
City of Livingston	City Manager	Tony Avina	X		Mtg. #3; Mtg. #4
City of Livingston	Administrative Analyst – Public Works	Martha Abeloe	X		Mtg. #3
City of Los Banos	City Manager	Alex Terrazas	X		
City of Los Banos	Public Information Officer	Jason Hedden	X		
City of Los Banos	Community and Economic Development Director	Stacy Souza Elms	X		Kick-off; Mtg. #2 Mtg. #3
City of Los Banos	Fire Chief - Designated Emergency Manager for Los Banos	Mason Hurley	X		Kick-off; Mtg. #4
City of Merced	City Manager	Stephanie Dietz			
City of Merced	Public Information Officer	Mike Conway			
City of Merced	Deputy Chief - Fire Department	Casey Wilson			Kick-off; Mtg. #2; Mtg. #3
City of Merced	Fire Chief - Designated Emergency	Derek Parker			Mtg. #2; Mtg. #3

Agency/Jurisdiction	Title	Name	Participating Jurisdiction	Stakeholder	Meetings ¹ Attended
	Manager for Merced				
Special Districts					
Turlock Irrigation District	Emergency Preparedness	Jason S. Hicks		X	Mtg. #2; Mtg. #3
Merced Irrigation District	Emergency Preparedness	Peter Wade		X	
Ballico Community Water Service District	Board President	Manuel Jimenez		X	
Delhi County Water	Maintenance Supervisor	Lyndal Hibdon		X	
Lower San Joaquin Levee	Executive Director	Reggie Hill		X	Mtg. #3; Mtg. #4
San Joaquin Valley Air District	Compliance Manager	Ron Giannone		X	
EPURE Company	Scientist	John Lambie		X	
State and Federal Contacts					
Department of Water Resources	Engineer WR	Nathan Hicks		X	Kick-off; Mtg. #2; Mtg. #3
Cal OES	Emergency Services Inland Region V	Walt Kent		X	Mtg. #2; Mtg. #3; Mtg. #4
Cal OES	Emergency Service Coordinator	Joanne Gurrola		X	Mtg. #3
CHP	Sergeant	Luis Lara		X	
NOAA	Warning Coordination Meteorologist	Jerald Meadows		X	Kick-off; Mtg. #3
State Parks		Gerald Heberling		X	
State Parks - Four Rivers Sector		Christopher Jou		X	
State Parks		Heather Reith		X	Kick-off; Mtg. #2
State Parks	District Environmental Coordinator	Andrew Collum		X	Kick-off;
Neighboring Jurisdictions and Academia					
UC Merced	Emergency Manager	Laura Rodriguez Mascorro		X	Kick-off; Mtg. #2; Mtg. #3; Mtg. #4
UC Merced	Police Chief	Chou Her		X	
Mariposa County Sheriff	Emergency Manager	Kevin Packard		X	
Mariposa County Sheriff	Emergency Manager	Alyssa Carroll		X	Mtg. #2
Mariposa County Sheriff	Emergency Manager	Wes Smith		X	Mtg. #2; Mtg. #3
Madera County Sheriff - Sergeant	Emergency Manager	Joseph Wilder		X	Kick-off;

Agency/Jurisdiction	Title	Name	Participating Jurisdiction	Stakeholder	Meetings ¹ Attended
Stanislaus County OES	Emergency Manager	Melba Hibbard		X	
Other Stakeholders					
Red Cross	Disaster Program Manager - Merced	Helen Cosentino		X	Kick-off; Mtg. #3; Mtg. #4
Red Cross	District Chair Merced Co	Irene Johnson		X	Mtg. #4
Red Cross		Beverly Brewster		X	
Merced County Food Bank	Executive Director	Bill Gibbs		X	Mtg. #3
Merced Medical Center		Marianne Shaw		X	Kick-off;
PG&E	Senior Public Safety Specialist	Deron Mills		X	Kick-off; Mtg. #3
Wood	Project Manager	Jeff Brislawn			Kick-off; Mtg. #2, Mtg. #3
Wood	Assistant Project Manager	Juliana Prosperi			Kick-off; Mtg. #2, Mtg. #3; Mtg. 4
Wood	Hazard Mitigation Planner	Amy Carr			Kick-off; Mtg. #2, Mtg. #3
Wood	Hazard Mitigation Planner	Chris Johnson			Kick-off; Mtg. #2, Mtg. #3
Wood	Hazard Mitigation Planner	Pujeeta Chowdhary			Mtg. #2
Wood	GIS Analyst/Planner	Mack Chambers			Kick-off; Mtg. #2, Mtg. #3



Appendix B: Planning Process Documentation



LETTER OF COMMITMENT (FOR MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLANS)

July 08, 2019

**California Governor's Office of Emergency
Services**

Hazard Mitigation Grant Program
3650 Schriever Avenue

RE: Letter of Commitment as Participating Jurisdiction in Merced County Multi-jurisdictional Hazard Mitigation Planning

Dear State Hazard Mitigation Officer:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Atwater is submitting this letter of commitment to confirm that City of Atwater has agreed to participate in the Merced County Multi-jurisdictional Hazard Mitigation Planning.

Furthermore, as a condition of participation in the mitigation planning, City of Atwater, agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to the Merced County to complete the plan in conformance with FEMA requirements.

City of Atwater understands that it must engage in the following planning process, as more fully described in [FEMA's Local Mitigation Planning Handbook](#), including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction.;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,

- Formal adoption of the Multi-jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Lori Waterman, commit City of Atwater to the Merced County Multi-jurisdictional Hazard Mitigation Planning effort.

This document is executed this eighth day of July 2019.

Please contact Fire Battalion Chief John Slate at (209) 761-6520 and/or fire@atwater.org with questions.

Sincerely,



Lori Waterman
City Manager
(209) 357-6300
lwatman@atwater.org



CITY HALL -- 2174 BLOSSOM STREET
DOS PALOS, CALIFORNIA 93620
PHONE (209) 392-2174
FAX (209) 392-2801

LETTER OF COMMITMENT

(FOR MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLANS)

June 26, 2019

California Governor's Office of Emergency Services
Hazard Mitigation Grant Program
3650 Schriever Avenue

RE: Letter of Commitment as Participating Jurisdiction in Merced County Multi-jurisdictional Hazard Mitigation Planning

Dear State Hazard Mitigation Officer:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Dos Palos is submitting this letter of commitment to confirm that City of Dos Palos has agreed to participate in the Merced County Multi-jurisdictional Hazard Mitigation Planning.

Furthermore, as a condition of participation in the mitigation planning, City of Dos Palos, agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to the Merced County to complete the plan in conformance with FEMA requirements.

City of Dos Palos understands that it must engage in the following planning process, as more fully described in [FEMA's Local Mitigation Planning Handbook](#), including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction. ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).



CITY HALL -- 2174 BLOSSOM STREET
DOS PALOS, CALIFORNIA 93620
PHONE (209) 392-2174
FAX (209) 392-2801

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Darrell Fonseca, commit City of Dos Palos to the Merced County Multi-jurisdictional Hazard Mitigation Planning effort.

This document is executed this 26 day of June, 2019.

Please contact Darrell Fonseca at 209-392-2174 or cityofdp@cityofdp.com with questions.

Sincerely,

Darrell Fonseca
City Manager
209-392-2174
209-392-2801
cityofdp@cityofdp.com

CITY OF GUSTINE

PO Box 16 - 682 Third Ave. - Gustine, CA 95322
Office: (209) 854-6471 - Fax: (209) 854-2840 - www.cityofgustine.com

LETTER OF COMMITMENT (FOR MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLANS)

July 1, 2019

California Governor's Office of Emergency Services
Hazard Mitigation Grant Program
3650 Schriever Avenue

RE: Letter of Commitment as Participating Jurisdiction in Merced County Multi-jurisdictional Hazard Mitigation Planning

Dear State Hazard Mitigation Officer:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Gustine is submitting this letter of commitment to confirm that City of Gustine has agreed to participate in the Merced County Multi-jurisdictional Hazard Mitigation Planning.

Furthermore, as a condition of participation in the mitigation planning, City of Gustine, agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to the Merced County to complete the plan in conformance with FEMA requirements.

City of Gustine understands that it must engage in the following planning process, as more fully described in [FEMA's Local Mitigation Planning Handbook](#), including, but not limited to:

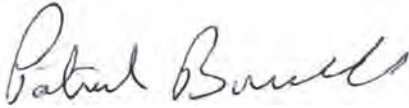
- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction. ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Patrick Borrelli, commit City of Gustine to the Merced County Multi-jurisdictional Hazard Mitigation Planning effort.

This document is executed this 1st day of July, 2019.

Please contact Patrick Borrelli at (209) 587-5749 or PatBorrelli57@gmail.com with questions.

Sincerely,

A handwritten signature in cursive script that reads "Patrick Borrelli". The signature is written in dark ink and is positioned above the printed name and contact information.

Patrick Borrelli
Fire Chief
(209) 587-5749
(209) 854-2840
PatBorrelli57@gmail.com



City of Livingston

1416 C Street
Livingston, CA 95334

LETTER OF COMMITMENT (FOR MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLANS)

June 19, 2019

California Governor's Office of Emergency Services
Hazard Mitigation Grant Program
3650 Schriever Avenue

RE: Letter of Commitment as Participating Jurisdiction in Merced County Multi-jurisdictional Hazard Mitigation Planning

Dear State Hazard Mitigation Officer:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Livingston is submitting this letter of commitment to confirm that City of Livingston has agreed to participate in the Merced County Multi-jurisdictional Hazard Mitigation Planning.

Furthermore, as a condition of participation in the mitigation planning, City of Livingston, agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to the Merced County to complete the plan in conformance with FEMA requirements.

City of Livingston understands that it must engage in the following planning process, as more fully described in [FEMA's Local Mitigation Planning Handbook](#), including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction. ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any

planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and

- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Jose Antonio Ramirez, commit City of Livingston to the Merced County Multi-jurisdictional Hazard Mitigation Planning effort.

This document is executed this 28th day of June, 2019.

Please contact Jose Antonio Ramirez at (209) 398-1721, citymanger@livingstoncity.com with questions.

Sincerely,



Jose Antonio Ramirez
City Manager
(209) 394-8041 ext. 113
citymanager@livingstoncity.com



CITY OF LOS BANOS FIRE DEPARTMENT

Proudly serving the Citizens of Los Banos with
Honor – Integrity – Compassion
Since 1890

LETTER OF COMMITMENT (FOR MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLANS)

July 1, 2019

California Governor's Office of Emergency Services

Hazard Mitigation Grant Program
3650 Schriever Avenue

RE: Letter of Commitment as Participating Jurisdiction in Merced County Multi-jurisdictional Hazard Mitigation Planning

Dear State Hazard Mitigation Officer:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Los Banos is submitting this letter of commitment to confirm that City of Los Banos has agreed to participate in the Merced County Multi-jurisdictional Hazard Mitigation Planning.

Furthermore, as a condition of participation in the mitigation planning, City of Los Banos, agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to the Merced County to complete the plan in conformance with FEMA requirements.

City of Los Banos understands that it must engage in the following planning process, as more fully described in [FEMA's Local Mitigation Planning Handbook](#), including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;

333 7th Street ♦ Los Banos, CA 93635
Telephone (209) 827-7025 ♦ Fax (209) 827-7028

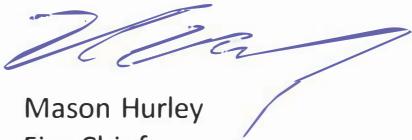
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction. ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I, Fire Chief Mason Hurley, commit City of Los Banos to the Merced County Multi-jurisdictional Hazard Mitigation Planning effort.

This document is executed this First day of July, 2019.

Please contact Fire Chief Mason Hurley at (209) 827-7025 or email mason.hurley@losbanos.org with questions.

Sincerely,



Mason Hurley
Fire Chief

O: (209) 827-7025

Fax: (209) 827-7028

Mason.hurley@losbanos.org

CITY OF MERCED

"Gateway to Yosemite"



LETTER OF COMMITMENT (FOR MULTI-JURISDICTIONAL LOCAL HAZARD MITIGATION PLANS)

July 1, 2019

**California Governor's Office of Emergency
Services**
Hazard Mitigation Grant Program
3650 Schriever Avenue

RE: Letter of Commitment as Participating Jurisdiction in Merced County Multi-jurisdictional Hazard Mitigation Planning

Dear State Hazard Mitigation Officer:

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the county, regional, or watershed level, the City of Merced is submitting this letter of commitment to confirm that City of Merced has agreed to participate in the Merced County Multi-jurisdictional Hazard Mitigation Planning.

Furthermore, as a condition of participation in the mitigation planning, City of Merced, agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to the Merced County to complete the plan in conformance with FEMA requirements.

City of Merced understands that it must engage in the following planning process, as more fully described in [FEMA's Local Mitigation Planning Handbook](#), including, but not limited to:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction. ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any

planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and

- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-jurisdictional Hazard Mitigation Plan by the jurisdiction's governing body (each jurisdiction must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional plan; I Steve Carrigan, commit City of Merced to the Merced County Multi-jurisdictional Hazard Mitigation Planning effort.

This document is executed this 1st day of July, 2019.

Please contact Fire Chief Billy Alcorn at (209) 388-8541 and/or alcornb@cityofmerced.org with questions.

Sincerely,



Steve Carrigan
City Manager
(209) 385-6834 Office
(209) 723-1780 fax
carrigans@cityofmerced.org

From: Scheurich, David@CALFIRE <david.scheurich@fire.ca.gov>
Sent: Friday, November 27, 2020 5:27 PM
To: Scheurich, David@CALFIRE; Perez, Michael@CALFIRE; Prosperi, Juliana; Brislawn, Jeff P
Subject: Merced County Multi-jurisdictional Hazard Mitigation Plan Update Kick Off Meeting

Importance: High

CAUTION: External email. Please do not click on links/attachments unless you know the content is genuine and safe.

Good afternoon and Happy Holidays!!

As we have spoken in the past, Merced County has been working on a Multi-jurisdictional Hazard Mitigation Plan Update. As I am sure everyone is aware, the hazard mitigation planning process is heavily dependent on the participation of representatives from local government agencies and departments, the public, and other stakeholder groups. As we have seen very recently, grant requirements and guidelines are changing rapidly, and this is an important document to help the County and Cities obtain funding and/or reimbursement. As this plan develops, the participant list will also grow.

You are invited to the first of 4 planning meetings to update the Merced County Multi-jurisdictional Hazard Mitigation Plan. The existing plan was developed in accordance with the Disaster Mitigation Act of 2000 which requires all local governments to develop a plan to assess their risks to hazards and identify actions that can be taken in advance to reduce future losses. Hazard mitigation plans are to be updated every five years in order to maintain eligibility for FEMA Hazard Mitigation Assistance grants. Merced County has hired a consultant, Wood Environment & Infrastructure Solutions, Inc., to manage the planning project.

A Hazard Mitigation Planning Team (HMPT) will be re-convened to support this project and will include representatives from the County and municipalities as participating jurisdictions. Other interested stakeholders, including local and regional agencies involved in hazard mitigation activities or agencies that regulate development, are also invited. This includes special districts, private-non-profit entities, business partners, academic institutions, and other local, state, and federal agencies in or that serve Merced County.

A Microsoft Outlook meeting invitation/calendar item will be sent out soon; please confirm your attendance or provide contact information for your designated alternate. Please "Reply To All" with your response on this initial email.

What: Merced County Multi-jurisdictional Hazard Mitigation Plan Update
Where: Virtual - Kickoff Meeting/Webinar - Microsoft Teams
When: December 16, 2020 10:00 - 12:00

[Click here to join the meeting](#)

Or call in (audio only – only for use if computer audio is not an option)

[+1 281-810-1627..212693756#](#) United States, Houston

[\(866\) 670-1764](tel:(866)670-1764), [212693756#](tel:212693756#) United States (Toll-free)
Phone Conference ID: 212 693 756#

At the kickoff meeting, we will discuss the benefits of updating the hazard mitigation plan, the project schedule, and all of the hazards that affect Merced County, such as wildfire, floods, winter storms, landslides, and more. Merced County requests your assistance in forwarding this invitation to others in your jurisdiction. Appropriate persons to be a part of the planning committee include, but are not limited to: county and municipal planners, public works directors, floodplain managers, economic development directors, GIS staff, first responders, local government administration, elected officials, business partners, private-non-profit representatives, and school district representatives. Each participating jurisdiction must have at least one representative at the meetings to meet participation requirements. There will be 4 total primary planning meetings held during the update process over the next 5-6 months, with target submittal of the updated plan for State and FEMA review within 8 months.

The consultant, Wood Environment & Infrastructure Solutions, Inc., will be helping to manage the planning project. Wood will facilitate the planning process, assist with coordination, collect the necessary data, and perform other technical services, including updating the risk assessment and plan document. However, to successfully complete this project and ensure your organization is eligible for FEMA hazard mitigation assistance funding, we need your participation and input.

[Link to 2015 Merced Hazard Mitigation](#)

Plan: <https://app.box.com/s/k84itkq1n7aec3ygofpti0qjrdqw2avk>

Thank you everyone in advance for your participation, this program is cannot be successful without it. As always, please let me know if you have any questions.

David Scheurich - Battalion Chief

Deputy Director - Administration

Merced County Office of Emergency Services

3500 N Apron Ave Atwater, CA 95301

Office (209) 385-7548 ext 4866 Fax (209) 725-0174

Cell (209) 761-1972

David.Scheurich@fire.ca.gov

CAL FIRE

Madera-Mariposa-Merced Unit

* Serving the citizens in Madera County, Mariposa County, Merced County, the City of Madera & the City of Atwater



HMPT Meeting #1 Agenda

Date: 16 Dec 2020

10:00 am - noon PST

Meeting at: Virtual/Webinar - Microsoft Teams (see email/Outlook for link)

Project: Merced County Multi-Jurisdictional Hazard Mitigation Plan Update

Subject/Purpose

The purpose of the meeting is to introduce the Disaster Mitigation Act of 2000 and summarize the hazard mitigation planning process that will be used to update the plan. The Local Hazard Mitigation Plan (LHMP) is intended to identify hazards, assets at risk, and ways to reduce impacts through long-term sustainable mitigation projects.

1. Introductions
2. Hazard Mitigation, Mitigation Planning and the Disaster Mitigation Act Requirements
3. Role of the Hazard Mitigation Planning Team (HMPT) and Benefits of Participation
4. Objectives and Schedule for the Plan Update and Overview of 2015 Plan
5. Review and Identification of Natural and Human-Caused Hazards
6. Coordination with Stakeholders, Related plans, and Recent Studies
7. Planning for Public Involvement
8. Initial Information Needs and Next Steps
9. Questions and Answers



Merced County HMPT Meeting #1 Minutes

Date: 16 December 2020 10:00 am - noon PST

Meeting at: Virtual/Webinar - Microsoft Teams

Written by: Jeff Brislawn (Wood, Project Manager), Juliana Prosperi (Wood, Assistant Project Manager)

Subject: Merced County MJHMP Update Hazard Mitigation Planning Team Meeting #1

Present:

David Scheurich (Merced County Office of Emergency Services, Assistant Director of Administration, County Lead for HMPT)
Mike Perez (Merced County, Fire Captain)
Gene Barrera (Merced County, GIS Manager)
Nathan Quevaedo (Merced County Office of Education, Communications Manager)
Mike North (Merced County Public Information Officer)
Cesar Ramirez (Merced County Division of Environmental Health)
Melissa Palomino (Merced County Division of Environmental Health, Hazardous Materials Specialist II)
Tom Ebersole (Merced County, Assistant County Counsel)
Steve Maxey (Merced County, Community and Economic Development)
Greg Padilla (Merced County, Fire Department)
Stacy Souza Elms (City of Los Banos, Community and Economic Development Director)
Mason Hurley (City of Los Banos Fire Department, Fire Chief)
Casey Wilson (City of Merced Fire Department)
Ruben Chavez (City of Gustine Police Department)
Laura Rodriguez-Mascorro (UC-Merced Emergency Manager)
Marianne Shaw (Merced Medical Center)
Joseph Wilder (Madera County Sheriff/Office of Emergency Services)
Helen Cosentino (American Red Cross, Disaster Program Manager: Merced/San Benito)
Nathan Hicks (California DWR, Flood Operations Center, Engineer)
Andrew Collum (California Department of State Parks, District Environmental Coordinator)
Heather Reith (California Department of State Parks)
Jerald Meadows (National Weather Service, Warning Coordination Meteorologist)
Deron Mills (Pacific Gas & Electric, Public Safety Specialist)



AGENDA TOPICS

This document is a record of attendance and a summary of the topics discussed at the above meeting including the following:

1. Introductions

Mr. Scheurich kicked off the meeting and thanked everyone for joining and explained the MJHMP is a valuable and important plan for the County have in place. Mr. Perez introduced himself as Mr. Scheurich's assistant on the project. Mr. Brislawn provided an overview of the agenda and what the team will talk about today. He introduced the Wood Environment & Infrastructure Solutions, Inc. (Wood) team and said they will support Merced County during the planning process and document preparation as the project consultant. He asked that the participants write their name and the agency they represent in the chat box. The participant attendance list is shown above. Mr. Brislawn also provided a link to a virtual poll that asked whether the team has participated in the planning process for a Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). Most of the group have not participated on a MJHMP (63%).

2. Hazard Mitigation, Mitigation Planning and the Disaster Mitigation Act Requirements

Mr. Brislawn began a discussion about the hazard mitigation planning process. Mitigation is one of four phases of emergency management cycle. Mitigation and preparedness build resilience in communities and reduce response and recovery costs. He introduced the concept of a "sustained" action – such as managing your floodplains wisely so that development and infrastructure is not put at risk in such areas.

Disaster Mitigation Act of 2000

Mr. Brislawn explained the Disaster Mitigation Act of 2000 which requires having an updated plan in place to ensure the County is eligible for pre- and post-disaster hazard mitigation grant funds. There are trends resulting in increased costs for disaster response and recovery related to population growth and the increase in the types of events we experience as a community. The COVID-19 pandemic a good example of a circumstance that can cause disruption in our community and to the economy. Mr. Brislawn explained we need these plans for several reasons because the reduce future recovery costs, we can plan around predictive events, and they guide mitigation activities in a coordinated manner.

Planning Process

Mr. Brislawn explained that previous Federal Emergency Management Agency (FEMA) guidance broke the planning process into 4 phases. We are in Phase 1 and next steps will be developing an outreach strategy and reviewing County capabilities. We will then move into Phase 2, which will involve conducting a Risk Assessment. Phase 3 involves developing a mitigation strategy. Phase 4 involves final plan adoption and implementation and ensuring the adopted plan builds a



safer and more resilient community. FEMA's most recent guidance breaks down the planning process into a 9-step planning framework.

Phase 1 will involve building a planning team with the County and participating jurisdictions. This phase involves working with other agency stakeholders, specifically those agencies that are already involved with emergency management or mitigation activities. There are several special districts that have direct involvement in levee maintenance, water conservation, and community services. These are some of the agencies we reach out to for input during the planning process.

Public Involvement

FEMA requires we provide two opportunities for public involvement during the planning process: during the draft stage and prior to plan approval. Public involvement will include online surveys and workshops during the planning effort, and will look to the participating jurisdictions to assist with advertising these opportunities. Our team will be responsible for documenting this process; this may involve documenting specific meetings with stakeholders or other organizations. Mr. Brislawn asked the group if there were any questions.

Phase II: Risk Assessment

Mr. Brislawn discussed the three components of the risk assessment. He covered what natural hazards we look at in the assessment and how those hazards overlap with community assets. He discussed where there is overlap between the hazards and assets is where we have risk (e.g. potential for losses).

The vulnerability assessment looks at a range of assets in the County: residential/commercial structures and critical facilities and infrastructure. Our team will align this update with the recent FEMA Community Lifeline framework. Understanding risks to lifeline facilities, and identifying ways to minimize those risk with mitigation actions, will better position the plan for grant funding. He also stated we will look at development trends and natural resource areas in terms of assets that may warrant protection from hazard impacts.

Mitigation Capability Assessment

Mr. Brislawn explained that the team will examine existing policies and programs and evaluate the effectiveness of the mitigation gaps and shortfalls to see where there are areas for improvement. He stated our team will also look at the County's fiscal abilities to understand where there could be funding options for mitigation not limited to grants.

Mitigation Strategy

The Mitigation Strategy begins with reviewing the plan's existing goals, which are broad overarching statements of what we want to achieve. Goals are supported by mitigation actions,



which are specific and measurable. Mr. Brislawn stated the team will rely on different reference guides for mitigation action alternatives, such as FEMA's Mitigation Ideas and the National Flood Insurance Program Community Rating System (NFIP CRS) guidance. There is also related guidance from the State of California in the 2020 Adaptation Planning Guide.

Goals from 2014 MJHMP

Mr. Brislawn reviewed the existing 2014 MJHMP goals. He noted they include common types of goals we see in these plans. We will have an opportunity to further review and revise these goals in future meetings.

Actions in 2014 MJHMP

Mr. Brislawn shared the current actions from the existing plan. Mr. Brislawn noted we will need to get a status update on the actions during this planning update. He also noted that if the County does not want to pursue an existing action, the County will need to provide reasoning on why. An action status form will be provided to capture this input at a later date.

Mitigation Alternatives

Mr. Brislawn stated that the team will need to review and select the alternatives for new actions as part of the plan update process. Each jurisdiction will need at least one new action, and actions will need to be prioritized. We will do this by applying selection and prioritization criteria, such as whether it will work, is it cost-beneficial, affordable, legal, and fair etc. This process will occur at a future planning meeting.

Plan Adoption and Implementation

The participating jurisdictions will need to readopt the plan to secure the buy-in for the process. In terms of implementation, Mr. Brislawn explained there will need to be an assigned Hazard Mitigation Manager to track the projects. A lot of this work will be related to ongoing work plans and efforts, so it ties in tandem with other existing department and agency partners' work.

California Legislation

Mr. Brislawn summarized various California legislation that formally links the MJHMP into other planning documents, such as the General Plan. By amending the MJHMP into the General Plan Safety Element in accordance with AB 2140 participating jurisdictions can achieve a higher share of disaster recovery costs from the State.

3. Role of the Hazard Mitigation Planning Team (HMPT) and Benefits of Participation

For participating jurisdictions, the requirements are that we need to document your participation and we need to show this documentation to the California Office of Emergency Services (Cal OES) and FEMA reviewers, so meeting attendance is key. If you cannot make it, Mr. Brislawn



explained that he recommends an alternate attend in your place so we can still show participation. He also said that the jurisdictions should review and complete planning documents and worksheets. The participating jurisdictions also coordinate the final adoption of the plan.

Mr. Brislawn noted that as the consultant we are here to help facilitate the process and do the heavy lifting for the risk assessment and technical portions, but we really want this to be your plan and that is why it is key to get your input. Mr. Brislawn asked if there were any questions on the roles of the HMPT.

Mr. Brislawn described other “stakeholders” as entities that may be involved in hazard mitigation or emergency management activities that are not going to formally adopt the plan. This can include other local, regional, state or federal government agencies, private, private non-profit, and educational institutions. Mr. Brislawn said if you are a stakeholder you have options to participate. One of them is to participate in the meetings and to provide comments on the plan.

4. Objectives and Schedule for the Plan Update and Overview of 2015 Plan

Mr. Brislawn explained we are reconvening the HMPT and updating the plan based on the latest federal requirements and California requirements. The built environment and hazard concerns in communities do change, so we conduct a substantial update to the risk assessment.

The next meeting will focus on the Risk Assessment, which will require the Wood team to conduct the assessment itself and complete the analysis. Other forthcoming deliverables include the public survey.

We will aim to schedule the next meeting in mid-March; the date in the calendar is tentative for now, but a target and we will try to find a date that works for everyone. Mr. Brislawn stated that as a consultant we will provide the tools to the County and jurisdictions to be successful and ensure the planning requirements are met.

5. Review and Identification of Natural and Human-Caused Hazards

Ms. Prosperi defined the Planning Area as the Merced County limits, but noted we also consider regional hazards in Central Valley that could impact the County. Mr. Brislawn added that a regional hazard may include dam failures associated with dams located outside the County limits with the potential to inundate portions of the County. Ms. Prosperi provided an overview of potential other hazards of concern – both natural and human-caused that could be addressed in the plan. She provided a list based on the California State Hazard Mitigation Plan and explained those in bold are the hazards currently addressed in the 2014 MJHMP.



Ms. Prosperi shared a virtual poll link with the group and asked everyone to complete the survey; The final results are listed below with the top five priority hazards bolded:

- **Flooding (80%)**
- **Drought (73%)**
- **Pandemic/Epidemic (60%)**
- **Dam Failure (53%)**
- **Earthquake (40%)**
- Hazardous Material Releases (40%)
- Power Outages (33%)
- Subsidence (27%)
- Wildfires (27%)
- Cyber Threats (20%)
- Severe Weather (20%)
- Erosion (7%)
- Landslides/Debris Flows (7%)
- Oil Spills (7%)
- Expansive Soils (0%)
- Fuel Shortages (0%)

Ms. Prosperi asked the group if there were any other natural or human-caused hazards they should consider assessing in the plan. Mr. Scheurich mentioned civil unrest may be a concern, as well as cyber threats. He stated it may be valuable to the County to address cyber threats in the plan, based on where things are trending. He noted there was a substantial and recent cyber-attack in the past month that impacted numerous health facilities and compromised their computer system for up to a month. Pandemic/Epidemic should also be included based on the current COVID19 outbreak and widespread impacts.

6. Coordination with Stakeholders, Related plans, and Recent Studies

Ms. Prosperi provided an overview of Merced County's existing mitigation capabilities starting with the 2030 Merced County General Plan through a broad summary of relevant regional plans, such as the California Department of Forestry and Fire Protection (CALFIRE) Merced-Mariposa-Madera Fire Unit Strategic Plan. Mr. Brislawn asked whether there have been any recent studies on the hazards listed in the County in the past few years.

Mr. Wilson stated the City of Merced recently prepared a Hazardous Materials Commodity Flow Study in 2018. The Merced County Economic Development Department stated the Climate Action Plan will be done by 2021. The County also recently updated the Zoning Code in 2019.



It was noted that UC-Merced was applying for an NSF grant for planning for energy resilience in regards to natural disasters.

It was also noted that county departments had recently completed COOP-COG plans.

Mr. Brislawn stated that during the process his team will ask the participants and stakeholders whether they have integrated any of the past planning efforts into the current MJHMP, such as whether the MJHMP was amended into the General Plan. Mr. Scheurich stated he will determine whether the 2014 plan was amended into the 2030 General Plan Safety Element.

7. Planning for Public Involvement

Ms. Prosperi provided an overview of outreach and engagement tools used in the planning process. Mr. Scheurich stated the silver linings of the pandemic is how the County has been able to enhance outreach to different communities in Merced. Ms. Prosperi explained how this planning process can piggyback on other planning efforts that recently occurred or those still underway in the County.

Ms. Prosperi indicated that other Community-Based Organizations (CBOs) mentioned to reach out to during the process may include the senior population, students, agricultural community, and the Latino population. Successful outreach to these groups may involve separate meetings we will want to capture during the planning process. Participants mentioned the City of Los Banos is updating their General Plan and they can share the Public Survey and leverage a monthly newsletter as part of their outreach.

8. Initial Information Needs and Next Steps

Mr. Brislawn discussed the Plan Update Guide (to be provided after the meeting) and next steps in the planning process and asked the group if there were any other questions.

9. Questions and Answers

The meeting adjourned at 11:40 a.m.

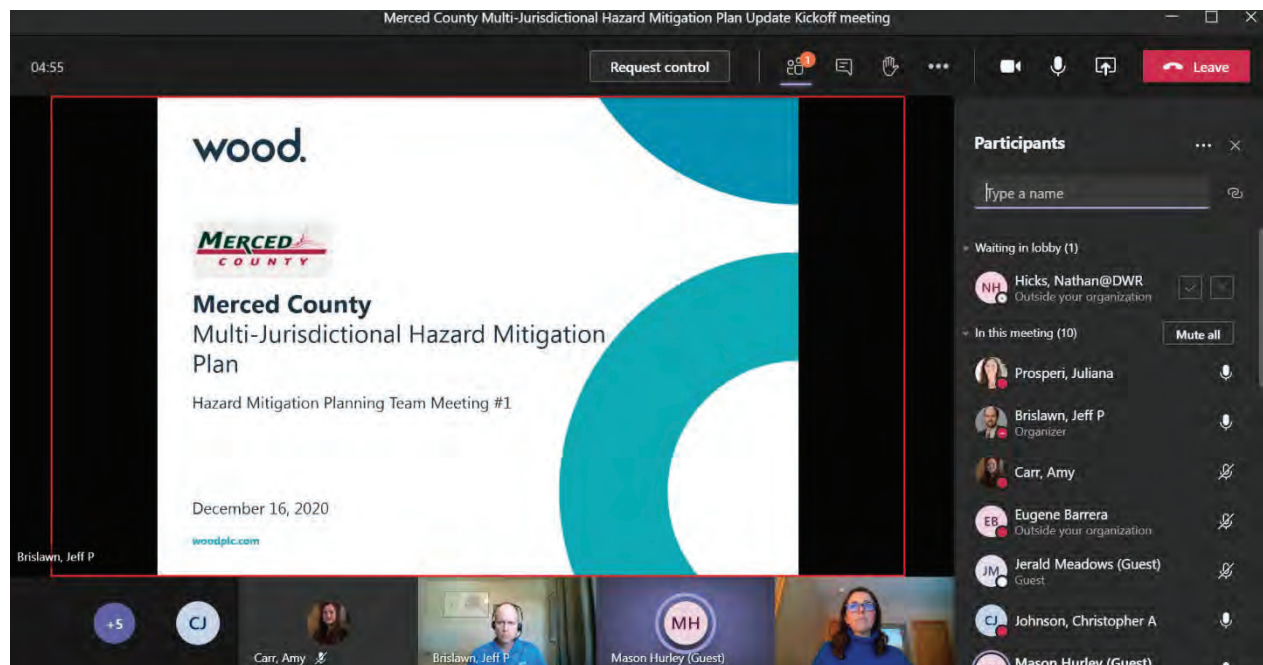
10. Post-Meeting Discussion

After the meeting, Mr. Scheurich mentioned other potential hazard concerns facing Merced County. He stated the groundwater table is lowering substantially more on the western part of the County (Planada area) compared to the central part of the County, which is exacerbating subsidence in the area. He noted a temporary declaration related to impacted water tanks (25,000-gallon tank replacements) associated with subsidence and drought hazards. Mr. Brislawn said they dealt with the subsidence issue in Fresno County and its effect on flooding and levees.

Mr. Brislawn asked whether the County deals with tree mortality. Mr. Scheurich stated this is not an issue because the County is fairly flat, and mostly grassland.

Mr. Scheurich said the County has recently tracked and pursued State Homeland Security Grants related to cyber threats. He does not want to necessarily want to focus on cyber threats, but the grant funding is transitioning in this direction. He also noted that 50 percent of the population does not have GED, 85 percent of school population on school lunch program, so outreach and grant funding may need to target socially vulnerable communities in the County.

IMAGE: Screenshot of Meeting



Attachment: Meeting Chat Log

Attachment: Meeting Chat Log

- For those who joined in the last 15 minutes... by Prosperi, Juliana

Prosperi, Juliana

10:35 AM

For those who joined in the last 15 minutes, can you write your name and the agency your represent in the Chat? Thanks.

- 8:orgid:249d9198-2b69-4f51-bf99-6844758a85fe joined the meeting.

Wilson, Casey joined the meeting.

- 8:teamsvisitor:8885d9e89aa84357ae79bfb2e771591b joined the meeting.

Ruben and Sammy Gusitine PD (Guest) joined the meeting.

- 8:orgid:c4c36458-a976-4a3c-953d-289d45a9a8f7 joined the meeting.

Reith, Heather@Parks joined the meeting.

-

Casey Wilson, City of Merced Fire Departmen by Wilson, Casey

Wilson, Casey

10:47 AM

Casey Wilson, City of Merced Fire Department

-

Ruben Chavez, Gustine PD by Ruben and Sammy Gusitine PD (Guest)

Ruben and Sammy Gusitine PD (Guest)

10:47 AM

Ruben Chavez, Gustine PD

-

Marianne Shaw Mercy Medical Center by marianne Shaw

marianne Shaw (Guest)

10:48 AM

Marianne Shaw Mercy Medical Center

-

Joseph Wilder, Madera County Sheriff's /OES by Joseph Wilder - Madera (Guest)

Joseph Wilder - Madera (Guest)

10:52 AM

Joseph Wilder, Madera County Sheriff's /OES

-

Slido.com Code# 60980 by Carr, Amy

Carr, Amy

10:57 AM

Slido.com Code# 60980

-

cyber? by Eugene Barrera

Eugene Barrera

11:04 AM

cyber?

-

The CItY of Merced did a commodity flow stu... by Wilson, Casey

cyber? by Eugene Barrera

Eugene Barrera

11:04 AM

cyber?

The City of Merced did a commodity flow stu... by Wilson, Casey

Wilson, Casey

11:13 AM

The City of Merced did a commodity flow study a few years back. I'll track that down and send it over.

- 8:teamsvisitor:651998254c5f47e9b23b06263c8e6ba8 left the meeting.

Joseph Wilder - Madera (Guest) left the meeting.

•

City of Los Banos is currently updating our... by Stcy Souza Elms (Guest)

Stcy Souza Elms (Guest)

11:16 AM

City of Los Banos is currently updating our General Plan

•

Program/Project environmental impact report... by Eugene Barrera

Eugene Barrera

11:17 AM

Program/Project environmental impact reports (CEQA)

- 8:teamsvisitor:8151012441414e13817470fad4b175eb joined the meeting.

Steve M joined the meeting.

- 8:teamsvisitor:8151012441414e13817470fad4b175eb left the meeting.

Steve M left the meeting.

- 8:teamsvisitor:3fa0cc50d5484537bbe42c94bc142cef left the meeting.

Melissa Palomino (Guest) left the meeting.

-

UC Merced is applying for an NSF grant for ... by Eugene Barrera

Eugene Barrera

11:22 AM

UC Merced is applying for an NSF grant for planning energy resilience in the face of natural disasters.

-

Each department within Merced County also j... by Scheurich, David@CALFIRE

Scheurich, David@CALFIRE

11:22 AM Edited

Each department within Merced County also just completed a COOP/COG update

-

Thanks for those comments! by Brislawn, Jeff P

Brislawn, Jeff P

11:24 AM

Thanks for those comments!

-

The use of web map applications is also a g... by Eugene Barrera

Eugene Barrera

11:25 AM

The use of web map applications is also a good venue to display spatial data

- any opportunities for student service-learn... by Eugene Barrera

Eugene Barrera 11:28 AM

any opportunities for student service-learning with a local State University?

The City of Los Banos will be starting a Mo... by Mason Hurley (Guest)

Mason Hurley (Guest)

11:29 AM

The City of Los Banos will be starting a Monthly News Letter. We will be happy to add updates for this Plan.

- Nathan Quevedo left the meeting.

Nathan Quevedo left the meeting.

•

Thank you! by Cosentino, Helen

Cosentino, Helen

11:38 AM

Thank you!

- 8:teamsvisitor:9768014d99c04804aee0be7d08133893 left the meeting.

Stcy Souza Elms (Guest) left the meeting.

- 8:teamsvisitor:38609dc180824d59aed104d5c1cbbfab left the meeting.

Jerald Meadows (Guest) left the meeting.

- 8:orgid:e473641d-7cf6-4175-9579-ab64bb4c8120 left the meeting.

Cosentino, Helen left the meeting.

- 8:orgid:9d43abf2-6db7-48dd-b48c-81a4ace7043b left the meeting.

Perez, Michael@CALFIRE left the meeting.

- 8:orgid:b9f5aceb-7d14-4499-b0d7-35411852fbe1 left the meeting.

Mills, Deron left the meeting.

- 8:orgid:3840cc28-241e-4f97-9558-9ddfdd224578 left the meeting.

Hicks, Nathan@DWR left the meeting.

- 8:teamsvisitor:1d16869eaeda4ba1a160ced98399c03b left the meeting.

Tom Ebersole (Guest) left the meeting.

•

Thank you by Mason Hurley (Guest)

Mason Hurley (Guest)

11:38 AM

Thank you

- 8:teamsvisitor:e5dd329ba7d84f9d8d27dbd6e0bcfab8 left the meeting.

marianne Shaw left the meeting.

- 8:teamsvisitor:984926caa6ca4230882949f1295c2730 left the meeting.

Mason Hurley (Guest) left the meeting.

- 8:teamsvisitor:8885d9e89aa84357ae79bfb2e771591b left the meeting.

Ruben and Sammy Gusitine PD (Guest) left the meeting.

- 8:teamsvisitor:09f238a480dd468180a8bd43bacfbff2 left the meeting.

Cesar Ramirez, MCDEH (Guest) left the meeting.

- 8:orgid:de858603-eced-4bde-9c5e-1d12c1c2e417 left the meeting.

Padilla, Gregory@CALFIRE left the meeting.

04:55

Request control



Leave

wood.



Merced County Multi-Jurisdictional Hazard Mitigation Plan

Hazard Mitigation Planning Team Meeting #1

December 16, 2020

woodplc.com

Participants

Type a name

Waiting in lobby (1)

Hicks, Nathan@DWR
Outside your organization

In this meeting (10)

Mute all

Prosperi, Juliana

Brislawn, Jeff P
Organizer

Carr, Amy

Eugene Barrera
Outside your organization

Jerald Meadows (Guest)
Guest

Johnson, Christopher A

Mason Hurley (Guest)

+5

CJ

Carr, Amy

Brislawn, Jeff P

Mason Hurley (Guest)

01:44:39

Request control



Leave

Recording is being saved Recording has stopped. You can find the link to the recording in meeting chat history. [Learn more](#)

Dismiss

Questions?

Juliana Prosperi, AICP

juliana.prosperi@woodcl.com

(916) 636-3200

Jeff Brislawn, CFM

jeff.brislawn@woodcl.com

(303) 820-4654

wood.

Environment & Infrastructure Solutions

Brislawn, Jeff P

+5

MC

DS

Carr, Amy

Scheurich, David@CA...

Brislawn, Jeff P

Meeting chat

- John Meadows (Guest)** left the meeting.
- Cosentino, Helen** left the meeting.
- Perez, Michael@CALFIRE** left the meeting.
- Mills, Deron** left the meeting.
- Hicks, Nathan@DWR** left the meeting.
- Tom Ebersole (Guest)** left the meeting.

MH **Mason Hurley (Guest)** 11:38 AM
Thank you

marianne Shaw left the meeting.

Mason Hurley (Guest) left the

MH **Merced County Multi-...**
Thank you

← Reply



HMPT Meeting #2 Agenda

Date: 24 March 2021
10:00 am - noon PST

Meeting at: Virtual/Webinar - Microsoft Teams (see
email/Outlook for link)

Project: Merced County Multi-Jurisdictional Hazard Mitigation Plan Update

Subject/Purpose

The purpose of the meeting is to review the highlights of the updated Hazard Identification and Risk Assessment. The meeting will be delivered as a webinar due to the COVID-19 pandemic and social distancing requirements.

Attendees: Hazard Mitigation Planning Team, Stakeholders and Wood

-
1. Introductions
 2. Review of the Hazard Mitigation Planning Process
 3. Update on public involvement activities
 4. Hazard Identification and Risk Assessment (HIRA) update
 5. Web-map application and critical facility data
 6. Capability Assessment Highlights
 7. Review of mitigation goals
 8. Next steps
 9. Questions and answers

Meeting Summary

Total Number of Participants

41

Merced County Multi-Jurisdictional Hazard Mitigation Plan Update: Meeting #2 Risk and Goals

Meeting Title

Meeting Start Time

Meeting End Time

3/24/2021, 10:47:36 AM

3/24/2021, 1:18:11 PM

Full Name

Join Time

Leave Time

Prosperi, Juliana

3/24/2021, 10:47:36 AM

3/24/2021, 1:03:43 PM

Johnson, Christopher A

3/24/2021, 10:47:42 AM

3/24/2021, 1:04:57 PM

Brislawn, Jeff P

3/24/2021, 10:48:32 AM

3/24/2021, 1:04:17 PM

Carr, Amy

3/24/2021, 10:50:57 AM

3/24/2021, 1:03:31 PM

Parker, Derek

3/24/2021, 10:56:26 AM

3/24/2021, 1:02:55 PM

Scheurich, David@CALFIRE

3/24/2021, 10:56:26 AM

3/24/2021, 1:04:04 PM

Hicks, Nathan@DWR

3/24/2021, 10:56:27 AM

3/24/2021, 1:02:35 PM

Sean Runyon/Merced Co. Ag Comm. (Guest)

3/24/2021, 10:56:28 AM

3/24/2021, 1:03:56 PM

Barrera, Gene

3/24/2021, 10:56:39 AM

3/24/2021, 1:03:16 PM

Padilla, Gregory@CALFIRE

3/24/2021, 10:57:37 AM

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Chambers, Mack

3/24/2021, 10:57:42 AM

3/24/2021, 12:58:16 PM

Kristi Kelechenyi

3/24/2021, 10:58:14 AM

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Jason Hicks

3/24/2021, 10:58:16 AM

3/24/2021, 12:10:01 PM

Stacy Souza Elms (Guest)

3/24/2021, 10:58:16 AM

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Wes Smith - Mariposa County OES

3/24/2021, 10:58:17 AM

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Justin Lemons

3/24/2021, 10:58:59 AM

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Zachery Falcon

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Ruben and Sammy Gusitine PD (Guest)

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12095818675 3/24/2021, 11:00:24 AM

3/24/2021, 12:59:57 PM

\Alyssa Carroll (Guest)\

3/24/2021, 11:00:32 AM

3/24/2021, 1:02:27 PM

Kent, Walt@CalOES.ca.gov

3/24/2021, 11:00:33 AM

3/24/2021, 12:37:45 PM

Vanessa Padilla

3/24/2021, 11:00:58 AM

3/24/2021, 12:17:18 PM

Kuhlemeier, Rob

3/24/2021, 11:01:13 AM

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Chowdhary, Pujeeta

3/24/2021, 11:01:18 AM

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12093835023 3/24/2021, 12:33:45 PM

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Reith, Heather@Parks

3/24/2021, 11:01:55 AM

3/24/2021, 11:57:37 AM

Reith, Heather@Parks

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3/24/2021, 1:03:00 PM

12093857602 3/24/2021, 11:01:58 AM

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Mitchell, Carrie

3/24/2021, 11:02:21 AM

3/24/2021, 1:03:12 PM

Wilson, Casey

3/24/2021, 11:02:21 AM

3/24/2021, 1:03:25 PM

Nishihama, John J

3/24/2021, 11:02:21 AM

3/24/2021, 11:58:58 AM

	12098546183	3/24/2021, 11:02:24 AM	3/24/2021, 1:02:38 PM
Mike Stephenson (Guest)		3/24/2021, 11:03:31 AM	3/24/2021, 1:03:13 PM
	12097262999	3/24/2021, 11:03:44 AM	3/24/2021, 11:24:41 AM
Sandra OShields (Guest)		3/24/2021, 11:04:47 AM	3/24/2021, 11:44:22 AM
Vicki Jones (Guest)		3/24/2021, 11:06:23 AM	3/24/2021, 11:50:43 AM
Laura Rodriguez-Mascorro		3/24/2021, 11:31:46 AM	3/24/2021, 1:02:34 PM
Sandra OShields		3/24/2021, 11:46:22 AM	3/24/2021, 1:03:12 PM
	12097611972	3/24/2021, 12:36:11 PM	3/24/2021, 12:37:26 PM

Duration	Email	Role
2h 16m	juliana.prosperi@woodplc.com	Presenter
2h 17m	christopher.johnson3@woodplc.com	Presenter
2h 15m	jeff.brislawn@woodplc.com	Organizer
2h 12m	amy.carr@woodplc.com	Presenter
2h 6m	ParkerD@cityofmerced.org	Presenter
2h 7m	david.scheurich@fire.ca.gov	Presenter
2h 6m	Nathan.Hicks@water.ca.gov	Presenter
2h 7m		Presenter
2h 6m	gis5@co.merced.ca.us	Presenter
2h 9m	Gregory.Padilla@fire.ca.gov	Presenter
1h 2m		Attendee
25m 22s		Attendee
2h	mack.chambers@woodplc.com	Presenter
2h 1m	kkelechenyi@csustan.edu	Presenter
1h 11m	jshicks@tid.org	Presenter
2h 7m		Presenter
2h 5m		Presenter
50m 23s	jlemons@csustan.edu	Presenter
18s		Attendee
1h 32m		Attendee
2h 3m	zfalcon@csustan.edu	Presenter
2h 2m		Presenter
1h 59m		Attendee
2h 1m		Presenter
1h 37m	KentW@CalOES.ca.gov	Presenter
1h 16m	vpadilla8@csustan.edu	Presenter
2h 1m	srfk@co.merced.ca.us	Presenter
2h 1m	pujeeta.chowdhary@woodplc.com	Presenter
2h 1m		Attendee
1h 15m		Attendee
29m 45s		Attendee
55m 41s	Heather.Reith@parks.ca.gov	Presenter
29m 51s	Heather.Reith@parks.ca.gov	Presenter
2h 16m		Attendee
2h	ag39@co.merced.ca.us	Presenter
2h 1m	wilsonc@cityofmerced.org	Presenter
56m 36s	sjjn@co.merced.ca.us	Presenter

2h		Attendee
1h 59m		Presenter
20m 56s		Attendee
39m 34s		Presenter
44m 20s		Presenter
1h 30m	lrodriguezmascorro@ucmerced.edu	Presenter
1h 16m	soshields@csustan.edu	Presenter
1m 15s		Attendee

Merced County
Multi-Jurisdictional Hazard Mitigation Plan Update
Risk Assessment and Goals Meeting Summary

March 24, 2021

10:00 AM– 12 PM PST

Virtual Meeting via Microsoft Teams

Introductions and Opening Remarks

David Scheurich with County OES began the meeting with welcoming remarks, a brief overview of the requirements for hazard mitigation planning, and introduced Jeff Brislawn of Wood, the consulting firm hired to facilitate the plan development process. 41 persons were present for the virtual meeting.

Review of Mitigation, Disaster Mitigation Act (DMA) Requirements, and the Planning Process

Following introductions of the Wood team by Jeff, it was requested that all attendees type their name, title, and affiliation in the chat function of the Microsoft Teams meeting in order to capture attendance and participation (documented in Attachments 1 and 2). Jeff reviewed the planning process being followed and discussed the project status. Jeff emphasized that jurisdictions that have not yet submitted information requested in the plan update guides to do so as soon as possible. This is particularly important for new jurisdictions to the Multi-Jurisdictional Hazard Mitigation Plan as the update guides will provide a basis for the development of jurisdictional annexes.

Juliana Prosperi with the Wood team spoke on the public outreach strategy and the work thus far. This included the creation of a public survey, with versions in English and Spanish, to gauge public input and the perception of risk for Merced County residents.

Risk Assessment Presentation and Discussion

Jeff outlined the general risk assessment requirements before beginning a detailed discussion of each hazard. He presented highlights on each hazard included in the updated risk assessment chapter of the plan, such as the number of new hazards profiled in the 2021 update which were not included in the previous plan. Refer to the Merced County HMP Risk Assessment PowerPoint presentation for specific details on each hazard and a handout summarizing hazard significance.

Additional insight and details were learned during the risk assessment conversation among participants. Highlights of the discussion are noted by hazard in the table below.

Hazard or Topic	Meeting Discussion
Dam Incidents	A question was posed by Ruben from the City of Gustine about the lack of inundation mapping below San Luis and O'Neill Forebay dams? Mack and Jeff noted the missing data layers have been asked for but not obtained yet. David Scheurich mentioned that he had a contact who could potentially provide data. Jeff also mentioned that the Emergency Action Plans should have inundation maps that could be referenced. David said he has a copy in his office.
Severe Weather: Dense Fog, Extreme Temps, Heavy Rain, Wind	No comment
Drought	No Comment
Subsidence	No Comment
Earthquake	No Comment
Flood & Levee Failure	- Levee failure has been added in the flood hazard profile - No comment
Wildfire	No Comment
Landslide	No Comment
Pandemic/Epidemic	No Comment
Agriculture/Pest and Disease	No Comment
Hazardous Materials	No Comment
Cyber Attack	No Comment
Growth and Development Trends	No Comment
HIRA Summary	David Scheurich – Where does climate change fall into this as a hazard? Jeff explained that we don't typically analyze climate change as its own individual hazard, but rather look at the role climate change plays in impacting the frequency and severity of other hazards

Web Map Application and Critical Facility Data

Gene Barrera, the Merced County GIS manager, gave a demonstration on a new Web Map application that was being created to support the plan update process, in conjunction with a planning class that he is teaching at Stanislaus State University. The ESRI Experience Builder web application will provide more publicly accessible information related to the project, including links to the public survey, and dynamic hazard maps. A password protected map application has been developed so that each jurisdiction could review, verify, and edit critical facilities data specific to them. David and Jeff will identify potential points of contact at each jurisdiction to followup with regarding the critical facilities data review.

The link to the website is below:

<https://experience.arcgis.com/experience/c6ad8529e3a84651918e00115607206e/>

The critical facilities are being grouped/classified to align with the FEMA Lifelines framework.

<https://www.fema.gov/sites/default/files/2020-05/CommunityLifelinesToolkit2.0v2.pdf>

Review of Mitigation Goals

Another next step will be updating the plan's goals. Juliana introduced the topic of Mitigation Goals and Objectives for a Hazard Mitigation Plan. She included a summary of the goals from the previous plan, which can be kept or updated to meet the current needs of the county. The group will revisit the goals for finalization at the beginning of the next meeting.

An online form for the planning team to review and provide input to the goals update is below.

<http://bit.ly/3txL8LI>

Input on the goals is requested by April 9th.

A worksheet will be provided after the meeting with the link, and some examples of goals from related plan for reference.

Capability Assessment Highlights

Juliana also gave an overview of the Capability Assessment portion of the plan, and noted some of the existing planning, regulatory, and project capabilities for the identified hazards. Moving forward jurisdictions should review and update capabilities to reflect current ones, and note opportunities for improvement. Worksheets have been provided in the plan update guides for this purpose.

Plan Timeline/Next steps

Jeff briefly discussed the Mitigation actions plan, highlighting the requirement that each participating jurisdiction provide will need at least one new mitigation action for the plan update, which will be discussed further at a future planning meeting.

The next HMPC planning meeting will be in April, with a date to be determined. The purpose of the next meeting is to update the mitigation strategy. This will include development of new mitigation actions for the plan and participating jurisdictions. Once the specific dates have been identified, a calendar update will be sent out. The meeting materials will also be shared electronically, including the presentation and handouts. The timeline and steps for the various drafts of the plan to be reviewed and approved by both Cal OES and FEMA was outlined as well.

The meeting adjourned at noon.

Attachment 1: Chat Log

Merced County Hazard Mitigation Plan 2021 Update

Risk Assessment Meeting Chat Log

March 24, 2021 – 10:00am-12:00pm PST

[9:47 AM] Unknown User Chowdhary, Pujeeta was invited to the meeting.
[10:56 AM] Unknown User Hicks, Nathan@DWR was invited to the meeting.
[10:56 AM] Unknown User Parker, Derek (External) was invited to the meeting.
[10:56 AM] Unknown User Sean Runyon/Merced Co. Ag Comm. (Guest) was invited to the meeting.
[10:56 AM] Unknown User Scheurich, David@CALFIRE was invited to the meeting.
[10:56 AM] Unknown User Barrera, Gene (External) was invited to the meeting.
[10:57 AM] Unknown User Chambers, Mack was invited to the meeting.
[10:57 AM] Unknown User Padilla, Gregory@CALFIRE was invited to the meeting.
[10:58 AM] Unknown User Stacy Souza Elms (Guest) was invited to the meeting.
[10:58 AM] Unknown User Kristi Kelechenyi was invited to the meeting.
[10:58 AM] Unknown User Wes Smith - Mariposa County OES was invited to the meeting.
[10:58 AM] Unknown User Jason Hicks (External) was invited to the meeting.
[10:59 AM] Unknown User Justin Lemons was invited to the meeting.
[10:59 AM] Unknown User Zachery Falcon was invited to the meeting.
[11:00 AM] Unknown User Ruben and Sammy Gustine PD (Guest) was invited to the meeting.
[11:00 AM] Unknown User "\"Alyssa Carroll (Guest)\""" was invited to the meeting.
[11:00 AM] Unknown User Kent, Walt@CalOES.ca.gov (External) was invited to the meeting.
[11:00 AM] Unknown User Vanessa Padilla was invited to the meeting.
[11:01 AM] Unknown User Kuhlemeier, Rob (External) was invited to the meeting.
[11:01 AM] Unknown User Reith, Heather@Parks (External) was invited to the meeting.
[11:02 AM] Unknown User Nishihama, John J was invited to the meeting.
[11:02 AM] Unknown User Mitchell, Carrie was invited to the meeting.
[11:02 AM] Unknown User Wilson, Casey (External) was invited to the meeting.
[11:03 AM] Unknown User Mike Stephenson (Guest) was invited to the meeting.
[11:04 AM] Unknown User Sandra OShields (Guest) was invited to the meeting.
[11:06 AM] Unknown User Vicki Jones (Guest) was invited to the meeting.

[11:10 AM] Barrera, Gene
Gene Barrera, Merced County GIS Manager

[11:10 AM] Ruben and Sammy Gustine PD (Guest)
Ruben Chavez, Chief of Police , Gustine Police Department

[11:10 AM] Stacy Souza Elms (Guest)
Stacy Souza Elms, City of Los Banos - Community and Economic Development Director

[11:10 AM] Hicks, Nathan@DWR (Guest)
Nathan Hicks, Engineer, DWR Flood Operations Center

[11:10 AM] Jason Hicks
Jason Hicks, Turlock Irrigation District, Manager of Security & Emergency Preparedness

[11:10 AM] Kuhlemeier, Rob
Rob Kuhlemeier Merced County IT, Merced County

[11:10 AM] "\"Alyssa Carroll (Guest)\\""
Alyssa Carroll Mariposa County OES

[11:10 AM] Kent, Walt@CalOES.ca.gov
Walt Kent, CalOES, Emergency Services Coordinator, Region V

[11:10 AM] Vicki Jones (Guest)
Vicki Jones, Merced County Environmental Health Division Director

[11:10 AM] Reith, Heather@Parks
Heather Reith, Natural Resources Program Manager, California Department of Parks and Recreation

[11:10 AM] Mike Stephenson (Guest)
Mike Stephenson Merced County Assistant Director Public Works

[11:10 AM] Nishihama, John J (Guest)
John Nishihama Assistant CIO, Merced County
Edited

[11:10 AM] Sean Runyon/Merced Co. Ag Comm. (Guest)
Sean Runyon/ Asst. Ag Commissioner/Merced County

[11:10 AM] Carr, Amy
Amy Carr, Hazard Mitigation Planner, Wood

[11:10 AM] Johnson, Christopher A
Christopher Johnson, Hazard Mitigation Planner/GIS Analyst, Wood PLC

[11:11 AM] Parker, Derek
Derek Parker, Merced Fire Department Fire Chief

[11:11 AM] Chowdhary, Pujeeta
Pujeeta Chowdhary, MPH, Risk Assessor, Wood

[11:11 AM] Wes Smith - Mariposa County OES (Guest)
Wes Smith - Mariposa County OES

Merced County Multi-Jurisdictional Hazard Mitigation Plan Update 2021

[11:11 AM] Wilson, Casey
Casey Wilson, City of Merced Fire, Deputy Chief

[11:11 AM] Prosperi, Juliana
Juliana Prosperi, AICP, Assistant Project Manager

[11:11 AM] Chambers, Mack
Mack Chambers, GIS Analyst, Wood

[11:12 AM] Padilla, Gregory@CALFIRE (Guest)
Greg Padilla Merced County OES. David Scheurich Merced County OES. Kevin Lindo CAL FIRE-Land use planning. Gene Potkey CAL FIRE- land use planning.

[11:12 AM] Barrera, Gene
CSU Students - Please include your information as well - Thanks

[11:13 AM] Sandra OShields (Guest)
Sandra OShields, Student of Barrera

[11:13 AM] Kristi Kelechenyi (Guest)
Kristi Kelechenyi, CSU Stanislaus student

[11:14 AM] Justin Lemons (Guest)
Justin Lemons Stanislaus State University-Planning Issues

[11:15 AM] Brislawn, Jeff P
Jeff Brislawn, Project Manager/Hazard Mitigation Lead, Wood

[11:18 AM] Zachery Falcon (Guest)
Zach Falcon, CSU Student

[11:19 AM] Vanessa Padilla (Guest)
Vanessa Padilla, CSU Stanislaus Student

[11:25 AM] Mitchell, Carrie (Guest)
Carrie Mitchell/Deputy Ag Commissioner/Merced County

[11:31 AM] Unknown User Laura Rodriguez Mascorro (External) was invited to the meeting.

[11:44 AM] Unknown User Sandra OShields (Guest) no longer has access to the chat.

[11:46 AM] Unknown User Sandra OShields was invited to the meeting.

[11:50 AM] Unknown User Vicki Jones (Guest) no longer has access to the chat.

[12:07 PM] Ruben and Sammy Gustine PD (Guest)
Pat Berrellii, Fire Chief, Gustine Fire Department

[12:23 PM] Chambers, Mack
yes

[12:25 PM] Barrera, Gene
<https://experience.arcgis.com/experience/c6ad8529e3a84651918e00115607206e/>

[12:37 PM] Unknown User Scheurich, David@CALFIRE no longer has access to the chat.

[12:37 PM] Prosperi, Juliana

For those of you who joined in the last 15 minutes, if you could enter your name and the agency/organization you represent that will help us track and document participation. Thanks!

[12:37 PM] Unknown User Scheurich, David@CALFIRE was invited to the meeting.

[12:37 PM] Laura Rodriguez Mascorro

Laura Rodriguez-Mascorro, UC Merced

[12:40 PM] Reith, Heather@Parks

Hi Julianna, I entered my name earlier. I had to leave for a bit for another meeting.

[12:40 PM] Prosperi, Juliana

Thanks Heather!

(1 liked)

[12:41 PM] Carr, Amy

great job Barrera, Gene and students!

[12:42 PM] Prosperi, Juliana

Amazing job Gene! And thanks to all the CSU students on the call today!!

[12:52 PM] Brislawn, Jeff P

Here is the link to the goals worksheet to provide suggested revisions to the goals

[12:52 PM] Brislawn, Jeff P

<http://bit.ly/3txL8LI>

Fill | Merced County Hazard Mitigation Goals & Objectives 2021 Update

The survey will take approximately 4 minutes to complete. FEMA requires that mitigation plans establish "mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards." ...

bit.ly

[12:54 PM] Ruben and Sammy Gustine PD (Guest)

Jeff, can you send the FEMA link also please?

[1:02 PM] Prosperi, Juliana

Here is the link: <https://www.fema.gov/emergency-managers/practitioners/lifelines>

[1:02 PM] Unknown User Johnny Nishihama - GCC Global Admin (External) was invited to the meeting.

[1:02 PM] Unknown User "\"Alyssa Carroll (Guest)\""" no longer has access to the chat.

[1:02 PM] Unknown User Hicks, Nathan@DWR no longer has access to the chat.

[1:02 PM] Kuhlemeier, Rob

Thank you for the information

[1:03 PM] Unknown User Mike Stephenson (Guest) no longer has access to the chat.

[1:03 PM] Unknown User Wes Smith - Mariposa County OES no longer has access to the chat.

[1:03 PM] Unknown User Ruben and Sammy Gusitine PD (Guest) no longer has access to the chat.

[1:03 PM] Unknown User Sean Runyon/Merced Co. Ag Comm. (Guest) no longer has access to the chat.

[1:04 PM] Unknown User Scheurich, David@CALFIRE no longer has access to the chat.

[1:06 PM] Unknown User Stacy Souza Elms (Guest) no longer has access to the chat.
[1:07 PM] Unknown User Padilla, Gregory@CALFIRE no longer has access to the chat.

Meeting ended 2h 30m 1:18 PM
1h 58m

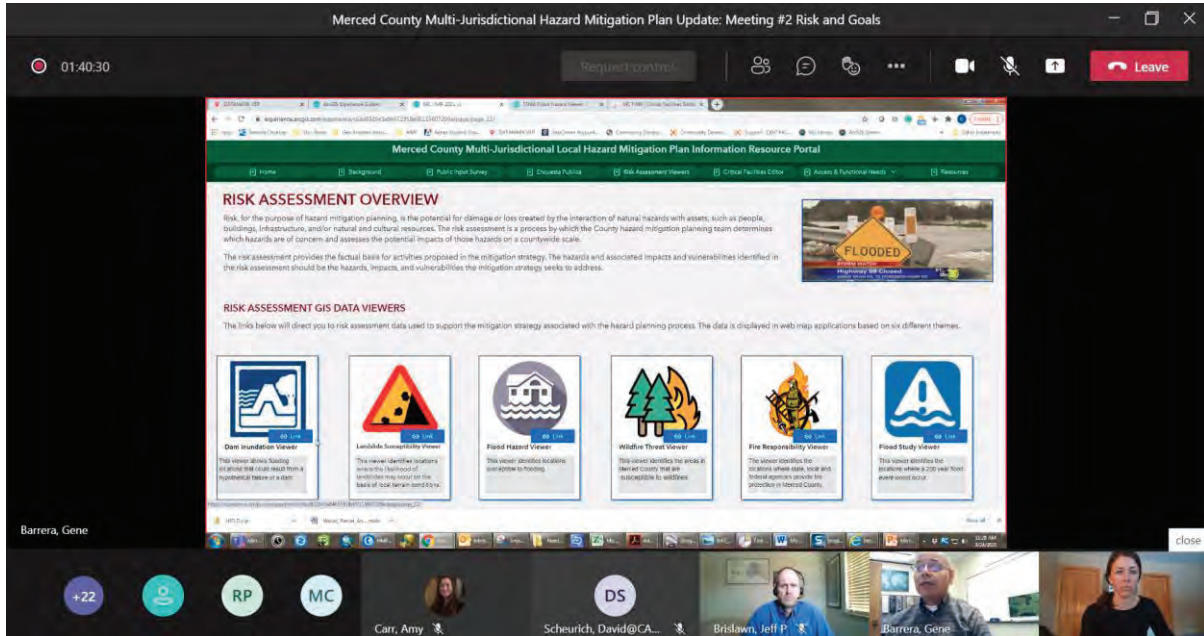
Meeting Recorded by: Johnson, Christopher A

<https://web.microsoftstream.com/video/25c20392-49c2-44da-b1d7-4ea505100984>

Attachment 2: Attendance Log

Meeting Summary				
Total Number of Participants	41			
Meeting Title	Merced County Multi-Jurisdictional Hazard Mitigation Plan Update: Meeting #2 Risk and Goals			
Meeting Start Time	3/24/2021, 10:47:36 AM			
Meeting End Time	3/24/2021, 1:18:11 PM			
Full Name	Join Time	Leave Time	Duration	Email
Prosperi, Juliana	3/24/2021, 10:47:36 AM	3/24/2021 2h 16m		juliana.prosperi@woodplc.com
Johnson, Christopher A	3/24/2021, 10:47:42 AM	3/24/2021 2h 17m		christopher.johnson3@woodplc.com
Brislaw, Jeff P	3/24/2021, 10:48:32 AM	3/24/2021 2h 15m		jeff.brislaw@woodplc.com
Carr, Amy	3/24/2021, 10:50:57 AM	3/24/2021 2h 12m		amy.carr@woodplc.com
Parker, Derek	3/24/2021, 10:56:26 AM	3/24/2021 2h 6m		ParkerD@cityofmerced.org
Scheurich, David@CALFIRE	3/24/2021, 10:56:26 AM	3/24/2021 2h 7m		david.scheurich@fire.ca.gov
Hicks, Nathan@DWR	3/24/2021, 10:56:27 AM	3/24/2021 2h 6m		Nathan.Hicks@water.ca.gov
Sean Runyon/Merced Co. Ag Comm. (Guest)	3/24/2021, 10:56:28 AM	3/24/2021 2h 7m		
Barrera, Gene	3/24/2021, 10:56:39 AM	3/24/2021 2h 6m		gis5@co.merced.ca.us
Padilla, Gregory@CALFIRE	3/24/2021, 10:57:37 AM	3/24/2021 2h 9m		Gregory.Padilla@fire.ca.gov
12095875749	3/24/2021, 10:57:41 AM	3/24/2021 1h 2m		
12095875749	3/24/2021, 12:32:22 PM	3/24/2021 25m 22s		
Chambers, Mack	3/24/2021, 10:57:42 AM	3/24/2021 2h		mack.chambers@woodplc.com
Kristi Kelechenyi	3/24/2021, 10:58:14 AM	3/24/2021 2h 1m		kkelechenyi@csustan.edu
Jason Hicks	3/24/2021, 10:58:16 AM	3/24/2021 1h 11m		jshicks@tid.org
Stacy Souza Elms (Guest)	3/24/2021, 10:58:16 AM	3/24/2021 2h 7m		
Wes Smith - Mariposa County OES	3/24/2021, 10:58:17 AM	3/24/2021 2h 5m		
Justin Lemons	3/24/2021, 10:58:59 AM	3/24/2021 50m 23s		jlemons@csustan.edu
12093857564	3/24/2021, 10:59:04 AM	3/24/2021 18s		
12093857564	3/24/2021, 11:01:16 AM	3/24/2021 1h 32m		
Zachery Falcon	3/24/2021, 10:59:19 AM	3/24/2021 2h 3m		zfalcon@csustan.edu
Ruben and Sammy Gusitine PD (Guest)	3/24/2021, 11:00:21 AM	3/24/2021 2h 2m		
12095818675	3/24/2021, 11:00:24 AM	3/24/2021 1h 59m		
\Alyssa Carroll (Guest)\ ""	3/24/2021, 11:00:32 AM	3/24/2021 2h 1m		
Kent, Walt@CalOES.ca.gov	3/24/2021, 11:00:33 AM	3/24/2021 1h 37m		KentW@CalOES.ca.gov
Vanessa Padilla	3/24/2021, 11:00:58 AM	3/24/2021 1h 16m		vpadilla8@csustan.edu
Kuhlemeier, Rob	3/24/2021, 11:01:13 AM	3/24/2021 2h 1m		srk@co.merced.ca.us
Chowdhary, Pujeeta	3/24/2021, 11:01:18 AM	3/24/2021 2h 1m		pujeeta.chowdhary@woodplc.com
12096754863	3/24/2021, 11:01:41 AM	3/24/2021 2h 1m		
12093835023	3/24/2021, 11:01:49 AM	3/24/2021 1h 15m		
12093835023	3/24/2021, 12:33:45 PM	3/24/2021 29m 45s		
Reith, Heather@Parks	3/24/2021, 11:01:55 AM	3/24/2021 55m 41s		Heather.Reith@parks.ca.gov
Reith, Heather@Parks	3/24/2021, 12:33:08 PM	3/24/2021 29m 51s		Heather.Reith@parks.ca.gov
12093857602	3/24/2021, 11:01:58 AM	3/24/2021 2h 16m		
Mitchell, Carrie	3/24/2021, 11:02:21 AM	3/24/2021 2h		ag39@co.merced.ca.us
Wilson, Casey	3/24/2021, 11:02:21 AM	3/24/2021 2h 1m		wilsonc@cityofmerced.org
Nishihama, John J	3/24/2021, 11:02:21 AM	3/24/2021 56m 36s		sjjn@co.merced.ca.us
12098546183	3/24/2021, 11:02:24 AM	3/24/2021 2h		
Mike Stephenson (Guest)	3/24/2021, 11:03:31 AM	3/24/2021 1h 59m		
12097262999	3/24/2021, 11:03:44 AM	3/24/2021 20m 56s		
Sandra OShields (Guest)	3/24/2021, 11:04:47 AM	3/24/2021 39m 34s		
Vicki Jones (Guest)	3/24/2021, 11:06:23 AM	3/24/2021 44m 20s		
Laura Rodriguez-Mascorro	3/24/2021, 11:31:46 AM	3/24/2021 1h 30m		lrodriguezmascorro@ucmerced.edu
Sandra OShields	3/24/2021, 11:46:22 AM	3/24/2021 1h 16m		soshields@csustan.edu
12097611972	3/24/2021, 12:36:11 PM	3/24/2021 1m 15s		

Attachment 3 Meeting Screen Capture



01:29:47

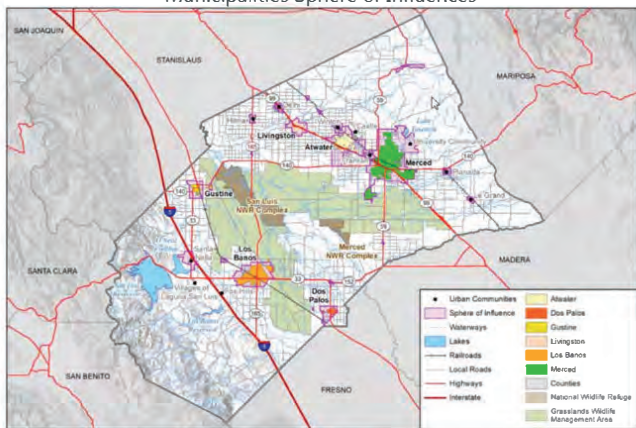
Request control



Leave

Growth and Development Trends

Municipalities Sphere of Influences



- Countywide pop. projected to increase by 82% by 2040
 - 283,521 - 2020
 - 346,085 - 2040 (CA DOF)
- Highlights from Plan Update Guides:
 - City of Merced 6th fastest growing city in CA (as of Jan. 2020)
 - Annexation of UC Merced approved February 2021.
 - City of Dos Palos received grant approval for construction of new Water Treatment facility.
- Sphere of Influence Parcel Analysis:
 - Estimated 6,917 buildings within Dam Inundation areas
 - Estimated 3,066 buildings within 1% Annual Chance Flood
 - Estimated 1,514 buildings within Fire Threat areas

wood.

Participants

Type a name

Share invite

In this meeting (30)

Mute all

- Prosperi, Juliana
- +12095818675
- +12093857564
- +12096754863
- +12093857602
- +12098546183
- "Alyssa Carroll (Guest)"

close

+25

MC

DS

Scheurich, David@CA...

Brislawn, Jeff P

Carr, Amy

01:39:10

Request control



Leave

Merced County Multi-Jurisdictional Local Hazard Mitigation Plan Information Resource Portal

Home Background **Public Input Survey** Encuesta Publica Risk Assessment Viewers Critical Facilities Editor Access & Functional Needs Resources

Merced County Hazard Mitigation Plan Update Public Input Survey

Merced County in collaboration with the cities of Merced, Los Banos, Gustine, Livingston, Dos Palos, and Atwater are updating their Multi-Jurisdictional Hazard Mitigation Plan pursuant to the five year update cycle requirements of the Disaster Mitigation Act of 2000 and to obtain approval from the Federal Emergency Management Agency (FEMA). This update is a prerequisite to enable the County and participating jurisdictions to remain eligible to use federal pre- and post-disaster financial assistance.

The Multi-Jurisdictional Hazard Mitigation Plan analyzes the County's vulnerabilities to natural hazards and identifies mitigation actions the jurisdictions in Merced County can take to minimize property damage and reduce the loss of life by lessening the impacts of disasters.

The purpose of this survey is to collect information from the public and stakeholders to better understand the vulnerabilities within Merced County and each of its jurisdictions as well as solicit input on needs to best mitigate, or reduce, the impacts of hazards before they occur.

The survey consists of 13 questions, plus an optional question for additional comments. The survey should take less than 5 minutes to complete.

Please complete this survey by April 30, 2021. Thank you for your participation!

Hazard Significance

Barrera, Gene

+22



RP

MC



Carr, Amy

DS

Scheurich, David@CA...



Brislawn, Jeff P.



Barrera, Gene



close

From: Brislawn, Jeff P
Sent: Thursday, April 08, 2021 11:46 AM
To: Scheurich, David@CALFIRE; robert.ayuso@fire.ca.gov;
rchavez@gustinepolice.com; csoria@livingstoncity.com;
Mason.hurley@losbanos.org; parkerd@cityofmerced.org;
rmceachin@dospalospd.org
Cc: Barrera, Gene; Padilla, Gregory@CALFIRE
Subject: Merced Multi-Jurisdictional Hazard Mitigation Plan Update - Critical Facility Data review and input

Importance: High

In follow up to the meeting on the Hazard Mitigation Plan on March 24th in regards to the critical facility data, we would like each jurisdiction's assistance validating the GIS data that has been collected. We are reaching out to you as points of contact for your jurisdiction. There are two primary aspects of the review of critical facilities:

1. Data completeness/correctness – we want to ensure we have the facilities and assets captured, and in the correct geographic location
2. Alignment/classification with FEMA Lifelines framework

In the long term there are other data attributes that this site will allow for update and maintenance, including facility valuations, contact info, etc.

Please go the online map application

<https://experience.arcgis.com/experience/c6ad8529e3a84651918e00115607206e/> to browse the data for your jurisdiction and verify the information. You can access the map application using the [Link to Maintenance Editor](#) button on the following page;

https://experience.arcgis.com/experience/c6ad8529e3a84651918e00115607206e/page/page_16/



[THE LOG IN USER NAME AND PASSWORD TO ACCES THE EDITOR APPLICATION IS:](#)

User Name: hmp_user

Password: mchmp2021@mercedcounty

Following your review, please send an email to Gene Barrera (gene.barrera@countyofmered.com) to let him know the following, as applicable:

I have reviewed and it looks complete.

I have reviewed and made edits to address completed/accuracy.

I have reviewed but need assistance making changes.

As a reminder, we are using the FEMA lifelines framework as the basis for defining critical facilities for the plan update:

Community lifelines are fundamental services in a County that provide day-to-day support for a community's basic needs and when stable allow the community to function.

FEMA further defines lifelines into 7 categories: safety and security (fire, police); food, water, and shelter (cooling center); health and medical; energy; communications; transportation; and hazardous materials (Hazmat facilities, pollutant controls).



More details on FEMA lifelines can be referenced here:

<https://www.fema.gov/sites/default/files/2020-05/CommunityLifelinesToolkit2.0v2.pdf>

We'd like to get the Critical Facility information updated in the GIS Experience Application by Wednesday April 21st. Gene Barrera with Merced County is available to provide additional assistance. On the splash page

of the editor application is a link to a video excerpt of his demo of the application on March 24th:

In addition, we will schedule another online-workshop to answer questions on this. This will be scheduled for Thursday April 15th at 9-10am. An Outlook invite will be sent for this.

Please let us know if you will be delegating this to someone else in your jurisdiction.

Thanks

Jeff

Jeff Brislawn

Hazard Mitigation Lead/Sr Associate

Hazard Mitigation and Emergency Management Program

Office: 303-742-5315 Mobile: 303-704-5506

www.woodplc.com

wood.

-

Merced HMP – workshop with emergency managers for each jurisdiction to discuss critical Facility data collection. Webinar on 4/15/21.

Gene Baraa

Attended by 19 persons.

Chat log is below.

01:12:23

Leave

Dan Arnold (Guest)

Meeting chat

Message List

•

Dan Arnold Public Works Director, City of G... by Dan Arnold (Guest)

Dan Arnold (Guest)

10:03 AM

Dan Arnold Public Works Director, City of Gustine, CA.

•

Mason Hurley, Fire Chief - City of Los Bano by Mason Hurley (Guest)

Mason Hurley (Guest)

10:03 AM

Mason Hurley, Fire Chief - City of Los Banos

•

Rich McEachin Dos Palos PD Chief by Rich McEachin (Guest)

Rich McEachin (Guest)

10:03 AM

Rich McEachin Dos Palos PD Chief

- Jeff Brislawn, Project Manager, Wood by Brislawn, Jeff P

Brislawn, Jeff P

10:03 AM

Jeff Brislawn, Project Manager, Wood

-

Nicole Desmond, Management Analyst III, Mer... by Desmond, Nicole M

Desmond, Nicole M

10:03 AM

Nicole Desmond, Management Analyst III, Merced County Executive Office

-

Derek Parker Merced Fire Department Fire Ch... by Parker, Derek

Parker, Derek (External)

10:03 AM

Derek Parker Merced Fire Department Fire Chief\

-

Ruben Chavez, Gustine Chief of Police by "Ruben and Sammy Gusitine PD (Guest)"

"Ruben and Sammy Gusitine PD (Guest)"

10:03 AM

Ruben Chavez, Gustine Chief of Police

-

Corina Falaschi Gustine Planning by Corina Falaschi (Guest)

Corina Falaschi (Guest)

10:04 AM

Corina Falaschi Gustine Planning

-

Sgt. Cliff Battles, Dos Palos Police Depart... by Guest

Guest

10:04 AM

Sgt. Cliff Battles, Dos Palos Police Department

-

Alex Harrington FAE Merced County Fire Dept... by Harrington- Gustine Fire Station (Guest)

Harrington- Gustine Fire Station (Guest)

10:04 AM

Alex Harrington FAE Merced County Fire Dept, Gustine Station

- 8:teamsvisitor:9552c6bf2cf947e6871402e542f6cf43 was invited to the meeting.

Corina Falaschi was invited to the meeting.

- 8:teamsvisitor:914be04aa9514a838a43ce3d98f83d4d was invited to the meeting.

Robert Ayuso (Guest) was invited to the meeting.

- 8:teamsvisitor:21afefc078c14d5894788275532ffd35 left the chat.

Robert Ayuso left the chat.

•

Robert Ayuso Atwater City Fire Battalion Ch... by Robert Ayuso (Guest)

Robert Ayuso (Guest)

10:10 AM

Robert Ayuso Atwater City Fire Battalion Chief

•

Here is a link to the FEMA Lifeline Toolkit... by Chambers, Mack

Chambers, Mack

10:13 AM

Here is a link to the FEMA Lifeline Toolkit, if you go to page 12 in the PDF you will see a summary of all the categories. Pages after break down each Lifeline into Components or SubComponents to better identify where facilities will fit.

<https://www.fema.gov/sites/default/files/2020-05/CommunityLifelinesToolkit2.0v2.pdf>

• 8:orgid:5f1f768a-ed5a-43f1-ba4f-001dad3eabb1 was invited to the meeting.

Scheurich, David@CALFIRE was invited to the meeting.

•

You are filtered and can't see the points by Parker, Derek

Parker, Derek (External)

10:21 AM

You are filtered and can't see the points

• 8:orgid:5f1f768a-ed5a-43f1-ba4f-001dad3eabb1 left the chat.

Scheurich, David@CALFIRE left the chat.

- 8:teamsvisitor:914be04aa9514a838a43ce3d98f83d4d left the chat.

Robert Ayuso (Guest) left the chat.

- 8:teamsvisitor:0fde14b7e014471db189b91c410bf54c left the chat.

Harrington- Gustine Fire Station (Guest) left the chat.

- 8:teamsvisitor:cffa1285721c48daa4b7e51a68f8fd16 left the chat.

Corina Falaschi (Guest) left the chat.

- 8:teamsvisitor:9552c6bf2cf947e6871402e542f6cf43 left the chat.

Corina Falaschi left the chat.

- 8:teamsvisitor:ef59c5c819db48bd858518a76df23057 left the chat.

Rich McEachin (Guest) left the chat.

- 8:teamsvisitor:ee4be146434a400699bd98020421049b left the chat.

Mason Hurley (Guest) left the chat.

- 8:teamsvisitor:fc80128326804a079f0af6cec2aac350 left the chat.

"Ruben and Sammy Gusitine PD (Guest)" left the chat.

- 8:orgid:de858603-eced-4bde-9c5e-1d12c1c2e417 left the chat.

Padilla, Gregory@CALFIRE left the chat.

- 8:teamsvisitor:b4500b4ab8ad42aaa87728fd2e01e4ef left the chat.

Cliff Battles (Guest) left the chat.

Merced County

Multi-Jurisdictional Hazard Mitigation Plan Update

Meeting # 3: Mitigation Strategy Meeting Agenda

Date: Thursday, May 13, 2021
10:00 am – noon

Meeting at: Virtual/Webinar - Microsoft Teams (see email/Outlook for link)

Subject/Purpose

This meeting will focus on updating the plan's mitigation strategy, including updating the plan's goals and objectives, actions undertaken since the last plan update, and identifying new mitigation activities. All participating jurisdictions and planning team members are encouraged to attend and provide input and ideas on new mitigation actions. The meeting will be delivered as a virtual meeting due to the COVID-19 pandemic and social distancing requirements.

Attendees: Hazard Mitigation Planning Team, Stakeholders and Consultant Team

1. Introductions
2. Review of the Planning Process and Progress to Date
3. Update of Mitigation Goals
4. Review of progress on Mitigation Actions from 2015 Plan
5. Review of Mitigation Action Categories and Alternatives
6. Development of New Mitigation Actions
7. Next steps
8. Questions and Answers

Merced County Multi-Jurisdictional Hazard Mitigation Plan 2021 Update

Mitigation Strategy Webinar May 13, 2021, 10:00 AM – 12:00 PM

Introductions and Opening Remarks

Jeff Brislawn, Project Manager with Wood Environment and Infrastructure Solutions (Wood), kicked off the webinar and thanked everyone for their participation. Jeff introduced the Wood team and led a roll call of attendees to introduce themselves. In total 34 individuals participated in the webinar representing Merced County and participating jurisdictions, including municipalities and special districts, as well as stakeholders and partner organizations.

Review of the Planning Process and Progress to Date

The FEMA planning process steps were recapped; Wood is currently wrapping up the Risk Assessment process and beginning the mitigation strategy portion. This webinar addressed mitigation strategizing and goal review/development aspects.

The roles of the participating jurisdictions in the HMPC vs. Stakeholders were reviewed, as differentiated under FEMA's eyes. Only the participating jurisdictions, will be specifically addressed in the plan and will be required to meet certain criteria such as attending planning meetings, identifying mitigation actions, and tracking other aspects in order to qualify for funding in the future. While other entities (i.e. everyone else) were key stakeholders that would provide useful input and feedback as well as review the Hazard Mitigation Plan (HMP) drafts.

The progress on the plan update process to date was reviewed. Highlights include:

- Kickoff meeting held December 16th
- Risk Assessment meeting held March 24th
- First public meeting held May 12th
- Online Public Survey closed May 31st
- HIRA Update Ongoing
- New project website and web map interface created for the project

Update on Public Involvement Activities/public meeting.

Jeff noted that the online public survey is closed on May 31st and received 264 responses. The top five hazards of concern based on this public survey were:

- Drought
- Extreme Temperatures
- Pandemic/Epidemic
- Wildfire
- Wind

Mitigation Goals and Objectives

The goals from the 2014 Hazard Mitigation Plan were revisited, as were the goals from the 2015 City of Merced HMP. Key differences between “goals,” “objectives” and “actions” were defined: goals and objectives are usually more general and broad guidelines while actions are specific and project-driven. Projects submitted for grant funding will need to tie back to goals and objectives in the HMP. The suggested 2021 Merced County Hazard Mitigation Plan goals and objectives were created based on a hybrid of the previous Merced County and City of Merced goals. They are as follows:

Goals:

- Goal 1: Reduce the potential for loss of life and injury from hazards
- Goal 2: Minimize or reduce damage to property.
- Goal 3: Build resiliency and redundancy to maintain essential services, lifelines, facilities, and infrastructure.
- Goal 4: Minimize impacts of hazards to agriculture and the economies of communities.
- Goal 5: Protect and leverage natural and beneficial mitigation functions of the environment.
- Goal 6: Promote hazard mitigation as an integrated policy.
- Goal 7: Increase public awareness of hazards.

For each of the goals and objectives, Jeff highlighted the proposed changes and additions and led a discussion with the committee members.

Review of Progress on Existing Mitigation Actions

Prior to the webinar, a Mitigation Action Tracker was sent to the HMPC listing each jurisdictions’ 2014 mitigation actions. Each HMPC representative was asked to provide status and comments on the status of each action. The Tracker was emailed again following the webinar to fill in some of the missing statuses, as some jurisdictions had not yet returned the Tracker at the time of the webinar. The mitigation action statuses are categorized as one of the following: Completed, Annual Implementation, In Progress, Not Started, and Deleted.

Some examples of “Deleted” actions may be due to lack of project applicability over time, or even inability to complete a project in an area where the community does not have control/jurisdiction (e.g. state owned vs. federal land). Annual Implementation are actions that a jurisdiction is conducting on an ongoing basis, but which the jurisdiction wants to continue forward into the updated plan to maintain visibility on the action.

Mitigation Actions

Jeff lead a discussion on the Mitigation Actions portion of the plan. One way to think of mitigation actions is the four A’s:

- Altering a hazard,
- Averting a hazard,
- Avoiding a hazard,
- Adapting to a hazard

FEMA suggests these four categories for mitigation actions:

- Plans and Regulations,

- Structure and Infrastructure Projects,
- Education and Awareness, and
- Natural Systems Protection.

Resources for more details on mitigation action types, categories, and example projects were provided, including a short discussion on climate change and adaptation considerations. Example hazard-specific mitigation projects were discussed including FEMA funding-eligible projects for winter weather, flood, and other hazards.

Developing New Mitigation Actions

Each participating jurisdiction is required to develop at least one new action for the 2021 plan update. Ideally, jurisdictions should develop actions that address all the hazards addressed in the plan, or at least the High significance hazards. All jurisdictions that participate in the National Flood Insurance Program (NFIP) will need to have a mitigation action addressing continued NFIP compliance.

The following are resources with ideas and examples of mitigation actions and implementation:

- FEMA's 'Mitigation Action Portfolio' Publication: https://www.fema.gov/sites/default/files/2020-08/fema_mitigation-action-portfolio-support-document_08-01-2020_0.pdf
- DOLA 'Planning for Hazard' Guide: <https://planningforhazards.com/home>

A link to the New Mitigation Action Survey was shared during the meeting and emailed after. Each HMPC member was asked to fill out the survey with at least one mitigation action by June 3rd.

New Mitigation Actions Survey: <http://bit.ly/MercedActions>

Next Steps

The project schedule was reviewed:

<u>Project Milestone</u>	<u>Anticipated Timeline</u>
• HMPT Meeting #4	June 2021
• HMPT Review Draft	Late June 2021
• Public Review Draft	August 2021
• Cal OES Review	September 2021
• FEMA Review (estimated)	November-December 2021

Adjourn

The meeting adjourned at 11:30 am

Merced County Hazard Mitigation Plan 2021 Update

Mitigation Strategy Meeting Chat Log

May 13, 2021 – 10:00am-12:00pm PST

Times below are reflected in Mountain Time.

Meeting started 10:46 AM

Michael Salvador (External) has temporarily joined the chat.

Buck (Guest) has temporarily joined the chat.

Mills, Deron (Guest) has temporarily joined the chat.

Parker, Derek (External) has temporarily joined the chat.

Mike North (Guest) has temporarily joined the chat.

Cliff Battles (Guest) has temporarily joined the chat.

Wilson, Casey (External) has temporarily joined the chat.

Calvin Curtin (External) has temporarily joined the chat.

Gurrola, Joanne@CalOES (External) has temporarily joined the chat.

Jones, Vicki (External) has temporarily joined the chat.

Robert Ayuso (Guest) has temporarily joined the chat.

Padilla, Gregory@CALFIRE (Guest) has temporarily joined the chat.

Runyon, Sean (External) has temporarily joined the chat.

Bill Gibbs - MCFB (Guest) has temporarily joined the chat.

Jason Hicks (External) has temporarily joined the chat.

Cosentino-Massimino, Helen (Guest) has temporarily joined the chat.

Janell Martin (External) has temporarily joined the chat.

Kuhlemeier, Rob (External) has temporarily joined the chat.

Alyssa Carroll (Guest) has temporarily joined the chat.

Wes Smith@mariposacountyOES (Guest) has temporarily joined the chat.

[11:01 AM] Unknown User mabeloe (Guest) has temporarily joined the chat.

[11:02 AM] Unknown User Kent, Walt@CalOES.ca.gov (External) has temporarily joined the chat.

[11:02 AM] Unknown User Christina Thurman (External) has temporarily joined the chat.

[11:03 AM] Unknown User Stacy Souza Elms, City of Los Banos (Guest) has temporarily joined the chat.

[11:03 AM] Unknown User Laura Rodriguez-Mascorro (External) has temporarily joined the chat.

[11:03 AM] Unknown User Ruben and Sammy Gusitine PD (Guest) has temporarily joined the chat.

[11:04 AM] Unknown User Barrera, Gene (External) has temporarily joined the chat.

[11:07 AM] Unknown User Jerald Meadows (Guest) has temporarily joined the chat.

[11:13 AM] Barrera, Gene

Gene Barrera, GIS Manager Merced County

[11:13 AM] Jason Hicks

Jason Hicks, Security/Emergency Preparedness Manager, Turlock Irrigation District

[11:13 AM] Bill Gibbs - MCFB (Guest)

Bill Gibbs, Executive Director, Merced County Food Bank

[11:13 AM] Jones, Vicki

Vicki Jones, Environmental Health Division Director, Merced County

[11:13 AM] Jerald Meadows (Guest)

Jerald Meadows - Meteorologist in Charge - National Weather Service

[11:13 AM] Cosentino-Massimino, Helen (Guest)
Helen Cosentino-Massimino, American Red Cross, Disaster Program Manager

[11:13 AM] Stacy Souza Elms, City of Los Banos (Guest)
Stacy Souza Elms, City of Los Banos Community and Economic Development Director

[11:13 AM] Kuhlemeier, Rob
Robert Kuhlemeier, Merced County IT supervisor

[11:13 AM] Kent, Walt@CalOES.ca.gov
Walt Kent, Emergency Services Coordinator, CalOES

[11:13 AM] Wes Smith@mariposacountyOES (Guest)
Wes Smith - Mariposa County OES

[11:13 AM] Michael Salvador
Michael Salvador Chief of Police City of Atwater

[11:13 AM] Janell Martin
Janell Martin, Executive to the City Manager, City of Atwater

[11:13 AM] Mills, Deron (Guest)
Deron Mills, PG&E Public Safety Specialist

[11:13 AM] Runyon, Sean
Sean Runyon, Assistant Agricultural Commissioner, Merced County

[11:13 AM] Laura Rodriguez-Mascorro
Laura Rodriguez-Mascorro, Emergency Manager, UC Merced

[11:14 AM] Carr, Amy
Amy Carr, Hazard Mitigation Planner, Wood

[11:14 AM] Mike North (Guest)
Mike North, Merced County Public Information Officer

[11:14 AM] Brislawn, Jeff P
Jeff Brislawn, Hazard Mitigation Lead, Wood

[11:14 AM] Padilla, Gregory@CALFIRE (Guest)
Greg Padilla Assistant Director of Administration for Merced County OES.

[11:14 AM] Cliff Battles (Guest)
Cliff Battles, Acting Chief of Police - Dos Palos

[11:14 AM] Ruben and Sammy Gusitine PD (Guest)
Ruben Chavez, Gusitine Chief of Police, Emergency Services Coordinator

[11:14 AM] mabeloe (Guest)

Martha Abeloe , Administrative Analyst PW, Adabel Pirita, Administrative Analyst PW, Tony Avina Public Works
Superintendent City of Livingston

[11:15 AM] Calvin Curtin

Calvin Curtin, Emergency Preparedness Coordinator, Turlock Irrigation District

[11:15 AM] Unknown User Justin Vinson (External) has temporarily joined the chat.

[11:17 AM] Gurrola, Joanne@CalOES

Joanne Gurrola, Emergency Services Coordinator, CalOES

[11:18 AM] Robert Ayuso (Guest)

Robert Ayuso CAL FIRE/Atwater City Fire Battalion Chief

[11:18 AM] Unknown User Stephenson, Michael J (External) has temporarily joined the chat.

[11:21 AM] Barrera, Gene

https://experience.arcgis.com/experience/c6ad8529e3a84651918e00115607206e/page/page_12/?draft=true

[11:28 AM] Wilson, Casey

Casey Wilson, Deputy Chief, City of Merced Fire

[11:28 AM] Parker, Derek

Derek Parker, Fire Chief, Merced Fire

[11:29 AM] Prosperi, Juliana

If anyone has any suggestions on the blended/hybrid goals, you can provide edits in the Meeting Chat here!

[11:30 AM] Barrera, Gene

Maintain a comprehensive database of hazards locations, data, infrastructure, and critical facilities inventories.

[11:32 AM] Michael Salvador

need to treat the public safety power shutoff as a future hazard that needs mitigation. in goal one.

[11:37 AM] Unknown User Scheurich, David@CALFIRE (Guest) has temporarily joined the chat.

[11:38 AM] Prosperi, Juliana

Juliana Prosperi, Wood E&IS, Assistant Project Manager

[11:42 AM] Carr, Amy

Slido.com

[11:43 AM] Carr, Amy

code#680239

[11:54 AM] Unknown User Hicks, Nathan@DWR (Guest) has temporarily joined the chat.

[12:07 PM] Carr, Amy

<http://bit.ly/MercedActions>

[12:12 PM] Carr, Amy

FEMA Mitigation Action Portfolio: https://www.fema.gov/sites/default/files/2020-08/fema_mitigation-action-portfolio-support-document_08-01-2020_0.pdf

[12:12 PM] Carr, Amy

CalOES California Adaptation Planning Guide <https://www.caloes.ca.gov/HazardMitigationSite/Documents/CA-Adaptation-Planning-Guide-FINAL-June-2020-Accessible.pdf>

[12:18 PM] Michael Salvador

general and specific to the City of Atwater

[12:18 PM] Unknown UserKent, Walt@CalOES.ca.gov (External) left the chat.

[12:19 PM] Cliff Battles (Guest)

Drought management and water infrastructure specific to Dos Palos

[12:27 PM] Cliff Battles (Guest)

unfortunately I had an incident arise and have to step out. Thank you for the information and I will contact you via email if I have any further questions

[12:34 PM] Janell Martin

Thank you for your time!

[12:34 PM] Robert Ayuso (Guest)

Thanks Jeff!

[12:34 PM] Jason Hicks

Thank you.

[12:34 PM] Parker, Derek

Thank you!

[12:34 PM] Unknown User Alyssa Carroll (Guest) no longer has access to the chat.

[12:34 PM] Padilla, Gregory@CALFIRE (Guest)

Thank you Jeff and Juliana!

[12:34 PM] Unknown User Jerald Meadows (Guest) no longer has access to the chat.

[12:34 PM] Barrera, Gene

Thanks Jeff and Juliana!

[12:34 PM] mabeloe (Guest)

Thank you for your presentation!

[12:34 PM] Unknown User Robert Ayuso (Guest) no longer has access to the chat.

[12:34 PM] Michael Salvador

thank you.

[12:34 PM] Unknown User Wes Smith@mariposacountyOES (Guest) no longer has access to the chat.

[12:35 PM] Unknown User Stacy Souza Elms, City of Los Banos (Guest) no longer has access to the chat.

[12:35 PM] Unknown User Mills, Deron (Guest) no longer has access to the chat.

[12:35 PM] Unknown User Buck (Guest) no longer has access to the chat.

[12:35 PM] Prosperi, Juliana

Thanks Everyone for participating today.

[12:35 PM] Unknown User Padilla, Gregory@CALFIRE (Guest) no longer has access to the chat.

[12:35 PM] Unknown User Scheurich, David@CALFIRE (Guest) no longer has access to the chat.

[12:35 PM] Unknown User Mike North (Guest) no longer has access to the chat.

[12:57 PM] Unknown User Bill Gibbs - MCFB (Guest) no longer has access to the chat.

01:15:04

Request control

Leave

Disaster Mitigation Act Requirements

- ▶ Each jurisdiction must have at least one new action
- ▶ "A comprehensive range" of activities and hazards
- ▶ Priority should be given to High Risk hazards
- ▶ Must be "true" mitigation to meet FEMA requirements
 - ▶ Preparedness & other actions may also be included
- ▶ Actions must be prioritized
- ▶ Actions must have detail on implementation & administration
- ▶ Actions must have a basic review of benefit vs cost
- ▶ Must include actions that address existing and future development

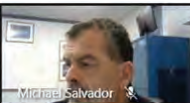
Merced County HMP Update - Meeting #3 Mitigation Strategy Meeting

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VJ

GB



Michael Salvador

RP

Ruben and Sammy Gu...

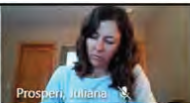
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mabeloe



Bralova, Jeff P.

wood.



Prosperi, Juliana

GP

Padilla, Gregory@CAL...



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Request control

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New Mitigation Action Development

► Please submit new mitigation actions by June 3rd

- Use New Mitigation Action Worksheet (Word doc) attached to Outlook Calendar invite.
- Alternately use online form:
- <http://bit.ly/MercedActions>

► Include as much detail as you can, collaboration with others is within and outside of jurisdiction encouraged.

► Feel free to submit more than one.

Merced County Multi-Jurisdictional Hazard Mitigation Plan New Mitigation Action Worksheet

Name of Jurisdiction: _____
Use this to record potential mitigation projects (1 page per project/action) identified during the planning process to include in the updated plan. Provide as much detail as possible and use additional pages as necessary. Complete and return to Amy Carr amy.carr@woodcl.com by June 3rd, 2021

Jurisdiction:	
Mitigation Project Title:	
Priority (High, Medium, Low):	
Mitigation Project Description:	
Ideas for implementation and Lifeline addressed (if applicable):	
Responsible Officer:	
Partners:	
Potential Funding:	
Cost Estimate:	
Benefits (Avoided Losses):	
Timeline:	

Prepared by: _____
Phone: _____
Email: _____

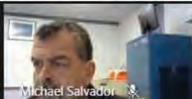
Merced County HMP Update - Meeting #3 Mitigation Strategy Meeting

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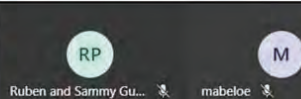
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Michael Salvador



Ruben and Sammy Gu...

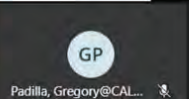
mabeloe



Bialawn, Jeff P



Prosper, Juliana



Padilla, Gregory@CAL...



Merced County

Multi-Jurisdictional Hazard Mitigation Plan Update

Meeting # 4: Mitigation Strategy Refinement

Meeting Agenda

Date: Tuesday June 29, 2021
9:00 am – noon

Meeting at: County EOC 3500 North Apron Ave.
Atwater CA 95301

Subject/Purpose

This meeting will focus on refining and prioritizing new mitigation activities, discussing the draft Hazard Mitigation Plan and final gaps, and plan implementation and maintenance procedures. All participating jurisdictions and planning team members are encouraged to attend and provide input. The meeting will be delivered as an in-person workshop, with a remote option available.

Attendees: Hazard Mitigation Planning Team, Stakeholders and Consultant Team

1. Introductions
2. Review of the Planning Process and Progress to Date
3. Revised Mitigation Goals
4. Review of Updated Mitigation Action Strategy and New Mitigation Actions
5. Prioritization of New Mitigation Actions
6. Draft Plan Overview
7. Plan implementation and maintenance
8. Next steps

SIGN-IN SHEET
MERCED COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE
HMPT Meeting #4: Mitigation Strategy Refinement
Tuesday, June 29, 2021 9:00 AM - Noon
County EOC 3500 North Apron Ave. Atwater, CA 95301

Name	Jurisdiction/Agency/Dept	Title	Phone	E-mail
Walt Kent	Cal OES	ESC	916-396-9292	walt.kent@caloes.ca.gov
DAVID SCHEUMANN	MERCED OES	DEPT. DIRECTOR	(209) 761-1972	DAVID.SCHEUMANN@FIRE.CA.GOV
Mark Pimentel	MERCED CO. FIRE/OES	AC	(559) 706-8804	Mark.pimentel@fire.ca.gov
Vicki Jones	Merced Co. Env. Hlth	Env. Hlth Director	(209) 381-1087	vicki.jones@countyofmerced.ca.gov
Michael Salvador	ATWATER	CHIEF OF POLICE	209-357-6298	MSALVADOR@ATWATER.CA.GOV
Carmie Mitchell	Merced Co. Ag Comm.	Deputy Ag Comm.	385-7431	Carmie.mitchell@countyofmerced.ca.gov
Tony Avino	Livingston	Superintendent	564-7510	taivino@livingstonca.gov
Reggie Hill	L.S.J.L.D.	Manager	209-387-4545	lsjld@elite.net
Irene Johnson	Red Cross	District Engineer Merced Co	760-688-9188	irene.johnson@redcross.org
ROBERT AYUJO	CAL FIRE/ATWATER CITY	BATTALION CHIEF	209-761-6520	ROBERT.AYUJO@FIRE.CA.GOV
Jaime Arceaga	MCDPH	HES	209-381-1195	jaime.arceaga@countyofmerced.ca.gov
Rich McEachin	Dos Palos PD	Chief	209-392-2177	rmceachin@dospalospd.org
Dana Hertzfelder	Merced Co. PWD	Director	209-385-7601	dana.hertzfelder@countyofmerced.ca.gov
Mike Stephenson	Merced Co DPH	Assist. Director	385-7601	Michael.Stephenson@countyofmerced.ca.gov
Mason Hurley	Los Banos City	Fire Chief	209-587-6581	Mason.hurley@losbanos.org

[illegible]

2021 Merced County Goals and Objectives

Goal 1: Reduce the potential for loss of life and injury from hazards

- Assist vulnerable populations from the impacts of severe weather by organizing a mechanism for outreach
- Educate property owners by increasing wildfire awareness and measures for reducing risks
- Identify opportunities to reduce losses associated with High Hazard potential dams

Goal 2: Minimize or reduce damage to property.

- Minimize growth and development in hazard areas
- Adopt and enforce building codes
- Educate property owners by increasing wildfire awareness and measures for reducing risks
- Identify opportunities to reduce losses associated with High Hazard potential dams

Goal 3: Build resiliency and redundancy to maintain essential services, lifelines, facilities, and infrastructure.

- Ensure protection and enhancement of key emergency access routes
- Protect critical facilities and infrastructure to minimize loss of critical services
- Seek funding sources and partners for future mitigation activities
- Improve organizational capabilities to address health and safety issues in mitigation and response

Goal 4: Minimize impacts of hazards to agriculture and the economies of communities.

- Encourage water conservation measures among urban, rural, and agricultural users
- Increase water storage to mitigate flooding and drought
- Strengthen disaster resistance and resiliency of major employers
- Develop plans for post-disaster recovery

Goal 5: Protect and leverage natural and beneficial mitigation functions of the environment.

- Encourage the use of drought tolerant or xeriscaping practices into landscape ordinances
- Incorporate defensible space in landscaping of new and existing development

Goal 6: Promote hazard mitigation as an integrated policy.

- Promote hazard mitigation as integrated policy among communities in the county and with the region and state
- Incorporate flood mitigation into local planning by adoption of post disaster recovery ordinance based on a plan to regulate repair activity
- Continue to improve enforcement of existing standards and regulations

Goal 7: Increase public awareness of hazards.

- Promote education and awareness about natural hazards risk, mitigation, and preparedness to citizens, public agencies, elected officials, nonprofit organizations, and businesses
- Develop water saving education program
- Increase communication regarding hazard mitigation among communities in the county

Open Ended Responses from Public Survey

Question 3: Do you have information on specific hazard issues/problem areas that you would like the planning committee to consider? Note the jurisdiction to which it applies:

- Wildfires
- Wind, lack of water for agriculture, fire.
- Fireplace smoke
- Wildfires west of gustine
- Wildfires.
- Fires
- Fires, Traffic accidents, power outages Merced county west side
- Methane gas
- Pesticides
- Water quality and over pumping of our water supply
- Natural fires and landslides on Pacheco Pass. Also, high winds and dense fog
- Flooding of Bear Creek in the southeast corner of Merced.
- Power outages and flooding
- Climate Change... cyberhacked institutionally... drought
- Merced/Stanislaus Counties all of the back roads need to be repaved, please. I travel them frequently between Gustine and Modesto. Thanks for asking.
- Covid-19 response
- Fires and earthquakes
- Covid-19
- Drought
- Pandemic, Fires, Wind, Flood
- Droughts. Build more dams.
- Not in my recollection about the disruption of my daily life.
- Smoke from Wildfires
- Fahrens park in merced overflowed with water 2 years ago.
- 5G/ cell towers in a close radius to homes and schools. This is major issue im concerned with.
- Fires and smoke inhalation in Merced County
- Bad air quality due to wildfires around us along with extreme temperatures.
- All natural factors that could affect power/internet outage should be reduced significantly.
- More planning for evacuation locations.
- Public Safety Power Shut offs (Atwater PD)
- Merced county - Gustine: high winds, constant city water issues,
- More Financial assistance/ Homelessness/ Health Insurance/ More Low income housing if pandemic hits USA again.
- bridges and roads
- Drinking water quality - Los Baños area
- Los Banos - Subsidence

Open Ended Responses from Public Survey 2021

- Flooding in the Los Banos area. It's closeness to the dam puts it in danger. All earthen dams fail, eventually, and San Luis is no different. Heavy rain affects our roads and the number of escape routes is limited.
- The largest hazard is lack of affordable housing for our friends and neighbors that rely on rentals
- If you don't fix the water storage (Dams) problem none of the other issues will matter. Try imagining life in the arid areas of Nevada, because that's what it will look like here. End of problems.
- Merced County was underprepared for pandemic response. Pandemics will increase with climate change, so climate change and pandemic preparedness should be of utmost importance for future planning. (Merced City and Merced County).
- Overpopulation of pigeons, seagulls, and crows.
- Flooding on City streets
- Fire in Del Puerto Canyon
- Fire
- Big rigs driving too fast on south ave /140/33 Gustine ca. its a hazard to the residents and our property. Day and night.
- Power outage and pandemic
- Bridges and roads washing out during heavy rains.
- Excessive heat and water shortage is most concerning
- Wildfires and strong wind
- Environment: Pollution/Littering
- Drought
- Homeless people with mental health problems and/or drug addiction in the downtown Merced area.
- Wind damaging roofs, earthquake mitigation in structures for future cases, covid, chemical sprays near homes next to orchards.
- I live in a nicer part of Merced so I am not too worried about most of these issues. I would be worried about fire since these houses would burn down pretty fast.
- Power outages
- There were the wildfires which meant that school was cancelled and going outside was not a good idea.
- It was in Stanislaus County with the fires that made it difficult to see and breathe
- High winds through the area. Hazmat being moved through the area on Hwy 33. Nearby airport with cropdusters - possibility of crash and hazmat leak. Dos Palos
- Bear creek/black raschal creek, cottonwood creek flooding. Merced
- I do not feel qualified to answer.
- Diseases delivered via mosquito bite, wetlands in Los Banos is cause for this concern. Also a blended concern of Agriculture impact on air quality when combined with Strong Winds, this includes but is not limited to pesticides and dirt becoming airborne due to agricultural land uses.
- Atwater has had many power outages
- It's mostly power outages (which is to blame PG&E for not taking the time for better infrastructure), wildfires have threatened us, and small earthquakes have happened. I live in Atwater
- Emergency plans for natural disasters and diseases.

Open Ended Responses from Public Survey 2021

- Protection from cyber attacks
- Poor air quality, pesticide use in agricultural areas/unsustainable farming practices, natural disaster preparedness in unincorporated jurisdictions throughout Merced County, specifically Winton.
- Road conditions in Merced County
- Merced, COVID.
- Flooding
- Wildfires
- Envíen más información a la población de Cuando hay peligros inminentes para siempre estar preparados. Y más talleres para Saber cómo actuar en caso de Emergencias.
 - o *Translation:* Send more information to the populations of when there are imminent dangers and how to always be prepared. And more workshops for how to act in case of an emergency
- Vientos fuertes; árboles de ramas quebradizas
 - o *Translation:* Strong winds; brittle branch trees

Question 5: Please comment on any other pre-disaster mitigation actions that the planning committee should consider for reducing future losses caused by disasters:

- More public awareness to the community for Covid-19 pandemic.
- Optimizing use of cell phone emergency notifications
- We have more than enough government involvement.
- Drought
- Warning on possible power outage during extreme weather
- Have enough water treatment pumps in dos palos
- The vaccine roll-out seems to be going well. Keep up the good work through education and availability.
- Food security and green spaces
- Wildfires and staging or evacuation area.
- Global Pandemics!!!
- Better signs to get to where you need to go. Better planning for the future hazards.
- Wildfires tree thinning
- Improvements of the levee to prevent flood.
- Education for the public
- Text messaging is the best source of contact No one listens to radio anymore or watch's local TV as much
- Stay at home order to avoid smoke inhalation
- Wildfire fire prevention along with saving water from snow melt.
- All types of production plants should be set to a high standard when it comes to taking all steps available to ensure they are as planet friendly as technology allows it.
- Water (dry wells) in Le Grande is an issue
- The effects of a prolonged public safety power shut off by a utility company
- Mostly just water conservation! So many green lawns and people washing their driveways.
- Better figure out where you will get a drink after the underground water is salty.

Open Ended Responses from Public Survey 2021

- Most of the listed activities were flood related. Flood is important, but so are many other potential hazards. Mitigation activities should be diversified.
- Power Outage Prevention. Proper preventative maintenance of the electrical grid in fire prone areas.
- The state needs to give the farmers the water instead of dumping it. Our ground water is depleting because of this. San Luis Dam was built for agriculture 1st.
- Protect city from cyber attack, ex city services compromised due to computer failure/shutdown
- Wildfire education
- Pay attention to seismic activity anywhere near the faults and how can homeowners prevent any future catastrophe to their properties. Education on Insurance and special programs to make it affordable is crucial. Before buying a house disclosure on flooding and earthquake or May other natural disaster-prone areas including where dams are located matter and should be disclosed.
- Air filters and water. Air filters for fire season and water for droughts
- Possibly look into quarterly or bi-annual training with agencies in affected areas.
- Alert residents when prescribed fires are taking place. Often time when the foothills or farmlands are having controlled fires the smoke affects the air quality of residents of surrounding communities. Since such burns must have special permissions, the agencies issuing such permissions should also notify citizens in the surrounding communities.
- Water
- Build a sanctuary that wildlife can live in post wildfire disaster until their homes can be restored.
- Mejor construccion de los edificios y/o casas en base a los terremotos
 - o *Translation:* Better construction of buildings and / or houses based on earthquakes
- Cuidado de comida
 - o *Translation:* Food care
- La Erosión de la tierra que está ocasionando que el agua escasee más. Y a futuro las Cosechas no servirán. Si no planificáramos con tiempo la pérdida del agua del subsuelo. Ya que año con año no llueve y la Nieve que cae no es suficiente para el Aumento de la población que crece cada día.
 - o *Translation:* The erosion of the land that is causing the water scarcity more. And in the future the harvests won't do. If we did not plan in advance the loss of groundwater. Since year after year it does not rain and Falling snow is not enough. Increase in the population that grows every day.
- Mantener la basura en su lugar
 - o *Translation:* Keep trash in its place
- Reducción de tarifa de luz en verano por el uso de aires acondicionados
 - o *Translation:* Reduction of electricity rates in summer due to the use of air conditioners

Question 14: Optional: Provide any additional comments you have which you feel are relevant for the Hazard Mitigation plan update:

- I believe Merced Co. is free of hazards or disasters.
- Mitigation efforts should heavily consider ways to offset climate change
- Enjoy the ride. Each day as it comes.
- What, if anything, is being done about the water in Los Banos?
- Please focus on food security and public health that take a preventative approach to disasters?
Also focus on ensuring the community will be fine regardless of whether there is a disaster

Open Ended Responses from Public Survey 2021

- Better planning and education and awareness. I was never contacted for my 2nd vaccination as I was told I would. I almost missed my deadline for it. I had to research when and where the next vaccine would be.
- HR Support is probably the worst provider partnered by the county in these Covid 19 vaccinations.
- I can't believe they are eliminating at burning for attrition
- Just a thank you for giving us a voice...
- How are you using social media to distribute information and educate the residents of your county? Let us know if we can help you?
- Lack of community organization. Atwater declaring itself a sanctuary city is a prime example.
- I'm not sure how useful this survey of the general public will be for planning purposes. I am an active and informed member of the community, and even I didn't feel qualified to answer most of these questions.
- This is the first time I have heard of our area having a disaster plan. More community education is needed for this subject topic.
- Que la cosas se hagan por El bien de todas las Comunidades y se tome acción inmediata.
 - o *Translation:* That things be done for the good of all communities and take immediate action



OFFICE OF EMERGENCY SERVICES

3500 NORTH APRON AVENUE
ATWATER, CA 95301
OFFICE (209) 385-7548
FAX (209) 725-0174

MIKE VAN LOBEN SELS
Director
(209) 966-3622

DAVID SCHEURICH
Deputy Director-Administration
(209) 385-7548

FOR IMMEDIATE RELEASE

CONTACT: Battalion Chief David Scheurich: (209) 385-7548

NOTICE OF PUBLIC WORKSHOP FOR THE PREPARATION OF THE MERCED COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE

Merced County and its six participating jurisdictions (City of Merced, City of Atwater, City of Los Banos, City of Livingston, City of Dos Palos, City of Gustine) have launched a planning effort to assess risks from natural, human-health, and human-caused hazards and to identify ways to reduce those risks. The planning process will result in an update to the County's existing Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). A MJHMP update is required under the Federal Disaster Mitigation Act of 2000 to be eligible to receive federal disaster assistance and funding.

Most people who live and work in Merced County are vulnerable to a wide range of natural hazards, including drought, climate change, earthquakes, extreme heat, flooding, subsidence, severe weather, and wildfires. The County's population, property, and critical facilities may be exposed to potential human-caused hazards associated with facilities and infrastructure that contain hazardous materials. The County is also vulnerable to cyber threats, agricultural pests, and public health hazards, such as pandemics. The MJHMP will provide the County with valuable tools to identify risks and mitigate hazards through future project-specific actions. The plan will assess the effects of climate change on natural hazards and will incorporate climate adaptation strategies and discuss how climate change can disproportionately impact socially vulnerable populations. The MJHMP update will also support the County's participation in the National Flood Insurance Program and include recommendations to improve the County's floodplain management policies and regulations.

Merced County will be hosting a **Public Workshop on Wednesday, May 12, 2021 from 6 to 8 p.m.** The Public Workshop will be an opportunity to learn more about the planning process and the hazards that will be assessed in the MJHMP. Following the Public Workshop, there will be an opportunity for the public to comment on the planning process. The County encourages participation and feedback by attending the Public Workshop, completing the Public Survey, visiting the County's Project Webpage, and commenting on the Draft MJHMP (once available). Information on how to participate is provided below.

- **Public Workshop – Wednesday, May 12, 2021, 6 – 8 p.m.,**
 - Watch the workshop live and ask questions: www.facebook.com/MercedCountyOES
- **Public Survey (English version) – available here:** <https://bit.ly/3spNICy>
- **Public Survey (Spanish version) – available here:** <https://bit.ly/3aSKq4P>
- **Merced County MJHMP Update Information Portal:**
https://experience.arcgis.com/experience/c6ad8529e3a84651918e00115607206e/page/page_10/

Questions may be directed to David Scheurich, Merced County OES, Battalion Chief/Deputy Director by calling (209) 385-7548 or by email at david.scheurich@fire.ca.gov

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Posted on: May 4, 2021

Public Workshop - Preparation of Merced County Multi-Jurisdictional Hazard Mitigation Plan Update

Merced County and its six participating jurisdictions (City of Merced, City of Atwater, City of Los Banos, City of Livingston, City of Dos Palos, City of Gustine) have launched a planning effort to assess risks from natural, human-health, and human-caused hazards and to identify ways to reduce those risks. The planning process will result in an update to the County's existing Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). A MJHMP update is required under the Federal Disaster Mitigation Act of 2000 to be eligible to receive federal disaster assistance and funding.



Most people who live and work in Merced County are vulnerable to a wide range of natural hazards, including drought, climate change, earthquakes, extreme heat, flooding, subsidence, severe weather, and wildfires. The County's population, property, and critical facilities may be exposed to potential human-caused hazards associated with facilities and infrastructure that contain hazardous materials. The County is also vulnerable to cyber threats, agricultural pests, and public health hazards, such as pandemics. The MJHMP will provide the County with valuable tools to identify risks and mitigate hazards through future project-specific actions. The plan will assess the effects of climate change on natural hazards and will incorporate climate adaptation strategies and discuss how climate change can disproportionately impact socially vulnerable populations. The MJHMP update will also support the County's participation in the National Flood Insurance Program and include recommendations to improve the County's floodplain management policies and regulations.

Merced County will be hosting a **Public Workshop on Wednesday, May 12, 2021 from 6 to 8 p.m.** The Public Workshop will be an opportunity to learn more about the planning process and the hazards that will be assessed in the MJHMP. Following the Public Workshop, there will be an opportunity for the public to comment on the planning process. The County encourages participation and feedback by attending the Public Workshop, completing the Public Survey, visiting the County's [Project Webpage](#), and commenting on the Draft MJHMP (once available). Information on how to participate is provided below.

- **Public Workshop – Wednesday, May 12, 2021, 6 – 8 p.m.**
 - [Watch the workshop live and ask questions](#)
- [Public Survey](#)
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Merced County

May 4 at 5:18 PM · 🌐

Hazard Mitigation Plan Public Workshop:
www.countyofmerced.com/CivicAlerts.aspx?AID=2049

Merced County and its six participating jurisdictions (City of Merced, City of Atwater, City of Los Banos, City of Livingston, City of Dos Palos, City of Gustine) have launched a planning effort to assess risks from natural, human-health, and human-caused hazards and to identify ways to reduce those risks. The planning process will result in an update to the County's existing Multi-Juris... See More



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Merced County, CA

Public Workshop - Preparation of Merced County
Multi-Jurisdictional Hazard Mitigation Plan Update

1

1 Share

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Merced County

May 4 at 5:08 PM · 🌐

As of 3:30 p.m. Tuesday, May 4, 2021, there are 31,682 confirmed cases (+25 from Monday) of COVID-19 (novel coronavirus) in Merced County. Approximately 393 of those cases are active, and 454 have died.

Current Risk Tier: Red (Substantial). Some non-essential indoor business

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Contact Merced County on Messenger



www.countyofmerced.com



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OFFICE (209) 385-7548
FAX (209) 725-0174

MIKE VAN LOBEN SELS
Director
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DAVID SCHEURICH
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(209) 385-7548

FOR IMMEDIATE RELEASE

CONTACT: Battalion Chief David Scheurich: (209) 385-7548

NOTICE OF PUBLIC WORKSHOP REGARDING THE DRAFT OF THE MERCED COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE

Merced County and its six participating jurisdictions (City of Merced, City of Atwater, City of Los Banos, City of Livingston, City of Dos Palos, City of Gustine) are in the final stages of a planning effort to assess risks from natural, human-health, and human-caused hazards and to identify ways to reduce those risks. A planning process that began in December 2020 has resulted in a draft update to the County's existing Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). A MJHMP update is required under the Federal Disaster Mitigation Act of 2000 to be eligible to receive certain federal disaster assistance and grants for hazard mitigation projects. Following the public workshop and comment period the Plan will be submitted for final approvals and ultimately adoption by all involved jurisdictions.

Most people who live and work in Merced County are vulnerable to a wide range of natural hazards, including drought, floods, severe weather, earthquakes, and wildfires. The County's population, property, and critical facilities may be exposed to potential human-caused hazards associated with facilities and infrastructure that contain hazardous materials. The County is also vulnerable to cyber threats, agricultural pests, and public health hazards, such as pandemics. The draft update of the MJHMP provides the County and municipalities with valuable tools to identify risks and mitigate hazards through future project-specific actions.

Merced County will be hosting a second virtual **Public Workshop on Wednesday, September 22, 2021 from 6 to 8 p.m.** The second virtual Public Workshop will be an opportunity to learn more about the updated draft MJHMP including the planning process, the hazards assessed, and the mitigation actions proposed in the MJHMP. Following the Public Workshop, there will be an opportunity for the public to comment on the draft MJHMP. The County encourages participation and feedback by attending the Public Workshop, visiting the County's Project Webpage, and/or commenting on the Public Review Draft MJHMP. Information on how to participate is provided below.

- **Public Workshop – Wednesday, September 22, 2021, 6 – 8 p.m.,**
 - Watch the workshop live and ask questions: <https://bit.ly/3nUmzZz>
- **Merced County Public Review Draft MJHMP:**
https://web2.co.merced.ca.us/pdfs/oes/Merced_MJHMP_2021_Draft.pdf
- **Merced County MJHMP Update Information Portal:**
https://experience.arcgis.com/experience/c6ad8529e3a84651918e00115607206e/page/page_10/

Questions may be directed to David Scheurich, Merced County OES, Battalion Chief/Deputy Director by calling (209) 385-7548 or by email at david.scheurich@fire.ca.gov

—30—



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ATWATER, CA 95301
OFFICE (209) 385-7548
FAX (209) 725-0174

MIKE VAN LOBEN SELS
Director
(209) 966-3622
DAVID SCHEURICH
Deputy Director-Administration
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Merced County Survey: Hazard Mitigation Plan

English:

Merced County, in collaboration with the cities of Atwater, Dos Palos, Merced, Gustine, Livingston, Los Banos, and Merced, are updating their Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) pursuant to the five-year update cycle requirements of the Disaster Mitigation Act of 2000 and to obtain approval from the Federal Emergency Management Agency (FEMA). This update is a prerequisite to enable the County and the participating jurisdictions to remain eligible to use federal pre- and post-disaster financial assistance.

"Hazard Mitigation" is defined as sustained actions taken to reduce or eliminate long-term risk to life and property from hazards. The Merced County MJHMP will analyze the County's vulnerabilities to natural, human-health, and human-caused hazards and identify proactive mitigation actions the County, its six participating jurisdictions, and stakeholders can take to minimize impacts to people, property, and critical facilities.

The purpose of this survey is to collect information from the public and stakeholders to better understand the vulnerabilities within Merced County and each of its jurisdictions as well as solicit input on needs to best mitigate, or reduce, the impacts of hazards before they occur.

Please scan the QR code with your camera on your phone and complete the survey. The survey should take less than 5 minutes to complete.

Spanish:

El Condado de Merced, en colaboración con las ciudades de Atwater, Dos Palos, Merced, Gustine, Livingston, Los Banos y Merced, están actualizando su Plan De Mitigación de Riesgos Multi-Jurisdiccionales (MJHMP) de acuerdo con los requisitos del ciclo de actualización de cinco años de la Ley de Mitigación de Desastres de 2000 y para obtener la aprobación de la Agencia Federal para el Manejo de Emergencias (FEMA). Esta actualización es un requisito previo para permitir que el Condado y las jurisdicciones participantes sigan siendo elegibles para usar asistencia financiera federal previa y posterior al desastre.

La "Mitigación de Riesgos" se define como acciones sostenidas tomadas para reducir o eliminar el riesgo a largo plazo para la vida y la propiedad de los peligros. El MJHMP del Condado de Merced analizará las vulnerabilidades del Condado a los peligros naturales, de salud humana y causados por el ser humano e identificará acciones proactivas de mitigación del Condado, son seis jurisdicciones participantes y las partes interesadas pueden tomar para minimizar los impactos a las personas, la propiedad y las instalaciones críticas.

El propósito de esta encuesta es recopilar información del público y las partes interesadas para comprender mejor las vulnerabilidades dentro del Condado de Merced y cada una de sus jurisdicciones, así como solicitar insumos sobre las necesidades para mitigar o reducir mejor los impactos de los peligros antes de que ocurran.

Por favor, escanee el código QR con su cámara en su teléfono y complete la encuesta. La encuesta debe tardar menos de 5 minutos en completarse.

English Version Survey:



Thank you for your participation!

¡Gracias por su participación!

Spanish Version Survey:





Merced County Hazard Mitigation Plan Update Public Input Survey

290	15:20	Closed
Responses	Average time to complete	Status

1. Several hazards which are addressed in the California State Hazard Mitigation Plan are listed below. Please rank each of these hazards Low, Medium, or High in their significance to Merced County.

Low Moderate High

Agricultural Pests and Disease

Climate Change

Cyber Attack

Dam Incident

Drought

Dense Fog

Earthquake

Extreme Temperature

Heavy Rainfall

Flood and Levee Failure

Hazardous Materials Incident

Landslide

Pandemic/Epidemic

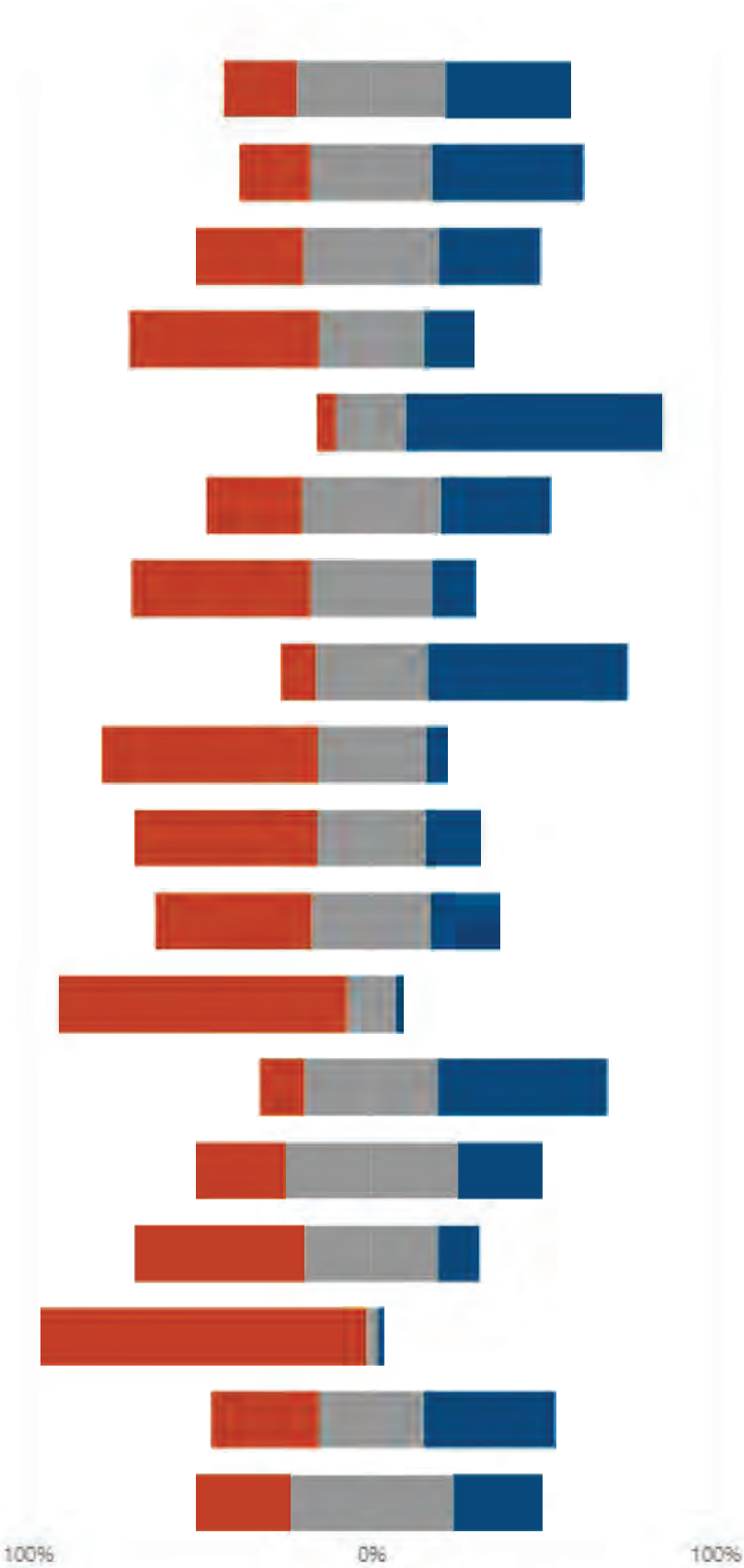
Power Outage

Subsidence

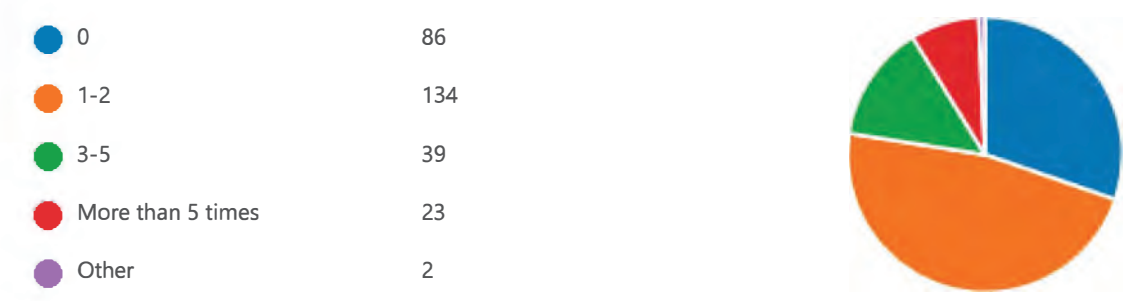
Tornado

Wildfire

Wind



2. How many times has a natural hazard disrupted your daily life in the last five years?



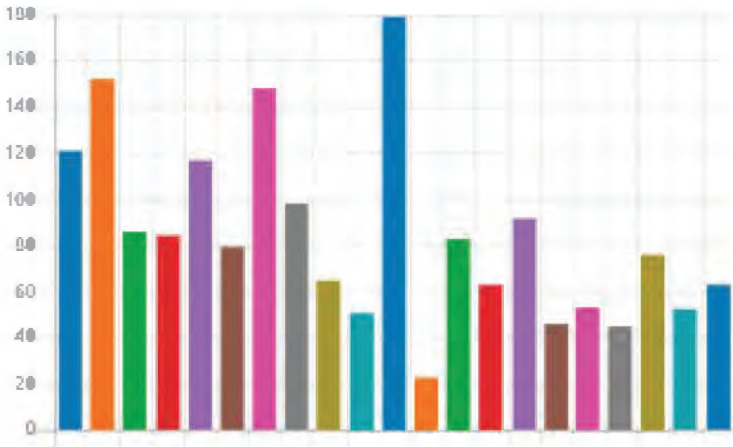
3. Do you have information on specific hazard issues/problem areas that you would like the planning committee to consider? Note the jurisdiction to which it applies:

104
Responses

Latest Responses

4. The following types of mitigation actions may be considered in Merced County. Please indicate the types of mitigation actions that you think should have the highest priority in the Merced County Multi-Jurisdictional Hazard Mitigation Plan.

Indoor/Outdoor Warning syst...	121
Wildfire Fuels Treatment proje...	152
Continued Participation in the...	86
Critical Facilities Protection	84
Generators for Critical Facilities	117
Planning/Zoning	79
Public Education/Awareness	148
Stormwater Drainage Improve...	98
Stream Restoration	65
Education and Discounts on Fl...	51
Water Conservation	179
Floodprone Property Buyout	23
Evacuation route development	83
Dam safety	63
Improve reliability of commun...	92
Levee enhancements/improve...	46
Seismic retrofit to public build...	53
Seismic safety for residential b...	45
Aquifer recharge	76
Subsidence hazard mitigation	52
Wind hazard mitigation	63



5. Please comment on any other pre-disaster mitigation actions that the planning committee should consider for reducing future losses caused by disasters:

53

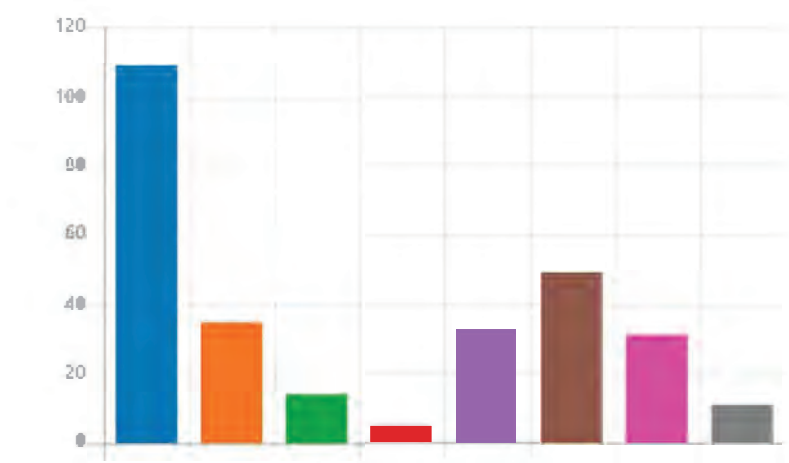
Responses

Latest Responses

"Not sure at the moment "

6. Please indicate the community you live in

City of Merced	109
City of Los Banos	35
City of Livingston	14
City of Dos Palos	5
City of Gustine	33
City of Atwater	49
Unincorporated Merced County	31
Other	11



7. What is your zip code?

277
Responses

Latest Responses

"95340"
"95301"
"95341"

8. How long have you lived in this community?

Less than 1 year	17
1-5 years	65
5-10 years	26
over 10 years	176



9. What is your age?

0-18 years old	16
18-24	49
25-39	91
40-55	67
55+	63



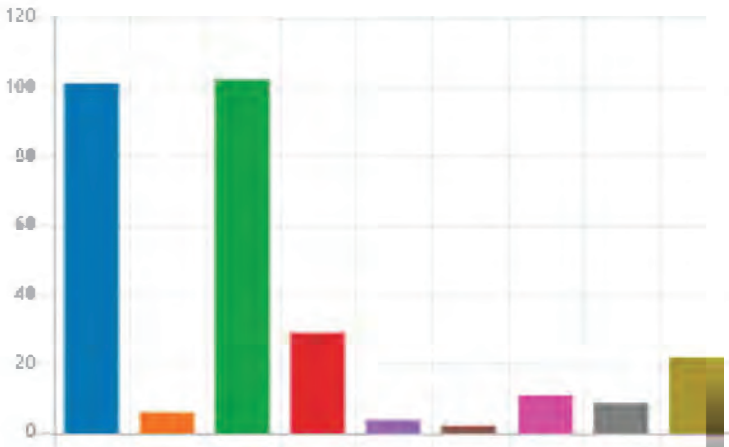
10. What gender do you identify as?

Woman	136
Man	136
Non-binary	4
Prefer not to say	10
Other	0



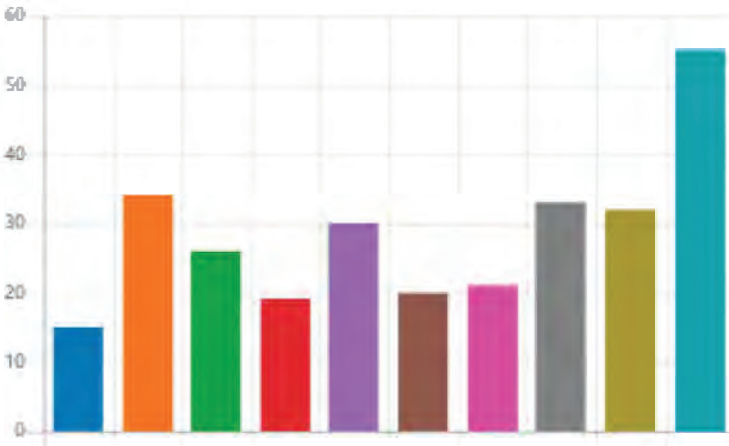
11. Please specify your ethnicity

Caucasian	101
African-American	6
Latino or Hispanic	102
Asian	29
Native American	4
Native Hawaiian or Pacific Isla...	2
Two or More	11
Other	9
Prefer not to say	22



12. What is your annual household income?

Less than \$10,000	15
\$10,000 - \$25,000	34
\$25,000 - \$40,000	26
\$40,000 - \$55,000	19
\$55,000 - \$70,000	30
\$70,000 - \$85,000	20
\$85,000 - \$100,000	21
\$100,000 - \$150,000	33
\$150,000 or more	32
Prefer not to say	55



13. Optional: Provide your name and email address if you would like to be added to a distribution list for upcoming activities related to this planning process:

37

Responses

Latest Responses

"Lalo_tejeda@hotmail.com "

14. Optional: Provide any additional comments you have which you feel are relevant for the Hazard Mitigation plan update:

21

Responses

Latest Responses

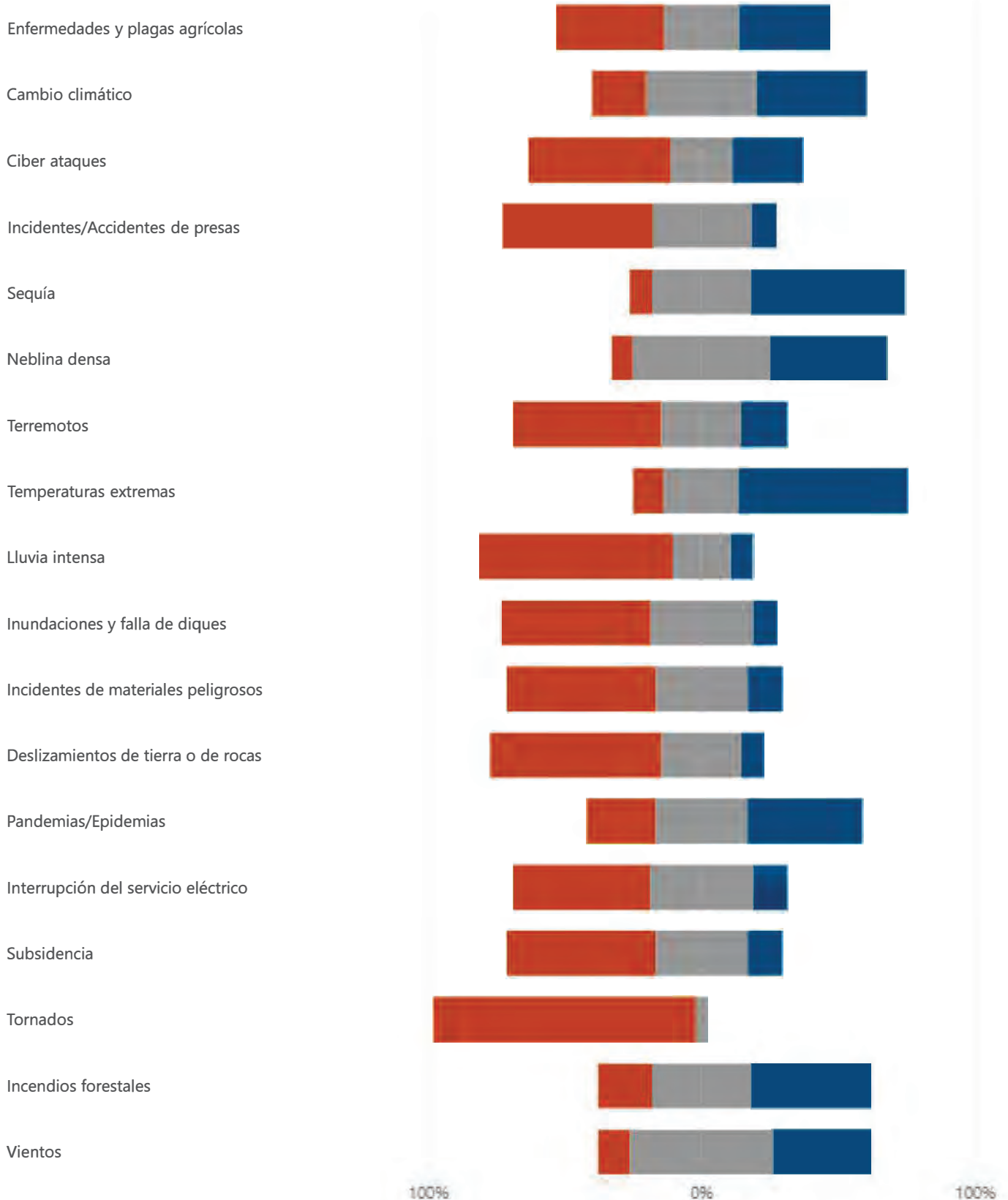
"Lalo_tejeda@hotmail.com "

La Actualización del Plan de Mitigación de Peligro del condado de Merced-Encuesta publica

33	06:19	Closed
Responses	Average time to complete	Status

1. Varios peligros abordados en el Plan de Mitigación del estado de California se enlistan a continuación. Por favor, indique el nivel de importancia en el condado de Merced que usted percibe para cada peligro, clasificándolo como: Bajo, Moderado o Alto

■ Bajo ■ Moderado ■ Alto



2. ¿Cuántas veces un peligro natural ha interrumpido su vida diaria en los últimos cinco años?

0 veces	16
1 a 2 veces	16
3 a 5 veces	1
Más de 5 veces	0
Otro	0



3. ¿Cuenta usted con información sobre peligros específicos o problemas en su área que quisiera que el comité de planificación considere? Anote la jurisdicción a la cuál aplica.

14

Responses

Latest Responses

4. Los siguientes tipos de acciones de mitigación podrían considerarse en el condado de Merced. Por favor indique el tipo de acción de mitigación, que usted crea que deba tener la mayor prioridad en el Plan de Mitigación de Peligros Multi-Jurisdiccional del condado de Merced.

- Sistemas de advertencia en int...

8
- Proyectos para el tratamiento ...

11
- Participación continua en el Pr...

8
- Protección de instalaciones crí...

0
- Generadores para instalacione...

0
- Planificación / Zonificación

2
- Educación pública y descuent...

8
- Mejoras al sistema de drenaje ...

8
- Restauración de Corrientes (rí...

3
- Educación y descuentos en se...

3
- Conservación del agua

15
- Compra de propiedades prop...

1
- Desarrollo de rutas de evacua...

9
- Seguridad de presas

4
- Mejorar la confiabilidad de los...

4
- Mejoras a los diques de prote...

3
- Rehabilitación sísmica de edifi...

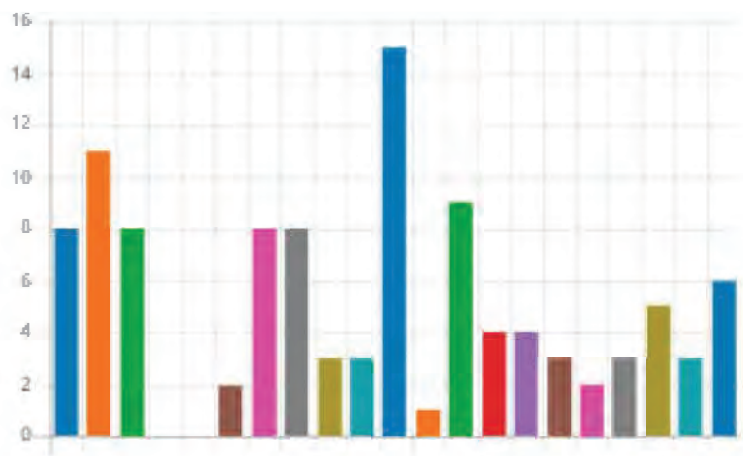
2
- Seguridad sísmica para edifici...

3
- Recarga de acuíferos

5
- Mitigación de peligros ante su...

3
- Mitigación de peligro por vien...

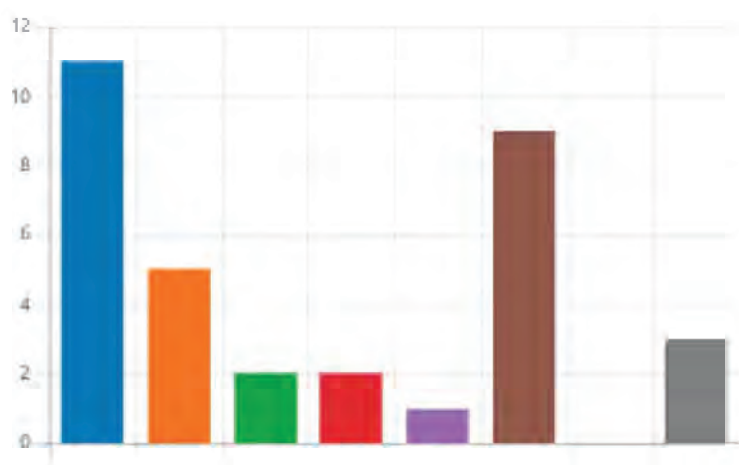
6



5. Por favor, comente sobre cualquier otra acción mitigatoria pre-desastre que el comité de planificación debe considerar para reducir pérdidas futuras causadas por desastres:

6. Por favor, indique la comunidad donde vive:

Ciudad de Merced	11
Ciudad de Los Baños	5
Ciudad de Livingston	2
Ciudad de Dos Palos	2
Ciudad de Gustine	1
Ciudad de Atwater	9
Condado desincorporado de ...	0
Otro	3



7. ¿Cuál es su código postal?

32

Responses

Latest Responses

"9t341"

"95350"

8. ¿Cuánto tiempo ha vivido en esta comunidad?

Menos a un año	4
De 1 a 5 años	14
De 5 a 10 años	6
Más de 10 años	9



9. ¿Cuál es su edad?

0 a 18 años	0
18 a 24 años	0
25 a 39 años	17
40 a 55 años	11
Más de 55 años	4



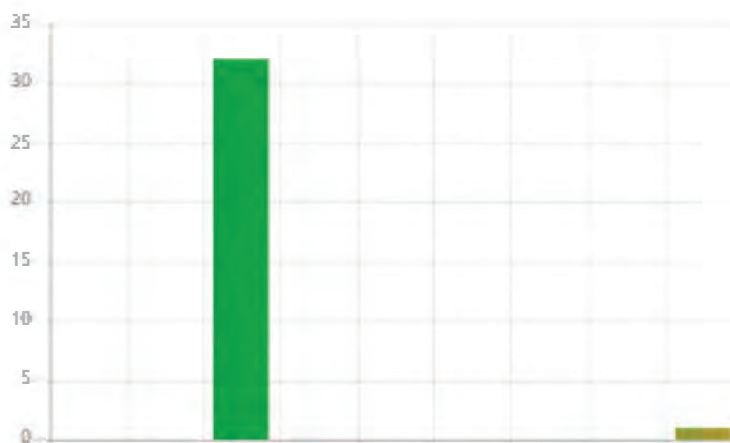
10. ¿Con qué género se identifica?

Mujer	19
Hombre	14
Np-binario	0
Prefiero no decirlo	0
Otro	0



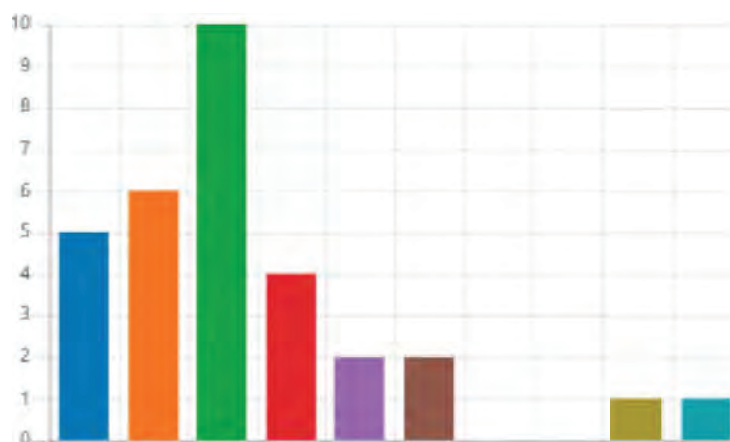
11. 1Por favor, especifique su etnicidad

Caucásico	0
Afroamericano	0
Latino o hispano	32
Asiático	0
Nativo americano	0
Nativo hawaiano o Isleño del ...	0
Dos o más	0
Otro	0
Prefiero no decirlo	1



12. ¿Cuál es el ingreso anual en su núcleo familiar?

Menos de \$10,000 dólares	5
\$10,000 a \$25,000 dólares	6
\$25,000 a \$40,000 dólares	10
\$40,000 a \$55,000 dólares	4
\$55,000 a \$70,000 dólares	2
\$70,000 a \$85,000 dólares	2
\$85,000 a \$100,000 dólares	0
\$100,000 a \$150,000 dólares	0
\$150,000 dólares o más	1
Prefiero no decirlo	1



13. OPCIONAL. Provea su nombre y dirección de correo electrónico si le gustaría ser agregado a una lista de distribución para eventos futuros relacionados a este proceso de planificación:

10

Responses

Latest Responses

14. OPCIONAL. Provea cualquier comentario adicional el cuál creo sea relevante en la Actualización del Plan de Mitigación de Peligro:

1

Responses

Latest Responses

Do you have information on specific hazard issues/problem areas that you would like the planning committee to consider? Note the jurisdiction to which it applies:

Wild fires

Wind, lack of water for agriculture, fire.

Fireplace smoke

Wildfires west of gustine

Wild fires..

Fires

Fires, Traffic accidents, power outages Merced county west side

Methane gas

Pesticides

Water quality and over pumping of our water supply

Natural fires and landslides on Pacheco Pass. Also, high winds and dense fog

Flooding of Bear Creek in the southeast corner of Merced.

Power outages and flooding

Climate Change... cyberhacked institutionally... drought

Merced/Stanslaus Counties all of the back roads need to be repaved, please. I travel them frequently between Gustine and Modesto. Thanks for asking.

Covid-19 response

Fires and earthquakes

Covid-19

Drought

Pandemic, Fires, Wind, Flood

Droughts. Build more dams.

Not in my recollection about the disruption of my daily life.

Smoke from Wildfires

Fahrens park in merced overflowed with water 2 years ago.

5G/ cell towers in a close radius to homes and schools. This is major issue im concerned with.

Fires and smoke inhalation in Merced County

Bad air quality due to wildfires around us along with extreme temperatures.

All natural factors that could affect power/internet outage should be reduced significantly.

More planning for evacuation locations.

Public Safety Power Shut offs (Atwater PD)

Merced county - Gustine: high winds, constant city water issues,

More Financial assistance/ Homelessness/ Health Insurance/ More Low income housing if pandemic hits USA again.
bridges and roads

Drinking water quality - Los Baños area

Los Banos - Subsidence

Flooding in the Los Banos area. It's closeness to the dam puts it in danger. All earthen dams fail, eventually, and San Luis is no different. Heavy rain affects our roads and the number of escape routes is limited.

The largest hazard is lack of affordable housing for our friends and neighbors that rely on rentals

If you don't fix the water storage (Dams) problem none of the other issues will matter. Try imagining life in the arid areas of Nevada, because that's what it will look like here. End of problems.

Merced County was underprepared for pandemic response. Pandemics will increase with climate change, so climate change and pandemic preparedness should be of utmost importance for future planning. (Merced City and Merced County).

Overpopulation of pigeons, seagulls, and crows.

Flooding on City streets

Fire in Del Puerto Canyon

Fire

Big rigs driving to fast on south ave /140/33 Gustine ca. its a hazzard to the residents and our property. Day and night.

Power outage and pandamic

Bridges and roads washing out during heavy rains.

Excessive heat and water shortage is most concerning

Wild fires and strong wind

Environment: Pollution/Littering

Drought

Homeless people with mental health problems and/or drug addiction in the downtown Merced area.

Wind damaging roofs, earthquake mitigation in structures for future cases, covid, chemical sprays near homes next to orchards.

I live in a nicer part of Merced so I am not too worried about most of these issues. I would be worried about fire since these houses would burn down pretty fast.

Power outages

There were the wildfires which meant that school was cancelled and going outside was not a good idea.

It was in stanislaus County with the fires that made it difficult to see and breath

High winds through the area. Hazmat being moved through the area on Hwy 33. Nearby airport with cropdusters - possibility of crash and hazmat leak. Dos Palos

Bear creek/black raschal creek, cottonwood creek flooding. Merced

I do not feel qualified to answer.

Diseases delivered via mosquito bite, wetlands in Los Banos is cause for this concern. Also a blended concern of Agriculture impact on air quality when combined with Strong Winds, this includes but is not limited to pesticides and dirt becoming airborne due to agricultural land uses.

Atwater has had many power outages

It's mostly power outages (which is to blame PG&E for not taking the time for better infrastructure), wildfires have threatened us, and small earthquakes have happened. I live in Atwater

Emergency plans for natural disasters and diseases.

Protection from cyber attacks

Poor air quality, pesticide use in agricultural areas/unsustainable farming practices, natural disaster preparedness in unincorporated jurisdictions throughout Merced County, specifically Winton.

Road conditions in Merced County

Merced, COVID.

Flooding

Wild fires

Please comment on any other pre-disaster mitigation actions that the planning committee should consider for reducing future losses caused by disasters:

More public awareness to the community for Covid-19 pandemic.

Optimizing use of cell phone emergency notifications

We have more than enough government involvement.

Drought

Warning on possible power outage during extreme weather

Have enough water treatment pumps in dos palos

The vaccine roll-out seems to be going well. Keep up the good work through education and availability.

food security and green spaces

Wild fires and staging or evacuation area.

Global Pandemics!!!

Better signs to get to where you need to go. Better planning for the future hazards.

Wildfires tree thinning

Improvements of the levee to prevent flood.

Education for the public

Text messaging is the best source of contact

No one listens to radio anymore or watch's local TV as much

Stay at home order to avoid smoke inhalation

Wildfire fire prevention along with saving water from snow melt.

All types of production plants should be set to a high standard when it comes to taking all steps available to ensure they are as planet friendly as technology allows it.

Water (dry wells) in Le Grande is an issue

The effects of a prolonged public safety power shut off by a utility company

Mostly just water conservation! So many green lawns and people washing their driveways.

Better figure out where you will get a drink after the underground water is salty.

Most of the listed activities were flood related. Flood is important, but so are many other potential hazards. Mitigation activities should be diversified.

Power Outage Prevention. Proper preventative maintenance of the electrical grid in fire prone areas.

The state needs to give the farmers the water instead of dumping it. Our ground water is depleting because of this. San Luis Dam was built for agriculture 1st.

Protect city from cyber attack, ex city services compromised due to computer failure/shutdown

Wildfire education

Pay attention to seismic activity anywhere near the faults and how can homeowners prevent any future catastrophe to their properties. Education on Insurance and special programs to make it affordable is crucial. Before buying a house disclosures on flooding and earthquake or May other natural disaster prone areas including where dams are located matter and should be disclosed.

Air filters and water. Air filters for fire season and water for droughts

Possibly look into quarterly or bi-annual training with agencies in affected areas.

Alert residents when prescribed fires are taking place. Often time when the foothills or farm lands are having controlled fires the smoke affects the air quality of residents of surrounding communities. Since such burns must have special permissions, the agencies issuing such permissions should also notify citizens in the surrounding communities.

Water

Build a sanctuary that wildlife can live in post wildfire disaster until their homes can be restored.

Optional: Provide any additional comments you have which you feel are relevant for the Hazard Mitigation plan update:

I believe Merced Co. is free of hazards or disasters.

Mitigation efforts should heavily consider ways to offset climate change

Enjoy the ride. Each day as it comes.

What, if anything, is being done about the water in Los Banos?

Please focus on food security and public health that take a preventative approach to disasters? Also focus on ensuring the community will be fine regardless of whether there is a disaster

Better planning and education and awareness. I was never contacted for my 2nd vaccination as I was told I would. I almost missed my deadline for it. I had to research when and where the next vaccine would be.

HR Support is probably the worst provider partnered by the county in these Covid 19 vaccinations.

I can't believe they are eliminating at burning for attrition

Just a thank you for giving us a voice...

How are you using social media to distribute information and educate the residents of your county? Let us know if we can help you?

Lack of community organization. Atwater declaring itself a sanctuary city is a prime example.

I'm not sure how useful this survey of the general public will be for planning purposes. I am an active and informed member of the community, and even I didn't feel qualified to answer most of these questions.

This is the first time I have heard of our area having a disaster plan. More community education is needed for this subject topic.

¿Cuenta usted con información sobre peligros específicos o problemas en su área que quisiera que el comité de planificación considere? Anote la jurisdicción a la cuál aplica.

Envíen más información a la población de

Cuando hay peligros inminentes para siempre estar preparados. Y más talleres para

Saber cómo actuar en caso de

Emergencias.

Vientos fuertes; árboles de ramas quebradizas

***Google Translation**

Send more information to the populations of when there are imminent dangers and how to always be prepared. And more workshops for how to act in case of an emergency

Strong winds; brittle branch trees

Por favor, comente sobre cualquier otra acción mitigatoria pre-desastre que el comité de planificación debe considerar para reducir pérdidas futuras causadas por desastres:	*Google Translation
Mejor construccion de los edificios y/o casas en base a los terremotos	Better construction of buildings and / or houses based on earthquakes
Cuidado de comida	Food care
Creo que ya están considerado las más importantes	I think the most important are already considered
La Erosión de la tierra que está ocasionando que el agua escasee más. Y a futuro las Cosechas no servirán. Si no planificáramos con tiempo la pérdida del agua del subsuelo. Ya que año con año no llueve y la Nieve que cae no es suficiente para el Aumento de la población que crece cada día.	The erosion of the land that is causing the water scarcity more. And in the future the harvests won't do. If we did not plan in advance the loss of groundwater. Since year after year it does not rain and Falling snow is not enough. Increase in the population that grows every day.
Mantener la basura en su lugar	Keep trash in its place
Reducción de tarifa de luz en verano por el uso de aires acondicionados	Reduction of electricity rates in summer due to the use of air conditioners

OPCIONAL. Provea cualquier comentario adicional el cuál creo sea relevante en la Actualización del Plan de Mitigación de Peligro:

Que la cosas se hagan por
El bien de todas las
Comunidades y se tome acción inmediata.

***Google Translation**

That things be done for the
good of all communities and
take immediate action

Respondent



1

Anonymous



00:31



Time to complete

Affiliation

1. Select affiliation (select one): *

- ☒ Member of the Public
- ☐ Private industry
- ☐ Nonprofit
- ☐ Government-Local
- ☐ Government-State
- ☐ Government-Federal

Comments

2. Please provide comments regarding the Draft Update of the Merced County Multi-Jurisdictional Hazard Mitigation Plan here:

Great job!

Contact Information

3. Please provide your contact information (Name and email address)

Jason Larrieu



Respondent



2

Anonymous



01:32

Time to complete



Affiliation

1. Select affiliation (select one): *

- ☐ Member of the Public
- ☐ Private industry
- ☐ Nonprofit
- ☒ Government-Local
- ☐ Government-State
- ☐ Government-Federal

Comments

2. Please provide comments regarding the Draft Update of the Merced County Multi-Jurisdictional Hazard Mitigation Plan here:

The Lower San Joaquin Levee District has no responses per the document as presented.

Contact Information

3. Please provide your contact information (Name and email address)

Reggie N. Hill email : lsjld@elite.net



Merced County MJHMP - Public Workshop #2

01:00:16

Request control



Leave

Recording and transcription have started. By attending this meeting, you consent to being i...

Dismiss



Prosperi, Juliana



+12097616...



Padilla, Gre...



+6



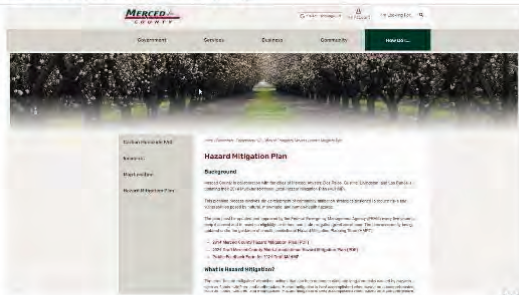
Meeting chat

- 5:39 PM Meeting started
- Merced County OES (Guest) has temporarily joined the chat.
- Padilla, Gregory@CALFIRE has temporarily joined the chat.
- Rich McEachin (Guest) has temporarily joined the chat.
- Scheurich, David@CALFIRE has temporarily joined the chat.
- Wilson, Casey (External) has temporarily joined the chat.
- Pimentel, Mark@CALFIRE has temporarily joined the chat.
- 6:58 PM Recording has started
- Pimentel, Mark@CALFIRE no longer has access to the chat.

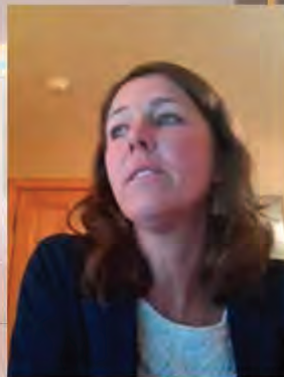
Type a new message



Merced County MJHMP Webpage



wood.



Prosperi, Juliana

From: [Padilla, Gregory@CALFIRE](mailto:Padilla_Gregory@CALFIRE)
To: [Cosentino, Helen](#); beverly.brewster@redcross.org; Billg@mmcfb.org; [Hicks, Jason S.@TID](mailto:Hicks_Jason_S.@TID); ManuelJ1976@yahoo.com; delhicwd@yahoo.com; lsjld@elite.net; rortega@gwdwater.org; Ron.Giannone@valleyair.org; John.Lambie; [Collum, Andrew@Parks](mailto:Collum_Andrew@Parks); [Hicks, Nathan@DWR](mailto:Hicks_Nathan@DWR); Kent.Walt@CalOES.ca.gov; [Lara, Luis@CHP](mailto:Lara_Luis@CHP); [Jerald Meadows - NOAA Federal](#); [Heberling, Gerald@Parks](mailto:Heberling_Gerald@Parks); [Jou, Christopher@Parks](mailto:Jou.Christopher@Parks); [Reith, Heather@Parks](mailto:Reith_Heather@Parks)
Cc: [Brislawn, Jeff P](mailto:Brislawn_Jeff_P); [Prosperi, Juliana](mailto:Prosperi_Juliana); [Scheurich, David@CALFIRE](mailto:Scheurich_David@CALFIRE); [Pimentel, Mark@CALFIRE](mailto:Pimentel_Mark@CALFIRE)
Subject: Merced County Multi-Jurisdictional Hazard Mitigation Plan for public review notice to neighboring jurisdictions
Date: Saturday, September 25, 2021 9:27:38 PM

CAUTION: External email. Please do not click on links/attachments unless you know the content is genuine and safe.

Good evening,

We are letting you know as a potentially interested stakeholder or neighboring jurisdiction that the Merced County Multi-Jurisdictional Hazard Mitigation Plan is in draft form for public review and comment before it is finalized. The plan can be viewed online at the link below. A comment form can also be provided on the website, or you can send an email directly to me. The comment period is open through October 6.

[Hazard Mitigation Plan | Merced County, CA - Official Website](#)

Thank you,

Greg J. Padilla

Fire Captain C-15 / Assistant OES Coordinator

[Merced County Office of Emergency Services](#)

CAL FIRE / Madera-Mariposa-Merced Unit

Office: 209-385-7344 Ext.4883

Cell: 209-761-1977



Appendix C: Approval and Adoption

APPENDIX C: ADOPTION RESOLUTIONS

Sample model resolution is provided below:

Resolution # _____

Adopting the Merced County Multi-Jurisdictional Hazard Mitigation Plan Update 2021

Whereas, (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) recognizes the threat that natural hazards pose to people and property within our community; and

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

Whereas, an adopted Multi-Jurisdictional Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, (Name of Government/District/Organization) fully participated in the FEMA-prescribed mitigation planning process to prepare this Multi-Jurisdictional Hazard Mitigation Plan; and

Whereas, the California Office of Emergency Services and Federal Emergency Management Agency, Region IX officials have reviewed the Merced County Multi-Jurisdictional Hazard Mitigation Plan () and approved it () contingent upon this official adoption of the participating governing body;

Now, therefore, be it resolved, that the (Name of Government/District/Organization) adopts the Merced County Multi-Jurisdictional Hazard Mitigation Plan as an official plan; and

Be it resolved that the (Name of Government/District/Organization) adopts the Merced County Multi-Jurisdictional Hazard Mitigation Plan by reference into the safety element of their general plan in accordance with the requirements of AB 2140, and

Be it further resolved, (Name of Government/District/Organization) will submit this adoption resolution to the California Office of Emergency Services and FEMA Region IX officials to enable the plan's final approval in accordance with the requirements of the Disaster Mitigation Act of 2000 and to establish conformance with the requirements of AB 2140.

Passed: _____
(date)

Certifying Official



Appendix D: Mitigation Categories and Alternatives

APPENDIX D: MITIGATION CATEGORIES AND ALTERNATIVES

Categories of Mitigation Measures Considered

PREVENTION: Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not increase damage to other properties.

- Planning
- Zoning
- Open Space Preservation
- Land Development Regulations
 - Subdivision regulations
 - floodplain development regulations
- Storm Water Management
- Fuels Management, Fire-Breaks
- Building Codes
 - Fire-Wise Construction
- (See Property Protection also)

EMERGENCY SERVICES measures protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- Warning (floods, tornadoes, ice storms, hail storms, dam failures)
 - NOAA Weather Radio
 - Sirens
 - Reverse 911
- Evacuation & Sheltering
- Communications
- Emergency Planning
 - Activating the emergency operations room (emergency management)
 - Closing streets or bridges (police or public works)
 - Shutting off power to threatened areas (utility company)
 - Holding children at school/releasing children from school (school district)
 - Passing out sand and sandbags (public works)
 - Ordering an evacuation (mayor)

- Opening evacuation shelters (Red Cross)
- Monitoring water levels (engineering)
- Security and other protection measures (police)
- Monitoring of Conditions (dams)
- Critical Facilities Protection (Buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)
 - Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
 - Lifeline Utilities Protection
 - Health & Safety Maintenance

PROPERTY PROTECTION: Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

- Retrofitting/disaster proofing
 - Floods
 - Wet/Dry floodproofing (barriers, shields, backflow valves)
 - Relocation
 - Acquisition
 - Tornadoes
 - Safe Rooms
 - Securing roofs and foundations with fasteners and tie-downs
 - Strengthening garage doors and other large openings
 - Drought
 - Improve water supply (transport/storage/conservation)
 - Remove moisture competitive plants (Tamarisk/Salt Cedar)
 - Water Restrictions/Water Saver Sprinklers/Appliances
 - Grazing on CRP lands (no overgrazing-see Noxious Weeds)
 - Create incentives to consolidate/connect water services
 - Recycled wastewater on golf courses
 - Earthquakes
 - Removing masonry overhangs, bracing other parts.

- Tying down appliances, water heaters, bookcases and fragile furniture so they won't fall over during a quake.
- Installing flexible utility connections that won't break during shaking (pipelines too!)
- Wildfire, Grassfires
 - Replacing building components with fireproof materials
- Roofing, screening
 - Create "Defensible Space"
 - Installing spark arrestors
 - Fuels Modification
- Noxious Weeds/Insects
 - Mowing
 - Spraying
 - Replacement planting
 - Stop overgrazing
 - Introduce natural predators
- Insurance

NATURAL RESOURCE PROTECTION: Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

- storage of floodwaters
- absorption of flood energy
- reduction in flood scour
- infiltration that absorbs overland flood flow
- groundwater recharge
- removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
- habitat for flora and fauna
- recreational and aesthetic opportunities

Methods of protecting natural resources include:

- Erosion & Sediment Control
- Wetlands Protection
- Riparian Area/Habitat Protection
- Threatened & Endangered Species Protection

- Fuels Management
- Set-back regulations/buffers
- Best Management Practices

Best management practices (“BMPs”) are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground’s surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project’s design to permanently address nonpoint source pollutants. There are three general categories of BMPs:

1. Avoidance: setting construction projects back from the stream.
2. Reduction: Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
3. Cleanse: Stopping pollutants after they are en route to a stream, such as using grass drainageways that filter the water and retention and detention basins that let pollutants settle to the bottom before they are drained

- Dumping Regulations
- Water Use Restrictions
- Weather Modification
- Landscape Management

STRUCTURAL PROJECTS have traditionally been used by communities to control flows and water surface elevations. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. These measures are popular with many because they “stop” flooding problems. However, structural projects have several important shortcomings that need to be kept in mind when considering them for flood hazard mitigation:

- They are expensive, sometimes requiring capital bond issues and/or cost sharing with Federal agencies, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service.
- They disturb the land and disrupt natural water flows, often destroying habitats.

- They are built to a certain flood protection level that can be exceeded by a larger flood, causing extensive damage.
- They can create a false sense of security when people protected by a structure believe that no flood can ever reach them.
- They require regular maintenance to ensure that they continue to provide their design protection level.

Structural measures include:

- Detention/Retention structures
- Erosion and Sediment Control
- Basins/Low-head Weirs
- Channel Modifications
- Culvert resizing/replacement/Maintenance
- Levees and Floodwalls
- Fencing (for snow, sand, wind)
- Drainage System Maintenance
- Reservoirs(for flood control, water storage, recreation, agriculture)
- Diversions
- Storm Sewers

PUBLIC INFORMATION: A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take protection

- Hazard Maps and Data
- Outreach Projects
 - (mailings, media, web, speakers bureau)
- Library Resources
- Real Estate Disclosure
- Environmental Education
- Technical Assistance

Alternative Mitigation Measures per Category

Prevention

Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not increase damage to other properties.

- Planning
- Zoning
- Open space preservation
- Land development regulations
 - Subdivision regulations
 - Floodplain development regulations
- Stormwater management
- Fuels management, fire breaks
- Building codes
 - Firewise construction
- (also see Property Protection)

Emergency Services

Emergency services protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- Warning (floods, tornadoes, ice storms, hail storms, dam failures)
 - NOAA weather radio all hazards
 - Sirens
 - Reverse 911
- Evacuation and sheltering
- Communications
- Emergency planning
 - Activating the emergency operations room (emergency management)
 - Closing streets or bridges (police or public works)
 - Shutting off power to threatened areas (utility company)
 - Holding children at school/releasing children from school (school district)
 - Passing out sand and sandbags (public works)
 - Ordering an evacuation (mayor)
 - Opening evacuation shelters (red cross)

- Monitoring water levels (engineering)
- Security and other protection measures (police)
- Monitoring of conditions (dams)
- Critical facilities protection (buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)
 - Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
 - Lifeline utilities protection
 - Health and safety maintenance

Property Protection

Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

- Retrofitting/disaster proofing
 - Floods
 - Wet/dry floodproofing (barriers, shields, backflow valves)
 - Relocation
 - Acquisition
 - Tornadoes
 - Safe rooms
 - Securing roofs and foundations with fasteners and tie-downs
 - Strengthening garage doors and other large openings
 - Drought
 - Improve water supply (transport/storage/conservation)
 - Remove moisture competitive plants (tamarisk/salt cedar)
 - Water restrictions/water saver sprinklers/appliances
 - Grazing on CRP lands (no overgrazing—see noxious weeds)
 - Create incentives to consolidate/connect water services
 - Recycled wastewater on golf courses
 - Earthquakes
 - Removing masonry overhangs, bracing other parts

- Tying down appliances, water heaters, bookcases and fragile furniture so they will not fall over during a quake.
- Installing flexible utility connections that will not break during shaking (pipelines, too)
- Wildland fire
 - Replacing building components with fireproof materials (roofing, screening)
 - Creating “defensible space”
 - Installing spark arrestors
 - Fuels modification
- Noxious weeds/insects
 - Mowing
 - Spraying
 - Replacement planting
 - Stop overgrazing
 - Introduce natural predators
- Insurance

Natural Resource Protection

Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

- Storage of floodwaters
- Absorption of flood energy
- Reduction in flood scour
- Infiltration that absorbs overland flood flow
- Groundwater recharge
- Removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
- Habitat for flora and fauna
- Recreational and aesthetic opportunities

Methods of protecting natural resources include:

- Erosion and sediment control
- Wetlands protection
- Riparian area/habitat protection

- Threatened and endangered species protection
- Fuels management
- Set-back regulations/buffers
- Best management practices—Best management practices (“BMPs”) are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground’s surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project’s design to permanently address nonpoint source pollutants. There are three general categories of BMPs:
 - Avoidance—Setting construction projects back from the stream.
 - Reduction—Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
 - Cleanse—Stopping pollutants after they are en route to a stream, such as using grass drainageways that filter the water and retention and detention basins that let pollutants settle to the bottom before they are drained
- Dumping regulations
- Water use restrictions
- Weather modification
- Landscape management

Structural Projects

Structural projects have traditionally been used by communities to control flows and water surface elevations. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. These measures are popular with many because they “stop” flooding problems. However, structural projects have several important shortcomings that need to be kept in mind when considering them for flood hazard mitigation:

- They are expensive, sometimes requiring capital bond issues and/or cost sharing with Federal agencies, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service.
- They disturb the land and disrupt natural water flows, often destroying habitats.

- They are built to a certain flood protection level that can be exceeded by a larger flood, causing extensive damage.
- They can create a false sense of security when people protected by a structure believe that no flood can ever reach them.
- They require regular maintenance to ensure that they continue to provide their design protection level.

Structural measures include:

- Detention/retention structures
- Erosion and sediment control
- Basins/low-head weirs
- Channel modifications
- Culvert resizing/replacement/maintenance
- Levees and floodwalls
- Fencing (for snow, sand, wind)
- Drainage system maintenance
- Reservoirs (for flood control, water storage, recreation, agriculture)
- Diversions
- Storm sewers

Public Information

A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take protection

- Hazard maps and data
- Outreach projects (mailings, media, web, speakers bureau)
- Library resources
- Real estate disclosure
- Environmental education
- Technical assistance

Mitigation Alternative Selection Criteria

The following criteria were used to select and prioritize proposed mitigation measures:

Does the proposed action protect lives?

Does the proposed action address hazards or areas with the highest risk?

Does the proposed action protect critical facilities, infrastructure, or community assets?

Does the proposed action meet multiple objectives (multi-objective management)?

STAPLE/E

Developed by FEMA, this method of applying evaluation criteria enables the planning team to consider in a systematic way the social, technical, administrative, political, legal, economic, and environmental opportunities and constraints of implementing a particular mitigation action. For each action, the HMPC should ask, and consider the answers to, the following questions:

Social

Does the measure treat people fairly (different groups, different generations)?

Technical

Will it work? (Does it solve the problem? Is it feasible?)

Administrative

Is there capacity to implement and manage project?

Political

Who are the stakeholders? Did they get to participate? Is there public support? Is political leadership willing to support it?

Legal

Does your organization have the authority to implement? Is it legal? Are there liability implications?

Economic

Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development? Does it reduce direct property losses or indirect economic losses?

Environmental

Does it comply with environmental regulations or have adverse environmental impacts

Example Mitigation Action Items by Community Rating System Mitigation Category and Hazard

Alternative Mitigation Actions	Floods	Earthquakes	Wildfires	Drought and Severe Weather: Extreme Heat	Dam Incidents	Severe Weather: Heavy Rain/ Lightning/ Hail	Severe Weather: Wind	Hazardous Materials	Landslide	Subsidence
PLANS and REGULATIONS										
Building codes and enforcement	■	■	■	■		■	■	■	■	■
Comprehensive Watershed Tax	■									
Density controls	■		■		■			■	■	■
Design review standards	■	■	■					■	■	■
Easements	■		■					■	■	■
Environmental review standards	■	■	■					■	■	■
Floodplain development regulations	■				■			■		■
Hazard mapping	■		■		■			■	■	■
Floodplain zoning	■				■			■		
Forest fire fuel reduction			■							
Housing/landlord codes				■		■		■		
Slide-prone area/grading/hillside development regulations			■						■	■
Manufactured home guidelines/regulations	■	■				■				
Minimize hazardous materials waste generation								■		
Multi-Jurisdiction Cooperation within watershed	■				■					
Open space preservation	■		■		■				■	■
Performance standards	■	■	■	■	■	■	■		■	■
Periodically contain/remove wastes for disposal								■		
Pesticide/herbicide management regulations								■		
Special use permits	■		■	■	■			■	■	■

Alternative Mitigation Actions	Floods	Earthquakes	Wildfires	Drought and Severe Weather: Extreme Heat	Dam Incidents	Severe Weather: Heavy Rain/ Lightning/ Hail	Severe Weather: Wind	Hazardous Materials	Landslide	Subsidence
Stormwater management regulations	■							■		
Subdivision and development regulations	■	■	■	■	■			■	■	■
Surge protectors and lightning protection						■				
Tree Management			■			■	■			
Transfer of development rights	■		■	■					■	■
Utility location				■		■	■	■	■	■
STRUCTURE AND INFRASTRUCTURE PROJECTS										
Acquisition of hazard prone structures	■		■	■	■				■	■
Facility inspections/reporting	■	■		■	■			■		
Construction of barriers around structures	■				■			■		
Elevation of structures	■				■					
Relocation out of hazard areas	■		■	■	■			■	■	■
Structural retrofits (e.g., reinforcement, floodproofing, bracing, etc.)	■	■	■			■	■	■		
Channel maintenance	■									
Dams/reservoirs (including maintenance)	■			■	■					
Isolate hazardous materials waste storage sties								■		
Levees and floodwalls (including maintenance)	■									
Safe room/shelter		■		■		■	■			
Secondary containment system								■		

Alternative Mitigation Actions	Floods	Earthquakes	Wildfires	Drought and Severe Weather: Extreme Heat	Dam Incidents	Severe Weather: Heavy Rain/ Lightning/ Hail	Severe Weather: Wind	Hazardous Materials	Landslide	Subsidence
Site reclamation/restoration/revegetation	■									
Snow fences							■			
Water supply augmentation				■		■				■
Debris Control	■									
Defensible Space			■							
Stream stabilization	■									
EDUCATION AND AWARENESS										
Flood Insurance	■				■					
Hazard information centers	■	■	■	■	■	■	■	■	■	■
Public education and outreach programs	■	■	■	■	■	■	■	■	■	■
Real estate disclosure	■	■	■	■	■	■	■	■	■	■
Crop Insurance		■		■		■				
Lightning detectors in public areas						■				
NATURAL SYSTEMS PROTECTION										
Best Management Practices (BMPs)	■		■	■		■		■	■	■
Forest and vegetation management	■		■	■	■	■	■		■	■
Hydrological Monitoring	■			■	■	■		■	■	■
Sediment and erosion control regulations	■				■			■	■	■
Stream corridor restoration	■			■					■	■
Stream dumping regulations	■							■		
Urban forestry and landscape management	■		■	■		■	■		■	■
Wetlands development regulations	■		■	■				■	■	■
EMERGENCY SERVICES										
Critical facilities protection	■	■	■	■	■	■	■	■	■	■
Emergency response services	■	■	■	■	■	■	■	■	■	■

Alternative Mitigation Actions	Floods	Earthquakes	Wildfires	Drought and Severe Weather: Extreme Heat	Dam Incidents	Severe Weather: Heavy Rain/ Lightning/ Hail	Severe Weather: Wind	Hazardous Materials	Landslide	Subsidence
Facility employee safety training programs	■	■	■	■	■	■	■	■		
Hazard threat recognition	■	■	■	■	■	■	■	■	■	■
Hazard warning systems (community sirens, NOAA weather radio)	■	■	■	■	■	■	■	■		
Health and safety maintenance	■	■	■	■	■	■	■	■		
Post-disaster mitigation	■	■	■	■	■	■	■	■		
Evacuation planning	■		■	■	■			■	■	■



Appendix E: Annual Progress Meeting Agenda and Report Template

APPENDIX E: ANNUAL PROGRESS MEETING AGENDA AND REPORT TEMPLATE

City of Sebastopol Local Hazard Mitigation Plan Annual Progress Meeting Agenda

- 1. Discussion on hazard events and impacts that occurred during the performance period**
- 2. Review of progress on mitigation action implementation**
- 3. Discussion on success stories**
- 4. Recommendations for new actions/projects**
- 5. Review of funding options and grant opportunities**
- 6. Review of changes in plan maintenance or implementation**
- 7. Review of continuing public involvement**

APPENDIX E: ANNUAL PROGRESS MEETING AGENDA AND REPORT TEMPLATE

Merced County Multi-Jurisdictional Hazard Mitigation Plan Annual Progress Report Template

Reporting Period:

Background: Merced County and participating cities and towns in the county developed a hazard mitigation plan to reduce risk from all hazards by identifying resources, information, and strategies for risk reduction. The federal Disaster Mitigation Act of 2000 requires state and local governments to develop hazard mitigation plans as a condition for federal disaster grant assistance. To prepare the plan, the participating partners organized resources, assessed risks from natural hazards within the county, developed planning goals and objectives, reviewed mitigation alternatives, and developed an action plan to address probable impacts from natural hazards. By completing this process, these jurisdictions maintained compliance with the Disaster Mitigation Act, achieving eligibility for mitigation grant funding opportunities afforded under the Robert T. Stafford Act. The plan can be viewed online at:

Summary Overview of the Plan's Progress: The performance period for the Hazard Mitigation Plan became effective on ____, 2021, with the final approval of the plan by FEMA. The initial performance period for this plan will be 5 years, with an anticipated update to the plan to occur before ____ 2026. The *Merced County Multi-Jurisdictional Hazard Mitigation Plan* has targeted 70 hazard mitigation initiatives to be pursued during the 5-year performance period. As of the reporting period, the following overall progress can be reported:

__ out of __ initiatives (__%) reported ongoing action toward completion.

__ out of __ initiatives (__%) were reported as being complete.

__ out of __ initiatives (__%) reported no action taken.

Purpose: The purpose of this report is to provide an annual update on the implementation of the action plan identified in the *Merced County Multi-Jurisdictional Hazard Mitigation Plan*. The objective is to ensure that there is a continuing and responsive planning process that will keep the hazard mitigation plan dynamic and responsive to the needs and capabilities of the partner jurisdictions. This report discusses the following:

- Natural hazard events that have occurred within the last year
- Changes in risk exposure within the planning area (all of Merced County)
- Mitigation success stories
- Review of the action plan
- Changes in capabilities that could impact plan implementation
- Recommendations for changes/enhancement

The Hazard Mitigation Planning Committee: The Hazard Mitigation Planning Team, made up of planning partners and stakeholders within the planning area, reviewed and approved this progress report at its annual meeting held on ____, 202_. It was determined through the plan's development process that the HMPT would remain in service to oversee maintenance of the plan. At a minimum, the HMPT will provide technical review and oversight on the development of the annual progress report. It is anticipated that there will be turnover in the membership annually, which will be documented in the progress reports. For this reporting period, the HMPT membership present at the meeting is as indicated in Table 1.

TABLE 1.
HMPT MEMBERS PRESENT

Name	Title	Jurisdiction/Agency

Natural Hazard Events within the Planning Area: During the reporting period, there were ____ natural hazard events in the planning area that had a measurable impact on people or property. A summary of these events is as follows:

Changes in Risk Exposure in the Planning Area: *(Insert brief overview of any natural hazard event in the planning area that changed the probability of occurrence or ranking of risk for the hazards addressed in the hazard mitigation plan)*

Mitigation Success Stories: *(Insert brief overview of mitigation accomplishments during the reporting period)*

Review of the Action Plan: Table 2 reviews the action plan, reporting the status of each initiative. Reviewers of this report should refer to the *Merced County Multi-Jurisdictional Hazard Mitigation Plan* for more detailed descriptions of each initiative and the prioritization process.

Address the following in the "status" column of the following table:

Was any element of the initiative carried out during the reporting period?

If no action was completed, why?

Is the timeline for implementation for the initiative still appropriate?

If the initiative was completed, does it need to be changed or removed from the action plan?

TABLE 2.
ACTION PLAN MATRIX

Action No.	Action Title	Action Taken? (Yes or No)	Timeline	Priority	Comments	Status (✓, O, X)
MERCED COUNTY						
1	Countywide Public Education Program.					
2	Integrate Local Hazard Mitigation Plan into Safety Element of General Plan.					
3	Non-structural Earthquake Mitigation Outreach.					
4	Countywide Inventory of Historic Unreinforced Masonry Buildings.					
5	Periodically review building codes.					
6	Develop a Hazard Specific Flood Annex for all jurisdictions.					
7	Flood Insurance Promotion Program Implementation/Participation.					
8	Identify and evaluate effectiveness of alternative detention basin flood control projects that will reduce flood flows in Black Rascal Creek at the diversion.					
9	Winter Weather Preparedness Campaign.					
10	Cyber Security. Establish a risk management program to identify the risks, understand their likelihood and impact.					
11	Drought Plan.					
12	Groundwater Recharge and Stormwater Detention Pilot Project.					
13	Public Safety GIS Management.					
14	Encourage and continue to establish countywide evacuation zones, sections and routes.					
15	Conduct an After Action Review for COVID-19 response.					
16	Develop a plan for a Countywide Medical Reserve Corps (MRC).					

TABLE 2.
ACTION PLAN MATRIX

Action No.	Action Title	Action Taken? (Yes or No)	Timeline	Priority	Comments	Status (✓, O, X)
17	Provide public outreach through a variety of media for awareness and mitigation of various agricultural pests and disease.					
18	Enhance the County's capabilities associated with the Pest Detection Program, Pest Exclusion Program, and Pest Eradication Program.					
19	Identify and increase water management practices that reduce pesticide movement offsite.					
20	Create a hazardous materials safety flyer to post on public health social media and the division of environmental health's website.					
21	Develop countywide commodity flow study to further understand the quantity and types of hazardous materials being transported through the county.					
City of Atwater						
1	Participate in Countywide Public Education Program.					
2	Integrate Local Hazard Mitigation Plan into Safety Element of General Plan.					
3	Non-structural Earthquake Mitigation Outreach.					
4	Participate in Countywide Inventory for Unreinforced Masonry Buildings.					
5	Periodically review building codes for updates and enhancements.					
6	Promote Water Conservation Program.					

TABLE 2.
ACTION PLAN MATRIX

Action No.	Action Title	Action Taken? (Yes or No)	Timeline	Priority	Comments	Status (✓, O, X)
7	Emergency power system to protect the City of Atwater 911 Communications Center and Police Department.					
8	Seismic Upgrade and Remodel of the Atwater Police Department Headquarters.					
9	Review hazards and awareness of earthquakes in a public platform and educate the public on helpful procedures in the aftermath.					
10	Public education of current seasonal threat.					
City of Dos Palos						
1	Radio upgrade for police department.					
2	Construction of new water treatment plant.					
City of Gustine						
1	Develop and enhance storm-water drainage improvements to reduce frequent flooding.					
2	Perform building specific seismic vulnerability assessment of City-owned critical facilities constructed prior to 1980.					
3	Develop drought plan.					
City of Livingston						
1	Participation in Countywide Public Education Program.					
2	Integrate Local Hazard Mitigation Plan into Safety Element of General Plan.					
3	Non-structural Earthquake Mitigation Outreach.					
4	Participate in Countywide Inventory for Unreinforced Masonry Buildings.					
5	Periodically review buildings for update and enhancements.					
6	Flood Insurance Promotion.					

TABLE 2.
ACTION PLAN MATRIX

Action No.	Action Title	Action Taken? (Yes or No)	Timeline	Priority	Comments	Status (✓, O, X)
7	Participate in Severe Weather Preparedness Campaign.					
8	Promote Water Conservation Program.					
9	Upgrade storm lift station/SCADA.					
City of Los Banos						
1	Participate in Countywide Public Education Program.					
2	Integrate Local Hazard Mitigation Plan into Safety Element of General Plan.					
3	Non-structural Earthquake Mitigation Outreach.					
4	Participate in Countywide Inventory for Unreinforced Masonry Buildings.					
5	Periodically review building codes for updates and enhancements and ensure necessary capabilities for enforcement.					
6	Participate in Severe Weather Preparedness Campaign.					
7	Promote Water Conservation Program.					
8	Implement and Monitor Weed Abatement Program.					
9	Prepare Emergency Plan for Critical Infrastructure.					
10	Perform Building-Specific Seismic Vulnerability Assessment of City Owned Critical Facilities.					
11	Continue to Update Storm Water System Master Plan.					
12	Prepare a Shelter and Emergency Provision Plan.					
13	Prepare Weather Preparedness Program (Extreme Heat and Cold).					

TABLE 2.
ACTION PLAN MATRIX

Action No.	Action Title	Action Taken? (Yes or No)	Timeline	Priority	Comments	Status (✓, O, X)
14	Promote Water Conservation Program with continued updates to Urban Water Management Plan.					
15	Rental Home Inspections.					
City of Merced						
1	Prepare an Energy Assurance Plan					
2	Develop and enhance storm-water drainage improvements to reduce frequent flooding.					
3	Create a Disaster Preparedness Program.					
4	Support Merced County efforts to construct the Haystack Alternative of Black Rascal Creek.					
5	Update the City's Storm-water Drainage Master Plan.					
6	Prepare a Shelter and Emergency-Provision Plan.					
7	Prepare a Natural Area Fire Prevention Plan.					
8	Perform building-specific, structural seismic vulnerability assessment of City-owned critical facilities.					
9	Create a program to retrofit or upgrade unreinforced masonry buildings in Downtown Merced, or other buildings in the Plan area.					
10	Update Fire Station 52 seismic and flood resiliency.					
11	Enhance the weed abatement program to mitigate wildfire risk.					
Status Legend: ✓ = Project Completed O = Action ongoing toward completion X = No progress at this time						

Changes That May Impact Implementation of the Plan: *(Insert brief overview of any significant changes in the planning area that would have a profound impact on the implementation of the plan. Specify any changes in technical, regulatory and financial capabilities identified during the plan's development)*

Recommendations for Changes or Enhancements: Based on the review of this report by the Hazard Mitigation Planning Team, the following recommendations will be noted for future updates or revisions to the plan:

Public review notice: *The contents of this report are considered to be public knowledge and have been prepared for total public disclosure. Copies of the report have been provided to the governing boards of all planning partners and to local media outlets and the report is posted on the Merced County Multi-Jurisdictional Hazard Mitigation Plan website. Any questions or comments regarding the contents of this report should be directed to:*

Insert Contact Info Here



Appendix F: Outreach Strategy



Outreach Strategy

Merced County Multi-Jurisdictional Hazard Mitigation Plan Update



Prepared for:

Merced County
2222 M Street, Room 1
Merced, CA 95340

Prepared by:

Wood Environment & Infrastructure Solutions, Inc.
2000 S. Colorado Boulevard, Suite 2-1000
Denver, CO 80222

March 2021

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Table 1. Outreach Strategy Schedule of Activities

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1.0 Purpose of the Outreach Strategy

The purpose of the Outreach Strategy is to provide a meaningful process through which the County of Merced, the six participating municipalities, and their citizens, public officials, and stakeholder groups may effectively participate in the update of the Merced County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). The County is updating the MJHMP to expand the risk assessment to address changing priorities related to the frequency and severity of existing natural, human-caused, and public health hazards; climate change impacts; and to develop a mitigation strategy for the County. This strategy will be developed based upon the understanding that citizens and groups are the source of tremendous creativity, and that their engagement and input will produce better planning decisions. The emphasis is to recognize every citizen's right to participate in the process of informing local government decisions.

A wide variety of public participation methods and tools, representing distinct purposes, will be employed in the strategy to provide for broad public engagement and participation. These purposes of public engagement are as follows:

- **Public Awareness** – to share information and to promote awareness of planning process, including ways the public can participate
- **Public Education** – to educate citizens and help them make more informed choices
- **Public Input** – to provide citizens and groups with opportunities to provide input and ideas during the planning process
- **Public Interaction** – to exchange views and ideas as a means of reaching consensus
- **Public Partnership** – to involve citizens in the decision-making process

2.0 Objectives of the Outreach Strategy

1. Recognizing that there are many levels of public participation, to provide for an effective mix of participation opportunities that include the above bulleted purposes.
2. Recognizing that not everyone participates in the same way or at the same time, to include a mix of participation strategies that provides for a broad and diverse set of engagement opportunities that considers the diversity of the County's planning area.
3. Recognizing Merced County's history of past public participation during the General Plan 2030 and recent Community Plan update planning processes and public safety preparedness and outreach efforts, the Hazard Mitigation Planning Team (HMPT) will provide the public with opportunities to review, clarify, and provide input on hazard information, as well as generate goals, objectives, policies, and other information.
4. To build public support for, and ultimately ownership of, the Merced County MJHMP.

3.0 Local Government Outreach and Involvement Responsibilities

The requirements related to public involvement in hazard mitigation plans according to the Disaster Mitigation Act of 2000 (44 CFR Section 201.6(b) and (c)) are listed below:

Requirement §201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:

1. An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;

2. An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
3. Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Requirement §201.6(c)(1): [The plan **shall** document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Requirement §201.6(c)(4)(iii): [The plan maintenance process **shall** include a] discussion on how the community will continue public participation in the plan maintenance process.

Based on the requirements, the public participation process ensures citizens and local and regional agencies understand the risk and vulnerability and can work with Merced County to support policies, actions, and tools to reduce future losses. This is why the public must have opportunities to comment on disaster mitigation plans during the drafting stage and prior to plan approval. The County is encouraged to conduct a public workshop or open house within 90 days of the project kick-off, or first HMPT meeting.

To meet DMA requirements as well as the goals of the Outreach Strategy, the County is expected to engage in various public outreach and feedback efforts, which can include:

- Engage nonprofit organizations (NGOs) or community-based organizations (CBOs)
- Assist in distributing press releases and information to local media
- Share public input/comment with the HMPT
- Document and report on progress/activities related to public involvement
- Review public input for incorporation in plan, as appropriate
- Assist with advertising and holding a total of two (2) public workshops: one (1) public workshop (during draft development) and one (1) public workshop once the Public Review Draft MJHMP is circulated
- Announcing the planning effort at other public meetings, or holding additional public meetings, if desired
- Announce how the plan can be accessed during the public review period. This can include providing links from the County's Office of Emergency Services (OES) Webpage to a MJHMP Update Webpage or providing a hardcopy of the plan in a public location, such as a municipal building (e.g. library, community center).
- Follow the recommendations for continued public involvement as designated in the implementation chapter of the MJHMP.

Merced County can implement a robust public outreach process by asking citizens to share local knowledge of the County's vulnerability to hazards based on past occurrences. For Merced County this may include vulnerability to flooding, drought, and wildfires. Public involvement can be solicited by working with NGOs and CBOs, or through direct outreach via multiple media platforms, including the County's Website and social media, as well as traditional materials, such as newspaper notices, questionnaires, public workshops, involvement at public events, and distribution of the plan for public input at repositories.

The overall goal of communication is to inform the public about the process and to seek input, and to engage early and often. Messaging should cover the following topics:

- Announce kick-off of preparing a MJHMP (typically within 30 days of kick-off meeting)
- Advertising the County's MJHMP Webpage
- Advertisement of Public Workshop or Open House
- Distribution of the public survey
- Notification of public comment and availability of the Public Review Draft MJHMP
- Notification of availability of Final MJHMP
- Announce Board of Supervisors Hearing

3.1 Public Information Officer

The County's Public Information Officer (PIO), or designated Project Manager will lead the public involvement process and implementation of the Outreach Strategy. This strategy will be overseen and managed by Mr. David Scheurich, Battalion Chief and Deputy Director of the County OES for the plan preparation, as well as the County's consultant, Wood Environment & Infrastructure Solutions, Inc. (Wood). Mr. Gene Barrera will provide additional support. If the County's PIO is assigned to serve as a liaison to oversee the outreach strategy, this will ensure the continuity of the outreach after the project ends. It also provides ongoing communication after plan adoption and ensure implementation updates continue within the community.

4.0 Stakeholder Outreach Platforms

Stakeholders are persons, groups, or institutions that can affect or be affected by a course of action associated with the MJHMP update. Stakeholder involvement during the planning process develops support for the plan and implementation. Stakeholder involvement also results in greater information sharing on technical and scientific resources based on input from subject matter experts.

The Federal Emergency Management Agency (FEMA) requires stakeholder participation from neighboring communities, local and regional agencies involved with hazard mitigation activities, agencies with authority to regulate development, and business, academic institutions such as community colleges or universities, and private and non-profit agencies. Stakeholders do not need to be involved in all phases of the planning process like the HMPT but should inform the HMPT on specific hazard impacts and risks and provide input that reflects different perspectives in the community. Stakeholder involvement generally improves the overall quality and accuracy of the plan and builds greater consensus within the community.

4.1 Participating Jurisdictions

Six jurisdictions are participating in the MJHMP update. These six jurisdictions include the cities of Merced, Los Banos, Atwater, Livingston, Dos Palos, and Gustine. The HMPT consists of a representative from each municipality. This HMPT representative should integrate the outreach platforms outlined in this Outreach Strategy within their cities and engage additional stakeholders and the public. The HMPT representative should also inform their respective city managers and elected officials, such as Planning Commissioners and City Council members about the planning process and MJHMP update. These managers and elected officials are responsible for the public health and safety of their community. They are also the elected officials that will adopt the plan. The key to maximizing these leaders involvement should be based on engaging them early in the process and during the development of the draft plan.

This may consist of planning updates during City Manager briefings and regular Planning Commission and City Council meetings.

4.2 Neighboring Jurisdictions

Neighboring jurisdictions, such as adjacent counties must be given the opportunity to be on the HMPT or involved in the planning process as a stakeholder. Adjacent counties and municipalities are commonly affected by similar hazards and may be partners in mitigation efforts on a regional level. Involvement may include inviting these municipalities to participate in outreach activities and requesting their input on the draft plan. Merced County invited emergency management staff from Mariposa, Madera, and Stanislaus counties to participate on the HMPT. For those unavailable to formally participate on the HMPT, the County should request that these counties engage during outreach activities and provide formal input on the draft plan.

4.3 Federal, State, and Regional Agencies

Merced County can engage various public federal, state, and regional agencies, such as a representative from the National Ocean and Atmospheric Association and representatives from the two national wildlife refuges: Merced National Wildlife Refuge and San Luis National Wildlife Refuge. State agencies should also be involved and can include representatives from the California Department of Forestry and Fire Protection (CALFIRE), Department of Water Resources and the Division of Safety of Dams, Department of Parks and Recreation, California Highway Patrol, and California Office of Emergency Services (Cal OES). The County can invite these representatives to participate during the virtual public workshops and request their feedback on the Public Review Draft MJHMP. Many of these federal and state agencies were identified as key cooperators by the County in the initial planning meetings. The County can also schedule regular updates with their Cal OES representative and let them know when the plan will be ready for state review.

The Merced County Association of Governments (MCAG) is an association of city and county governments focused on addressing regional issues, such as transportation, solid waste, and air quality problems. MCAG has also served as the Regional Transportation Planning Agency and Metropolitan Planning Organization making them a regional agency the County can coordinate on regarding demographic, housing, and development trends.

Federal, state, and regional agencies manage technical data and resources related to hazards, and in some cases grant funding opportunities and financial assistance. Therefore, involving stakeholders from these agencies can further complement the County's MJHMP update.

4.4 Academic Colleges and Universities

Academic institutions have additional educational resources to provide to support hazard mitigation planning departments, particularly through natural hazard research, Geographic Information Systems (GIS) mapping and planning courses. The HMPT may collaborate with a local university or college to engage students in the planning process or to complete research and analysis needs for the plan.

The HMPT is partnering with the County's GIS Manager and California State University – Stanislaus (CSU-Stanislaus) urban planning department. Students in a CSU-Stanislaus urban planning class are participating in the hazard mitigation planning process by developing the critical facility database and integrating outreach tools, such as the public survey into GIS Applications (e.g., Experience Builder, StoryMap, Survey 123, etc.). This class and the student projects and exercises help the students understand potential hazards within their campus and communities and how to set up tools and methods to reduce risks.

The County also plans on coordinating with the University of California – Merced (UC-Merced) emergency manager and police chief. UC-Merced Tomorrow is the Long Range Development Plan for the university. UC-Merced is located northeast of the City of Merced and is bordered on the north and east by conservation easements and a large campus natural reserve, designed to protect the campus from natural hazards, such as wildfires and flooding. Collaboration with UC-Merced’s Environmental Health and Safety and Police Departments on the risk assessment and mitigation action development should provide additional insight into hazard mitigation opportunities within the eastern portion of the County.

4.5 Municipal Advisory Councils

Merced County has eight unincorporated communities that each contain a Municipal Advisory Council (MAC) made up of 15 members appointed by the Merced County BOS for one 4-year term. The MACs advise the Board of Supervisors on planning matters that relate to each unincorporated community. Planning matters can cover land use decisions, the provision of public services, public health and safety, public works projects, and community welfare. The eight MACs meet monthly and include: Le Grand, Planada, Snelling, Delhi, Winton, Hilmar, McSwain, and the Franklin-Beachwood MACs. The County intends to engage each MAC during the planning process by requesting input on the Draft MJHMP Update.

4.6 Nonprofit and Community-Based Organizations

Inviting NGOs and CBOs to participate during the MJHMP planning process is important because they act as advocates for citizens and may represent traditionally under-served or disadvantaged communities (DACs), or socially vulnerable populations, such as seniors or disabled groups. As defined by Senate Bill 1000 (Health and Safety Code § 39711) DACs are low-income areas disproportionately affected by environmental pollution or other hazards that can lead to negative health effects, exposure, or environmental degradation.¹

Generally, NGOs and CBOs represent various segments of the community. In some cases, NGOs may include disaster preparedness and response organizations like Red Cross, and conservation and climate adaptation and mitigation partnerships and collaboratives. CBOs may represent DACs, serve persons with access and functional needs and individuals with disabilities, the senior population, parent-teacher/youth groups, church groups, or neighborhood associations. Outreach to CBOs is useful when providing information to members of the public whose first language is not English. A CBO representative may also be able to inform a segment of the community about the MJHMP process, plan implementation, and foster communication with residents during an emergency.

NGOs and CBOs may include neighborhood groups, the business community, climate collaboratives, educational groups, faith-based organizations, or healthcare advocates. Several CBOs were invited to participate on the HMPT and engage during the planning process, including the Red Cross and Merced County Food Bank. Ongoing outreach with these CBOs will enhance communication and outreach to a larger segment of the citizens in Merced County.

¹ According to the Department of Water Resources (DWR) DAC Mapping Tool, there are several census tracts within Merced County that contain a DAC. These maps show census tracts that meet the DAC definition (i.e., only those census tracts with an annual median household income (MHI) that is less than 80 percent of the statewide annual MHI (Public Resources Section 75005(g)). The census tract data within Merced County is available for download here: <https://gis.water.ca.gov/app/dacs/>.

4.7 Business Groups and Large Employers

The County should involve stakeholders from chamber of commerce, economic development organizations, the healthcare industry, and business leaders in the community. These organizations may include the Greater Merced Chamber of Commerce and local chambers, Merced General Hospital, and the County Agricultural Commissioner given the strong agricultural economy and support industries in the County.

4.8 Utility Roundtable

If desired, Merced County can schedule a roundtable meeting with local electric utility providers, such as Pacific Gas & Electric (PG&E), and special water districts, such as Merced Irrigation District (MID), Turlock Irrigation District (TID), and other community service districts (CSDs) (e.g., Ballico CSD, Lower San Joaquin Levee District, East Merced Resources Conservation District, San Joaquin Valley Air District, etc.) to review and discuss hazards specific to local utilities. Local utility infrastructure may include electric, gas, water, sewer and wastewater treatment, stormwater management, and telecommunications facilities.

5.0 Public Outreach Platforms

5.1 Webpage

At the beginning of the process, the County GIS Manager created a Project Webpage to keep the public informed on the development of the MJHMP and to solicit public input. This Webpage integrates GIS tools and applications such as the Experience Builder Application, which is designed to complement the County's existing OES MJHMP Update Webpage that includes information on flood and emergency preparation resources. This webpage will also have the ability to collect map-based public comment through the ArcGIS Survey 123 Application.

The MJHMP Webpage should be publicized on all media releases, mailings, newsletters, surveys, and public meeting advertisements. The Webpage can include a section for the public to sign up for project

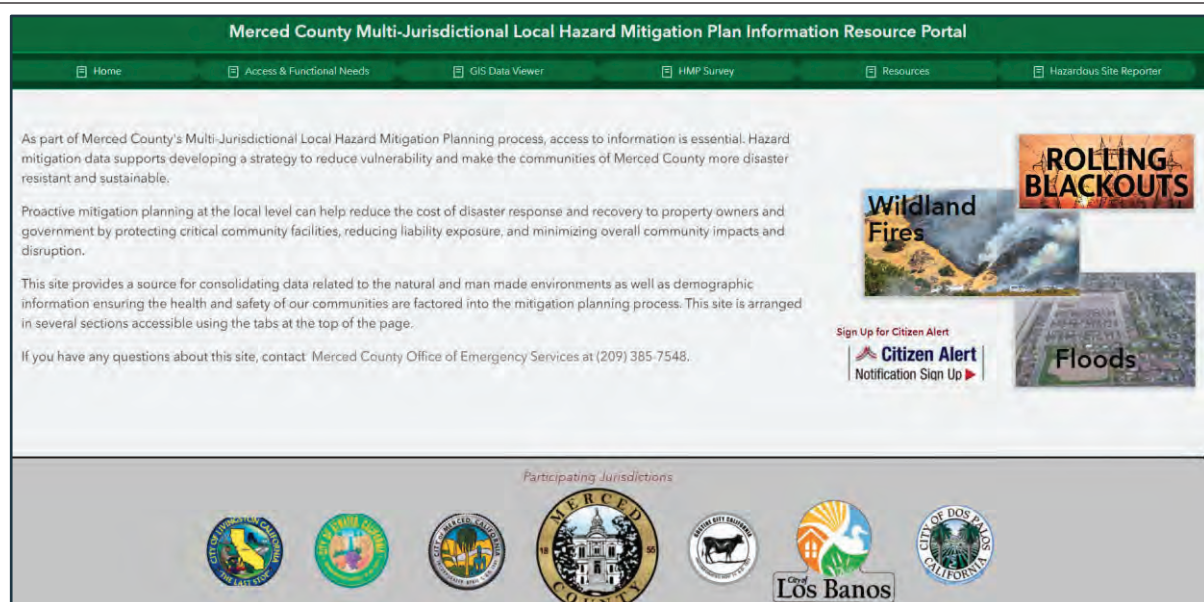


Photo 1. The County MJHMP Webpage can include information on hazard mitigation, disaster preparedness, and plan documents. It can also function as a repository of for the planning process documentation, Draft MJHMP, and Cal OES/FEMA approvals.

email announcements. The County can also keep the Webpage active after the plan is completed to keep the public informed about the status of the mitigation actions (see Photo 1).

5.2 Social Media

Merced County can use the following social media platforms to circulate information on the MJHMP:

- County Facebook (9,114+ followers)
- County Instagram (1,800+ followers)
- County Twitter (1,400+ followers)

At a minimum, the social media platforms should announce the kick-off of the MJHMP planning process, advertise the County's MJHMP Webpage and other events, post a link to the two versions (English and Spanish) of the public survey, notify the public about meetings and workshops, and announce the availability of the plan for public input and comment. The County can share MJHMP information with other social media groups and organizations, particularly each of the six participating cities to ensure information is circulated on their social media platforms.

The County should also post information about the MJHMP on other agency social media platforms. The County could circulate information regarding the MJHMP on the MCAG Webpage, as well as the CAL FIRE Madera-Mariposa-Merced Unit Webpages and social media feeds (CAL FIRE Madera-Mariposa-Merced Unit has over 11,600+ followers on Facebook).

5.3 Newspapers

The following regional and local print newspapers can be used to circulate and advertise information on the MJHMP:

- Merced Sun-Star
- Merced County News
- Los Banos Enterprise
- The Paper (Los Banos Live)
- Gustine Press-Standard

5.4 Press Releases

The County can distribute and circulate press releases over the course of the MJHMP development. They can also encourage HMPT participants and stakeholders to distribute press releases during the project. Press releases can be distributed as informational flyers, advertisements, and public notices during community events. These communication platforms can be used to spread the news about the MJHMP update and invite the public to participate in the process. According to the U.S. Census American Community Survey Population Estimates, the racial/ethnic distribution of Merced County residents as of July 1, 2019 was 61 percent Hispanic, 26 percent White, 7.8 percent Asian, 3.9 percent African American, and 2.5 percent American Indian and Alaska Native. Based on this information and input from the County OES Department, press releases will be published in both English and Spanish.

Advertisements can focus on emergency planning, natural hazards, mitigation projects, and how to get the community prepared for disasters. The press releases can include posts and links to the County's MJHMP Webpage and the public survey. As previously mentioned, the press releases should also announce the kick-off of the MJHMP planning process, advertise the County's MJHMP Webpage and

other events, post a link to the public survey, notify the public about meetings and workshops, and announce the availability of the plan for public input and comment.

5.5 Public Survey

The County can prepare and distribute a public survey during the planning process. The public survey can gauge information on household preparedness, hazard priorities, local knowledge of tools to reduce risk and loss, and mitigation projects. The number of questions in public surveys can vary, but they typically range from 10 to 20 questions and are structured to take a participant less than five minutes to complete. The questions are designed to help the County and HMPT understand local hazards and select and prioritize mitigation actions.

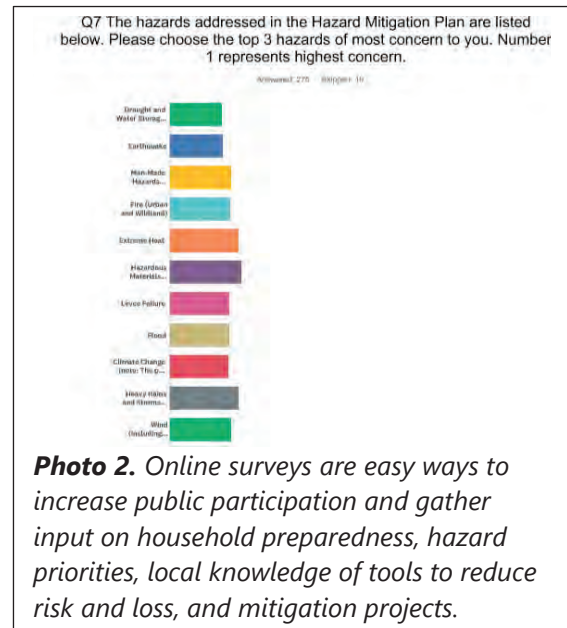
The public survey should be made available on the MJHMP Webpage, and paper copies could be left at informational booths or distributed at key events, such as the COVID-19 vaccination centers. Some counties and cities have made the public survey available on tablets at various community events, although this may no longer be safely feasible due to health and safety precautions that remain in place due to COVID-19. In summary, the public survey is designed to help the County better understand the following based on public input:

- Perception of natural hazards and risks
- Hazards with the most concern
- Best communication methods
- Level of public support for mitigation actions
- Willingness to invest in hazard mitigation

5.6 Informational Pop-Up Booths

The County can advertise the MJHMP planning process and seek public input at informational booths during local events or booths displayed at the local library or other public repositories. County staff should be able to speak to the public about the MJHMP project, invite them to visit the MJHMP Webpage, and ask them to take the public survey. During local events, informational booths can also be staffed by HMPT participants. Given the health and safety precautions in place, a repository may not be staffed, but should include map displays, handouts, copies of public surveys, and flyers.

Tablets, if available and feasible based on current safety precautions in Merced County, could be provided at the informational booths for easy access to the public survey; however, paper copies may be recommended while the health and safety precautions remain in effect. Some jurisdictions, like Merced County can also provide real-time hazard mapping services to the public interested in viewing hazard assessments for their property. This include providing hazard mapping information (see Section 3.3.10).



5.7 Local Events and Weekly Newsletters

Merced County and the HMPT may want to consider advertising the MJHMP process during the popular community events (e.g. vaccine rollout). The HMPT can also advertise the MJHMP process in a weekly newsletter.

5.8 Public Workshops

The County should invite the public to virtually participate in public workshops. Two public workshops will be scheduled as part of the planning process for the Merced County MJHMP update: one at the beginning of the planning process and a second once the Public Review Draft MJHMP is available.

The public workshop should cover the purpose of the plan, the components of the MJHMP, background on hazard mitigation planning, and next steps. The County can provide regular and ongoing project status updates on the MJHMP during regular Planning Commission and Board of Supervisor hearings. Wood recommends the County host the first public workshop within 90 days of the kick-off meeting.

During the public comment period, the County can hold a second public workshop. The public workshops can be scheduled as either stand-alone public workshops, or as part of a regularly scheduled Planning Commission or Board of Supervisors hearing. These meetings should be advertised to the public and provide an opportunity for public comment. The public can also comment on the MJHMP during final review and consideration during final hearings.



Photo 3. Requirement §201.6(b) of the Disaster Mitigation Act states the planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.

5.9 GIS Portal – Environmental Hazard Data Viewer

Merced County's existing GIS mapping platform includes an Environmental Hazard Data Viewer that displays hazard data layers developed in the MJHMP. Specific hazard layers currently include the FEMA NFIP National Flood Hazard Layer (NFHL), State Responsibility Area (SRA) and Local Responsibility Area (LRA) fire threat areas, and the U.S. Department of Agriculture Web Soil survey data. The platform could display additional hazard mapping data and other best available information used in the development of the MJHMP, such as the locations of the County critical facilities organized by FEMA Community Lifelines. These data layers can be viewed individually or with multiple hazard layers and combined the data layers from the plan risk assessment to ensure that all datasets are fully integrated. The GIS Portal can be utilized moving forward to access and maintain critical facility and hazards data to provide a basis for a "living" plan that is accessible to participating jurisdictions and the public.

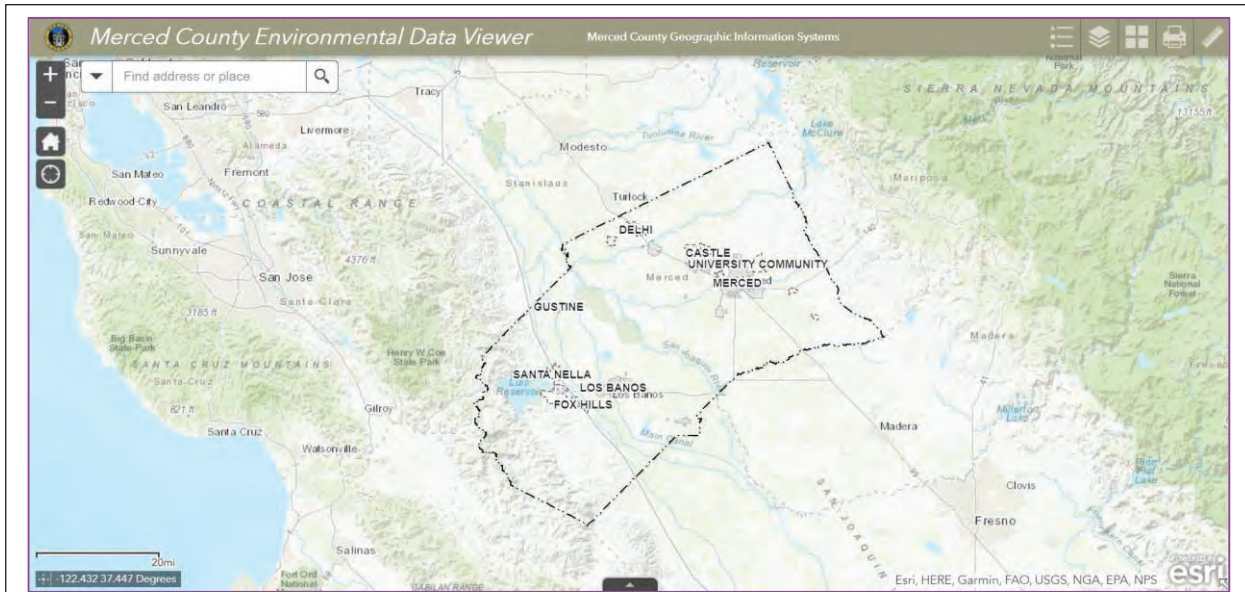


Photo 4. The Merced County Environmental Data Viewer provides the public an opportunity to research flood, fire, and soil hazards in their community.

5.10 Map your Neighborhood Mailing List

The County, six participating jurisdictions, and unincorporated communities could consider participating in the Map your Neighborhood (MYN) program. The MYN program is designed to help groups of neighbors prepare to and respond to an emergency together. This program has helped neighborhoods work together to develop stronger communities, particularly in preparation of potential hazard events.

6.0 Schedule of Outreach Activities

The following community engagement steps and activities are outlined in conjunction with the hazard mitigation planning phases and tasks to demonstrate how they are linked in the process. This Outreach Strategy is a document that will be utilized and updated during the plan development process. It can also serve to document the efforts made to involve the public during each subsequent plan update.

Table 1. Outreach Strategy Schedule of Activities

Timeframe	Mitigation Planning Steps	Public Participation Steps/Ideas	Specific Activities/Actions
December 2020 - February 2021	1. Getting Organized 2. Plan for public involvement 3. Coordinate with other departments and agencies	• Consider inviting NGOs and CBOs to participate in the process (i.e., Red Cross). • Schedule HMPT Meeting #1 • Set-up an informational display at a local library. • Create a Webpage for the MJHMP (new Webpage or one linked to the Merced County OES Webpage): what is hazard mitigation, invitation to take a public survey, input on mitigation actions/projects (Wood can provide the MJHMP backgrounder content for webpage). • Build public awareness through media channels/platforms, such as Facebook and Twitter. • Outreach through other groups, Private, Non-Profit. Non-governmental organizations with a focus on sensitive populations and major agricultural representation. • Possible public groups include: Local media, Chamber of Commerce, and the Merced County Office of Education (including the 20+ school districts).	• HMPT formed in January 2021 • HMPT Meeting #1 – Planning Process • Engage CSU-Stanislaus Planning/GIS Students (design class project around student participation and support in the MJHMP update process) • Design a stand-alone MJHMP Webpage • Schedule Utility Roundtable (if desired) • Develop and display content on the MJHMP Webpage - o Risk Assessment Key Findings • Design and circulate a Public Survey, including both English and Spanish versions

March – June 2021	4. Identify the hazards 5. Assess the risks	• Provide survey and materials at meetings • Share public input during HMPT Meeting #2 (March/April 2021) • Cooperative review of public input • Announce workshops • Build contact list of interested citizens based on survey to inform of future activities	• Finalize MJHMP Webpage/Experience Builder website/Survey 123 Application/StoryMap • Finalize English and Spanish version of surveys • Plan and circulate press releases, post on MJHMP Webpage • Advertisement for Public Workshop via Facebook, Twitter, Newspapers, Webpage, Paper Flyers • Collect public comments from a survey developed specifically for the plan • HMPT Meeting #2 – Hazard Identification • Additional outreach for Public Survey • Collection and compilation of survey results • Public Workshop #1
July – September 2021	6. Set planning goals 7. Review mitigation alternatives 8. Draft an action plan	• Place draft plan online on County's MJHMP Webpage • Advertise the plan and public comment period • Email list of interested citizens identified in previous step about the public review draft • Encourage public review of Final Draft MJHMP	• HMPT Meeting #3 – Mitigation Strategy • Develop links from County's Main Website to MJHMP Webpage, encourage review and comment on draft plan. • Work to develop Online Form so public could leave comments on Public Review Draft MJHMP Update • Public Workshop #2
October – December 2021	9. Adopt the plan 10. Implement the plan, evaluate its worth, and revise as needed	• Continue to host the MJHMP Webpage with a link from the County's Main Website with contact information for public inquiries • Celebrate successes – including receiving hazard mitigation funding, implementation of projects, and publicizing where the plan and its implementation is making a difference and building hazard and climate resilience.	• Presentation at County BOS hearing during adoption • Participating City Council hearing and adoption (Annexes) • Annual HMPT Meetings (to discuss status of mitigation projects) • 5-Year Update (scheduled for 2026/2027)

wood.





Annexes



1 CITY OF ATWATER

1.1 Community Profile

1.1.1 Mitigation Planning History and 2021 Process

This annex was created during the development of the 2021 Merced County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update. This Jurisdictional Annex builds upon the previous version of Atwater Annex as part of the 2014 Merced County MJHMP. A review of jurisdictional priorities found no significant changes in priorities since the last update.

The City's Local Planning Team (LPT) held the responsibility for the update, implementation, and maintenance of the plan. Members are listed in Appendix A. More details on the planning process followed and how the jurisdictions and stakeholders participated can be found in Section 3 Planning Process of the Base Plan, along with how the public was involved during the 2021 update.

1.1.2 Geography and Climate

The City of Atwater in Merced County is situated 7 miles northwest of the City of Merced, the county seat. Atwater is one of the larger cities in the County of Merced and is located in the heart of the San Joaquin Valley, 62 miles northwest of Fresno. The City is located in the northeastern portion of the County between Highway 99 and Castle Airport. According to the United States Census Bureau, Atwater has a total area of 6.1 square miles – 99.86% of it is land and 0.14% is water with an elevation of 151 feet above sea level. The City is a continuously evolving community immersed in tradition with a history of food, farming, and manufacturing in California.

The climate in the City of Atwater cycles through a cool rainy winter season and a dry summer season. Summers are hot and dry, and winters are cool and wet, with most of the year's rain falling from late October through early April.

1.1.3 History

The City of Atwater's history dates back to the late 1800s when Marshall D. Atwater was one of the largest landowners of the area. He had a huge contribution in developing the agricultural community of the area, and the place was named after him. Marshall Atwater was a wheat farmer whose land was used by the railroad for its station. The railroad reached Atwater in the 1870s, and then a town began to grow. The first post office opened in 1880. Two of the other influences on the area include Highway 99 and the Castle Air Force Base, which was set up in 1941 as an aircrew training facility by the US Army. The City of Atwater was incorporated in 1922.

Visitors to the City learn about the history of this City by visiting the Castle Air Museum or the Bloss House Museum. There are quite a few churches around the City that have retained their old-world charm. People also visit several parks including Heller Park, the Andy Albiani Park, the E. L. Walters Park or the Atwater Memorial Ballpark, all of which offer excellent entertainment opportunities for adults and kids alike.

1.1.4 Economy

The City of Atwater's vision is to be a vibrant and progressive community that provides economic opportunity and prosperity for all residents, while maintaining its "small town" friendliness, livability and safety. Traditionally, the City of Atwater has attracted agricultural-based industries and has relied on these types of industries for employment. A number of major events have occurred within Atwater itself and the reason that led to a need to take a comprehensive look at the community. Some of the events that impacted the area included the closure of Castle Air Force Base as a military facility and its conversion to civilian uses and development; the development of a prison facility just northeast of Castle Airport; the selection of a site for a new UC campus northeast of Merced near Lake Yosemite; plans to develop a University Access System that will link Atwater and the City of Merced to the University; and, plans to construct a new interchange at the intersection of Highway 99 and Westside Boulevard. Some of these events provided opportunities while others impacted the economic foundation of the City.

Estimates of select economic characteristics for the City of Atwater are shown in Table 1-1.

Table 1-1 City of Atwater Economic Characteristics, 2015-2019

Characteristic	City of Atwater
Families below Poverty Level (%)	18.5%
All People below Poverty Level (%)	20.7%
Median Family Income	\$58,584
Median Household Income	\$55,674
Per Capita Income	\$22,157
Population in Labor Force	63.4%
Population Employed*	56.2%
Unemployment**	11.2%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

*Excludes armed forces. **Does not reflect unemployment numbers due to COVID-19 Pandemic

The most common industries within a five-mile radius of Atwater are educational services and health care (a combined average of 19.6 percent of workers). Many other industries include food, agriculture, forestry, fishing and hunting, construction, accommodation and food services, and public administration. Atwater is also the home of one of the Federal Bureau of Prisons, which is a large employer in the City with over 100 employees and approximately 1,600 prisoners. The tables below show the labor force breakdown by occupations and industry based on estimates from the 2015-2019 five-year American Community Survey.

Table 1-2 City of Atwater Employment by Industry, 2015-2019

Occupation	# Employed	% Employed
Educational services, and health care and social assistance	3,118	26%
Retail trade	1,516	13%
Manufacturing	1,509	13%
Agriculture, forestry, fishing and hunting, and mining	1,316	11%
Construction	713	6%
Arts, entertainment, and recreation, and accommodation and food services	713	6%
Transportation and warehousing, and utilities	668	6%
Finance and insurance, and real estate and rental and leasing	623	5%
Public administration	539	5%

Occupation	# Employed	% Employed
Other services, except public administration	496	4%
Professional, scientific, and management, and administrative and waste management services	467	4%
Wholesale trade	343	3%
Information	64	1%
Total	12,085	100%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

*Excludes armed forces

Table 1-3 City of Atwater Employment by Occupation, 2015-2019

Occupation	# Employed	% Employed
Management, business, science, and arts occupations	2,863	23.7%
Service occupations	2,288	18.9%
Sales and office occupations	2,447	20.2%
Natural resources, construction, and maintenance occupations	2,299	19.0%
Production, transportation, and material moving occupations	2,188	18.1%
Total	12,085	100%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

*Excludes armed forces

1.1.5 Population

In May 2020, the State Department of Finance released preliminary population data for the state demographic report, the estimates did not include potential effects of the COVID-19 pandemic. According to the report the City of Atwater has a population of 31,378 persons as of January 1, 2020, and gained 8 residents from the previous year, leaving the population statically the same. Select demographic and social characteristics for the City of Atwater from the 2015-2019 American Community Survey and the California Department of Finance, are shown in Table 1-4.

Table 1-4 City of Atwater Demographic and Social Characteristics, 2015-2019

Characteristic	City of Atwater
Gender/Age	
Male	49.3%
Female	50.7%
Median age (years)	31.6
Under 5 years	8.1%
Under 18 years	29.8%
65 years and over	11.5%
Race/Ethnicity	
White	32.5%
Asian	4.5%
Black or African American	3.8%
American Indian/Alaska Native	0.3%
Hispanic or Latino (of any race)	56.5%
Native Hawaiian and Other Pacific Islander	0.1%

Characteristic	City of Atwater
Some other race	0.0%
Two or more races	2.1%
Education*	
% High school graduate or higher	73.2%
% with Bachelor's Degree or Higher	14.0%
Social Vulnerability	
% with Disability	13.6%
% Language other than English spoken at home	46.0%
% Speak English less than "Very Well"	16.5%
% of households with a computer with internet use	87.2%
% of households with no vehicle available	5.8%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

* Population 25 years and over

The following table with information from the American Community Survey 5-year estimates (2015-2019) is related to housing occupancy in the City of Atwater

Table 1-5 City of Atwater Housing Occupancy and Units, 2015-2019

Housing Characteristic	Estimate	Percentage
Housing Occupancy		
Total Housing Units	9,577	100%
Units Occupied	9,161	95.7%
Vacant	416	4.3%
Housing Units		
1-unit detached	6,589	68.8%
1-unit attached	350	3.7%
2 units	610	6.4%
3 or 4 units	700	7.3%
5-9 units	374	3.9%
10-19 units	207	2.2%
20 or more units	111	1.2%
Mobile Home	636	6.6%
Boat, RV, van etc.	0	0%
Housing Tenure		
Owner Occupied	4,815	52.6%
Renter Occupied	4,346	47.4%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

1.1.6 Development Trends

Atwater has long been recognized for its friendly small-town atmosphere, which is a valued characteristic that is desirable to maintain. In order to maintain a sustainable community, it must find a way to attract a variety of industries, local and region serving commercial development, and provide housing

opportunities that will appeal to all demographic categories ranging from university students and faculty to retirees and young families. In order to achieve these objectives, the General Plan focuses on a number of basic themes that are reflected in goals and policies.

Some parts of Atwater have changed substantially since the last General Plan update in 2000. The City identified four primary growth areas and a new proposed Sphere of Influence, as shown in Figure 2-1, designed to meet both short- and long-term development demands. Land use designations applied in these growth areas were designed to accommodate a variety of employment generating uses, small- and large-scale commercial development, and provide a broad range of housing opportunities for existing and future residents.

Atwater is surrounded by small unincorporated communities including Winton to the north, Franklin-Beachwood to the east, and directly south of the City is the McSwain area. One goal of the plan was to establish agreements with the City and County of Merced that ensures the establishment and maintenance of long-term agricultural and open space buffers between the referenced communities. The General Plan also identifies the goal to improve the entrance points into the City. In doing so, the City will enhance the view of Atwater from Highway 99 and along the City corridor. Throughout the City, enhanced landscape and design standards are encouraged to improve the appearance and quality of both newly developed and redeveloped areas.

The Merced County Association of Governments (MCAG) creates population projections for all jurisdictions in Merced County. Based on MCAG's projections, the City of Atwater was expected to a population of 40,000 in 2020.

The table below summarizes the estimates of the number of housing units, population, nonresidential square footage development, and acres of different land uses at build-out of the 2000 General Plan. The 2000 General Plan provides the opportunity for up to 20,000 additional residents in areas at build out. The General Plan plans for new jobs in commercial retail, commercial services, light industrial, manufacturing, public services, and other employment uses.

The City approved a large amount of development in the 2000 General Plan and other plans and projects, such as the Applegate Business Park and the Castle Airport Aviation and Development Center.

Build out estimates are not official growth projections and do not represent City policy. Actual population, square footage, or number of dwelling units could be lower or higher than these estimates based on a number of factors. Build out may vary overall or within individual land use designations due to:

- The need to preserve the agricultural base, grazing lands, and other types of open space;
- Infrastructure availability, including transportation facilities, public services, and facilities;
- The need to limit development due to flood risk, fire risk, geologic and soils constraints, presence of habitat and biological resources, and presence of other important natural resources; and
- Other factors, as described in the General Plan, community plans, specific plans, and City codes and ordinances.

The City has developed estimates of average density and intensity to use in calculating 2000 General Plan build out land use. The City has based build out estimates on past recorded development activity, recent development plan submittals, regional and statewide population and employment growth forecasts, and other factors.

Figure 1-1 Residential Land Uses

Land Use Designations	Assumed Typical Residential Density	Acres Designated (Gross)	Dwelling Units	Population ¹
Residential (dwelling unit per acre [du/a])				
Very Low Density Residential (du/a)	1.50 du/a	2,562.85	3,844.28	11,533
Low Density Residential	5.00 du/a	2,441.25	12,206.25	36,618
Medium Density Residential	11.00 du/ac	180.70	1,987.70	5,963
High Density Residential	25.00 du/a	124.30	3,107.50	9,323
Franklin-Beachwood (Estimate for Res.)	mixed	712.00 ²	245.00	735
TOTAL	N/A	6,021.11	21,390.73	64,172

¹ Assumes an average of 3.0 persons per dwelling unit.

² Of the 712.00 acres within the Franklin-Beachwood area, approximately 205.00 acres are specifically designated for various residential uses. Estimates given for dwelling units and population within Franklin-Beachwood are based on residentially designated acreage, not the total acreage of the community.

³ Separate residential acreage and buildout information for the Community McSwain was not available at the time of the City's 2000 General Plan update. Therefore, the entire McSwain area has been combined into the Very Low Density Residential designation on the City's Land Use Diagram for purposes of estimating the number of dwelling units and population anticipated in that area.

NOTE: Development of mixed use projects within the Downtown (Mixed Use) and Residential Transition designations at an assumed rate 15 and 11 du/ac, respectively, for 30% of the total acreage available; as well as, potential residential development under existing Merced County agricultural designations at an assumed average of one dwelling unit per 40 acres, would increase the potential build-out population by approximately 2,217 persons.

Source: General Plan, Land Use

In 1976, Atwater Redevelopment Agency was created. The Agency is a tool to assist in the elimination of blighting conditions within the Project Area, and it seeks to ensure that the City's economic base will grow and remain healthy through the provision of new public improvements, commercial and industrial development, and affordable housing. The Project Area outlined in the General Plan is approximately 806 acres in size and consists of the downtown commercial core, the Applegate Business Park, the Atwater Business Park, two public parks, and several residential neighborhoods. The goals of Atwater Redevelopment Agency (now Community Development) according to the City's General Plan are as follows:

- Improve the existing infrastructure supporting the Project Area
- Eliminate or mitigate other existing blighting conditions
- Ensure and maintain an attractive, viable downtown Business District which provides economic incentives that create new job opportunities
- Encourage and assist industrial and commercial development to ensure adequate job opportunities, a stable tax base in the community, and new investments in the Project Area

During the 2021 planning process the Planning Team noted the following development trends since the adoption of the 2014 MJHMP: Three-story projects are being constructed in the City but with the City's foresight in purchasing of an aerial apparatus some of the vulnerability concerns are alleviated. Also adopting current Code volumes (2019) is assisting with staying up to date with current hazard mitigation. The City also approved a 359-acre land development project in 2017 referred to as the Ferrari Project, which required annexation into the City and the development of a commercial/business park, hospital, medical offices, and other related infrastructure.

The areas located in the Sphere of Influence (SOI) shown in Figure 2-1 are areas each City plans to grow into and potentially slated for future development. Understanding the potential hazard exposure in the area can help to mitigate the impacts of events before development occurs in those areas. During this

plan update process parcel analysis was conducted using the SOI and overlaid with available hazard risk layers to determine where future development may be at risk of natural hazard events. The results of the analysis have been integrated into the applicable hazard sections: dam, flood and wildfire. Table 1-6 is the summary of the SOI total exposure for the City of Atwater.

Table 1-6 Sphere of Influence Total Exposure Summary

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value
Agricultural	194	273	\$33,415,022	\$33,415,022	\$66,830,044
Commercial	13	21	\$4,838,011	\$4,838,011	\$9,676,022
Exempt	11	13	\$3,064,153	\$3,064,153	\$6,128,306
Industrial	11	32	\$28,834,491	\$43,251,737	\$72,086,228
Mixed Use	2	2	\$14,811	\$7,406	\$22,217
Residential	444	496	\$80,208,808	\$40,104,404	\$120,313,212
Total	675	837	\$150,375,296	\$124,680,732	\$275,056,028

Source: Merced County Assessor, Wood analysis, City of Atwater

2 HAZARD IDENTIFICATION AND SUMMARY

The City of Atwater LPT identified the hazards that affect the City and summarized their frequency of occurrence, spatial extent, potential magnitude, and significance specific to their community (see Table 2-1). There are no hazards that are unique to Atwater. The overall hazard significance takes into account the geographic area, probability and magnitude as a way to identify priority hazards for mitigation purposes. This is discussed further in the Vulnerability Assessment Section.

Table 2-1 City of Atwater —Hazard Profiles

Hazard	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Agriculture Pests and Disease	Extensive	Likely	Critical	Medium
Dam Incidents	Limited	Occasional	Limited	Medium
Drought	Extensive	Likely	Limited	Medium
Earthquake	Extensive	Occasional	Critical	Medium
Flood and Levee Failure	Extensive	Likely	Critical	Medium
Severe Weather: Dense Fog, Freeze, Heat, Heavy Rain, High Wind/Tornado	Extensive	Highly Likely	Critical	Medium
Wildfire	Significant	Highly Likely	Negligible	Medium

Hazard	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Geographic Area Limited: Less than 10% of planning area Significant: 10-50% of planning area Extensive: 50-100% of planning area Probability of Future Occurrences Highly Likely: Near 100% chance of occurrence in next year or happens every year. Likely: Between 10 and 100% chance of occurrence in next year or has a recurrence interval of 10 years or less. Occasional: Between 1 and 10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years. Unlikely: Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.		Magnitude/Severity (Extent) Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid Significance Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact		

2.1 Vulnerability Assessment

The intent of this section is to assess Atwater's vulnerability that is separate from that of the planning area as a whole, which has already been assessed in Section 4 Hazard Identification and Risk Assessment in the Base Plan. This vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of medium or high significance that may vary from other parts of the planning area.

The information to support the hazard identification and risk assessment was based on a combination of the previous MJHMP for the City and County and jurisdiction specific information collected during the 2021 update. A Local Hazard Mitigation Plan Update Guide and associated worksheets was distributed to each participating municipality or special district to complete during update process in 2021. Information collected was analyzed and summarized in order to identify and rank all the hazards that could impact anywhere within the County, as well as to rank the hazards and identify the related vulnerabilities unique to each jurisdiction.

Each participating jurisdiction was in support of the main hazard summary identified in the Base Plan (see Table 4-2). However, the hazard summary rankings for each jurisdictional annex may vary due to specific hazard risk and vulnerabilities unique to that jurisdiction. The information in this annex helps differentiate the jurisdiction's risk and vulnerabilities from that of the overall County.

Note: The hazard "Significance" reflects overall ranking for each hazard and is based on the City of Atwater's Planning Team member input from the Data Collection Guide and the risk assessment developed during the planning process (see Section 4 of the Base Plan), which included a more detailed qualitative and quantitative analysis with best available data.

The hazard summaries in Table 2-1 above reflect the hazards that could potentially affect City. The discussion of vulnerability for each of the following hazards is located in Section 2.3 Estimating Potential Losses. Based on this analysis, the priority hazards (all of Medium Significance) for the City of Atwater are identified below.

- Agricultural Pests and Disease
- Dam Incidents
- Drought
- Earthquake
- Flood and Levee Failure
- Severe Weather: Dense Fog, Freeze, Extreme Heat, Heavy Rain, High Wind/Tornado
- Wildfire

Drought, Agricultural Pests and Disease, and Severe Weather hazards are not addressed in this vulnerability assessment as the exposure is similar to the overall County exposure, and the potential for losses are difficult to quantify specific to the City of Atwater.

Other Hazards

Hazards assigned a significance rating of Low and which do not differ significantly from the County ranking (e.g., Low vs. High) are not addressed further in this plan and are not assessed individually for specific vulnerabilities in this section. In the City of Atwater, those hazards include: subsidence, hazardous materials incidents, and cyber attacks.

Additionally, the City's committee members decided to rate landslides as Not Applicable (N/A) to the planning area due to a lack of exposure, vulnerability, and no probability of occurrence.

2.2 Assets at Risk

This section considers Atwater's assets at risk, including values at risk, critical facilities and infrastructure, historic assets, economic assets and growth and development trends.

2.2.1 Values at Risk

The following data on property exposure is derived from the Merced County 2020 Parcel and Assessor data. This data should only be used as a guideline to overall values in the City as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is likely low and does not reflect current market value of properties. It is also important to note that in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss and is not included in the values below. Table 2-2 shows the exposure of properties (e.g., the values at risk) broken down by property type for the City Atwater.

Table 2-2 City of Atwater Property Exposure by Type

Property Type	Parcel Count	Building Count	Improved Value	Content Value	Total Value
Agricultural	4	4	\$294,019	\$294,019	\$588,038
Commercial	254	941	\$187,232,236	\$187,232,236	\$374,464,472
Exempt	77	150	\$14,001,651	\$14,001,651	\$28,003,302
Industrial	48	48	\$28,819,757	\$43,229,636	\$72,049,393
Mixed Use	6	6	\$236,330	\$236,330	\$472,660
Residential	7,229	8,489	\$1,159,329,319	\$579,664,660	\$1,738,993,979
Vacant Land	16	16	\$1,463,486	\$1,463,486	\$2,926,972

Total	7,634	9,654	\$1,391,376,798	\$826,122,017	\$2,217,498,815

Source: Merced County Assessor, Wood analysis

2.2.2 Critical Facilities and Infrastructure

For the purposes of this plan, a critical facility is defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA sorts critical facilities into seven lifeline categories as shown in Figure 4-1 in the Base Plan.

Table 2-3 shows a summary of the critical facilities analysis. critical facilities and other community assets as important to protect in the event of a disaster. Within the City of Atwater, the following are considered critical facilities:

- Atwater Fire Department Stations (Stations #41 & 42)
- Atwater Police Department building
- Atwater City Hall (co-located with Police Department)
- Merced County Fire Department Stations 82 (Atwater) and 88 (Winton)
- Water supply lines and wells
- Wastewater treatment plant, pumping stations, and trunk lines
- Major electrical transmission lines and substations
- Major communication lines and microwave transmission facilities
- Federal Prison and major railways
- Castle Airport Aviation and Development Center (CAADC)
 - Academy
 - Airport
 - Aviation
 - EOC
 - Fire
 - Fuel
 - Sheriff
 - Water Facilities/Utilities/Sewer/Communications/Lightning
- Castle Air Museum
- Veteran's Memorial, Veterans Services
- Animal shelter
- Public Library
- Atwater CLEO
- Laboratories (Bess Test Labs, Castle Analytical Lab)

Critical facilities also include major roadways which may serve as principal evacuation routes. The table that follows lists the critical facilities and other community assets identified by the county's Planning Team as important to protect in the event of a disaster.

There are also several designated shelters in Atwater for use in an emergency event including the Veterans Memorial Building, recreation centers/parks, high school gyms and school cafeterias.

2.2.3 Historic, Cultural and Natural Resources

The following historical resources are located in the City of Atwater:

- Bloss Mansion – National Register (listed 9/3/1981) and Point of Interest (listed 3/15/1974)

Natural resources are important to include in benefit-cost analyses for future projects and may be used to leverage additional funding for projects that also contribute to community goals for protecting sensitive natural resources. Awareness of natural assets can lead to opportunities for meeting multiple objectives. For instance, protecting wetlands areas protects sensitive habitat as well as attenuates and stores floodwaters.

2.3 Estimating Potential Losses

2.3.1 Dam Incidents

Protection from flood hazards created by dam failures is critical to the safety and well-being of Atwater residents. A failure of one of the dams operated by the Merced Irrigation District (MID) that generate electricity could affect supply to the CAADC site, within which the Castle Medical Center is located. Should more of the City choose MID as its electricity supplier and distributor, those customers would likewise be affected.

A dam vulnerability assessment was completed during the 2021 update, following the methodology described in Section 4 of the Base Plan. Dam inundation areas from the New Exchequer and Yosemite dams with the City of Atwater are shown in Figure 2-1 and Table 2-3 and Table 2-4 summarize the values at risk within each inundation area, respectively. Not represented in the mapping is inundation from the Castle Dam, a high hazard dam to the northeast of the City, which likely poses the greatest risk. Both the New Exchequer and Yosemite dam are rated as high hazard. Yosemite dam is also rated as Extremely High by the California Department of Water Resources, Division of Safety of Dams. Extremely High rated dams are expected to cause considerable loss of human life or result in an inundation area with a population of 1,000 or more. Areas of future development, located within the City's Sphere of Influence are most vulnerable to dam inundation events, as noted in Table 2-5 and Table 2-6. One critical facility, categorized as a Transportation Lifeline, is located within a dam inundation area.



Figure 2-1 City of Atwater Potential Dam Inundation Areas (except for Castle Dam)

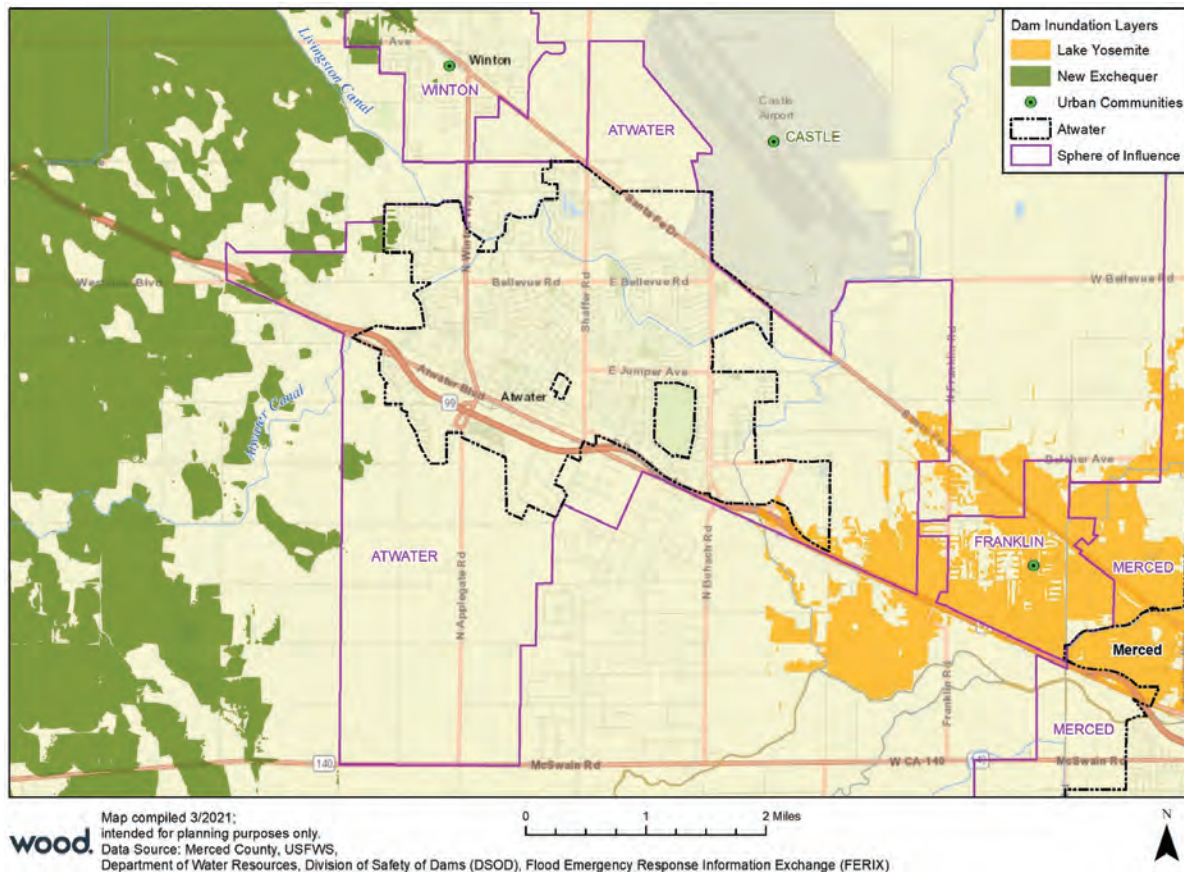


**Table 2-3 New Exchequer Dam Inundation**

Property Type	Improved Parcel County	Building Count
Residential	37	37
Total	37	37

Source: California DSOS, National Inventory of Dams, Merced County Assessor's Office

Table 2-4 Yosemite Dam Inundation

Property Type	Improved Parcel County	Building Count	Population
Commercial	1	2	
Residential	20	21	67
Total	21	23	67

Source: California DSOS, National Inventory of Dams, Merced County Assessor's Office

Future Development

The results of the sphere of influence and dam analysis are shown in and Table 2-5 and Table 2-6.

Table 2-5 Sphere of Influence Areas Exposed to New Exchequer Inundation

Property Type	Improved Parcel Count	Building Count	Population
Agricultural	8	10	
Residential	2	2	7
Total	10	12	7

Source: Merced County Assessor, Wood analysis, City of Atwater

Table 2-6 Sphere of Influence Areas Exposed to Yosemite Dam Inundation

Property Type	Improved Parcel Count	Building Count	Population
Agricultural	4	4	
Commercial	3	3	
Exempt	1	1	
Residential	34	36	120
Total	42	44	120

Source: Merced County Assessor, Wood analysis, City of Atwater

2.3.2 Earthquake

The City of Atwater and surrounding areas historical earthquake activity is below California's state average. No known faults are located in the Atwater area. The nearest known fault is the Kings Canyon Lineament, approximately 10 miles south of Atwater, however geological evidence would show this fault is not active. There is no record of any seismic activity originating within the City; however, the County of Merced has been shaken by earthquakes originating elsewhere. There is documented evidence of six earthquakes that shook the area, those of 1872, 1906, 1952, 1966, 1984, and 1989. Major damage occurred in Atwater in 1906, with minor damage recorded throughout the county from other occurrences.

No damaging earthquakes greater than M 6.0 have been recorded in the City of Atwater or Merced County in over 200 years, though several have been very close. The most recent large earthquake near

Merced County, and the City of Atwater, was 16 miles east north-east of King City at a magnitude of 5.3 on October 20, 2012. Several aftershocks followed the main earthquake, including a M3.1 aftershock. This quake was preceded by two earthquakes located approximately 100 miles from Merced County, the 1982 New Idria earthquake (M5.4) and the 1983 Coalinga quake (M6.5). There was low level ground shaking reported.

Based on the earthquake shaking potential mapped for Merced County and the City of Atwater, due to the proximity to the San Andreas Fault, and the history of shaking with no surface rupture, means the probability of damaging seismic ground shaking in the City of Atwater is considered as occasional. Other hazards associated with earthquake activity, such as lateral spreading, surface cracking or differential setting, are considered unlikely to occur, although no studies have been conducted to determine the likelihood of these hazards.

2.3.3 Flood and Levee Failure

The primary types of flood events in Merced County that may impact the City of Atwater are riverine and urban. Flooding could also occur as a result of dam failure, however, there is no evidence to indicate that flooding due to dam failure is likely. Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area, upstream, or from winter snowmelt.

Areas in the eastern part of the City of Atwater have been determined to be in the FEMA Special Flood Hazard Area or 100-year floodplain. The physical risks associated with potential flooding and the regulatory requirements for floodplain management are important considerations when decisions are being made regarding future land use throughout the City of Atwater. Most of Atwater lies outside the 100-year floodplain designated by FEMA. Based on the history of flooding in the County of Merced, the City of Atwater and surrounding areas are considered likely to have the hazard potential for future flooding.

A flood vulnerability assessment was completed during the 2021 update, following the methodology described in Section 4 of the Base Plan. Flood hazards for the City of Atwater are shown in Figure 2-2 and Table 2-7 summarize the values at risk in the City's 100-year floodplain, respectively. These tables also detail loss estimates for each flood.

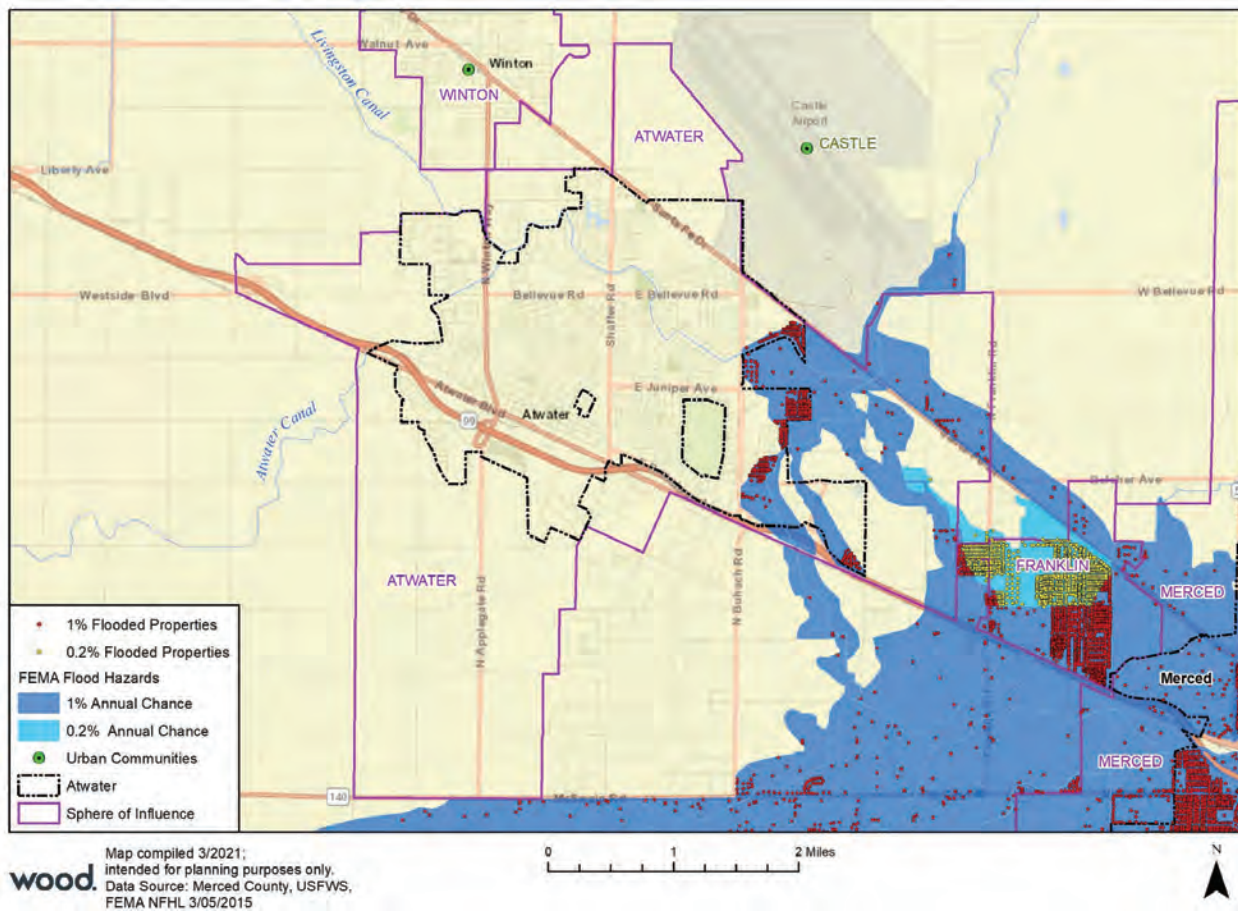
Figure 2-2 City of Atwater 100-year floodplain

Table 2-7 City of Atwater FEMA 1% Annual Chance Flood Hazard, by Property Type

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Estimated Loss	Population
Commercial	4	8	\$446,109	\$446,109	\$892,218	\$223,055	
Exempt	7	7	\$0	\$0	\$0	\$0	
Industrial	1	1	\$16,651	\$24,977	\$41,628	\$10,407	
Residential	342	344	\$87,919,330	\$43,959,665	\$131,878,995	\$32,969,749	1,094
Total	354	360	\$88,382,090	\$44,430,751	\$132,812,841	\$33,203,210	1,094

Source: Merced County Assessor's Office; National Flood Hazard Layer Effective 12/2/2008; FEMA; Wood analysis

Based on this analysis, the City of Atwater has 354 improved parcels located within the 100-year floodplain for a total value of over \$132 million. The potential loss is estimated at \$33 million if these areas were inundated by the 1% annual chance flood. No parcels were found to be located in within the 500-year floodplain. Population at risk was calculated for the 100-year based on the number of residential properties at risk and the average number of persons per household (3.32). There is an estimated 1,094 persons at risk to flooding in the City of Atwater.

Critical Facilities at Risk

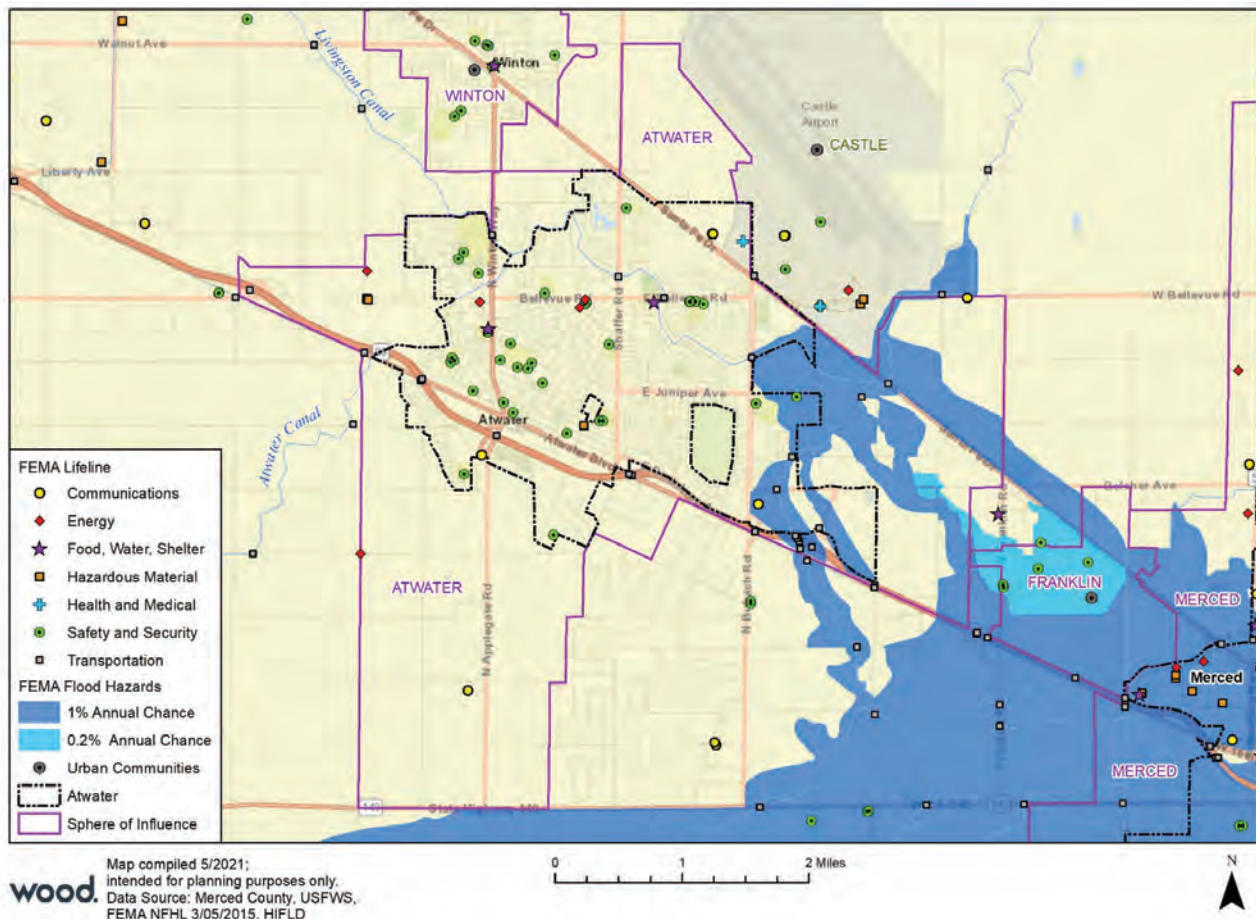
Critical facilities are those community components that are most needed to withstand the impacts of disaster as previously described. Table 2-8 lists the critical facilities in the City's 100-year floodplains and Figure 2-3 shows the location of the critical facilities. There are a total of 10 facilities potentially exposed to a 1% annual chance flood events, including the Station 42 of the Atwater City Fire Department (categorized as Safety and Security). The impact to the community could be great if any of these facilities are damaged or destroyed during a flood event.

Table 2-8 Critical Facilities at risk of 1% Annual Chance Flood Hazard, by FEMA Lifeline

FEMA Lifeline	Count
Communications	2
Energy	2
Food, Water, Shelter	1
Safety and Security	1
Transportation	4
Total	10

Source: HIFLD, FEMA NFHL

Figure 2-3 Critical Facilities at Risk of 1% Annual Flood Hazard



Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Atwater joined the National Flood Insurance Program (NFIP) on November 1, 1979. NFIP Insurance data indicates that as of July 2021, there were 14 flood insurance policies in force in the City with \$4,018,000 of coverage. All of the policies are single family residential and located in the B, C, and X zone.

There has been 1 historical claim for flood losses totaling \$1,740. According to the FEMA Community Information System accessed July 23, 2021, the City has no Repetitive Loss properties or Severe Repetitive Loss properties.

Future Development

The results of the sphere of influence and flood analysis are shown in Table 2-9 and Table 2-10. This indicates the risk to existing development that could be under the City's jurisdiction if the area was annexed.

Table 2-9 Sphere of Influence Areas Exposed to 1% Annual Chance Flood Hazard

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Estimated Loss	Population
Agricultural	23	26	\$2,212,362	\$2,212,362	\$4,424,724	\$1,106,181	
Exempt	2	3	\$548,933	\$548,933	\$1,097,866	\$274,467	
Residential	47	51	\$6,797,928	\$3,398,964	\$10,196,892	\$2,549,223	169
Total	72	80	\$9,559,223	\$6,160,259	\$15,719,482	\$3,929,871	169

Source: Merced County Assessor, Wood analysis, City of Atwater

Table 2-10 Sphere of Influence Areas Exposed to 0.5% Annual Chance Flood Hazard

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Estimated Loss	Population
Residential	1	1	\$81,844	\$40,922	\$122,766	\$30,692	3
Total	1	1	\$81,844	\$40,922	\$122,766	\$30,692	3

Source: Merced County Assessor, Wood analysis, City of Atwater

2.3.4 Wildfires

Both urban and wildland fires conditions exist in Merced County and its cities which increases the chances for damage to property, loss of life and/or injury. In most of Merced County, the California Department of Forestry and Fire Protection (Cal FIRE) ranks fuel loading as low. Fuels are mainly crops and grasses. In the southwest corner, there are some brush, pine, and grass fuels, which are ranked as moderate fuel hazards, primarily in the area west of Interstate 5. Figure 2-4 shows the fire threat areas in the city and Table 2-11 summarizes the values at risk and detail loss estimates.

Table 2-11 Properties Exposed to Wildfire Threat Areas

Property Type	Improved Parcel Count	Building Count High	Building Count Moderate	Building Count Low	Total Building Count	Improved Value	Estimated Content Value	Total Value
Commercial	7	0	3	6	9	\$6,430,503	\$6,430,503	\$12,861,006
Exempt	8	0	5	3	8	\$689,882	\$689,882	\$1,379,764
Residential	522	1	267	294	562	\$151,511,124	\$75,755,562	\$227,266,686
Vacant Land	1	0	1	0	1	\$15,000	\$15,000	\$30,000
Total	538	1	276	303	580	\$158,646,509	\$82,890,947	\$241,537,456

Source: CAL FIRE, Merced County Assessor, Wood GIS analysis

Figure 2-1 Wildfire Threat Areas in City of Atwater

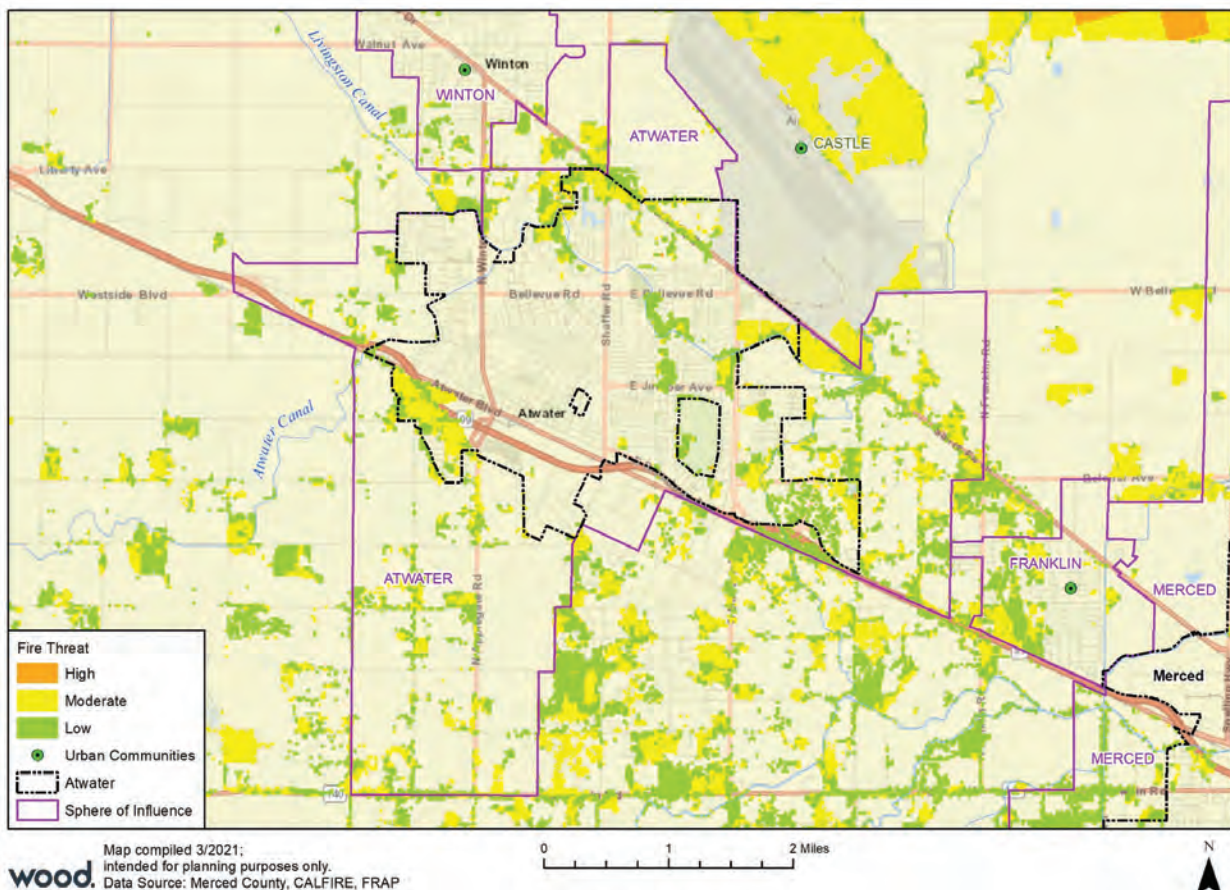


Table 2-12 shows the results of the critical facility analysis by fire threat area.

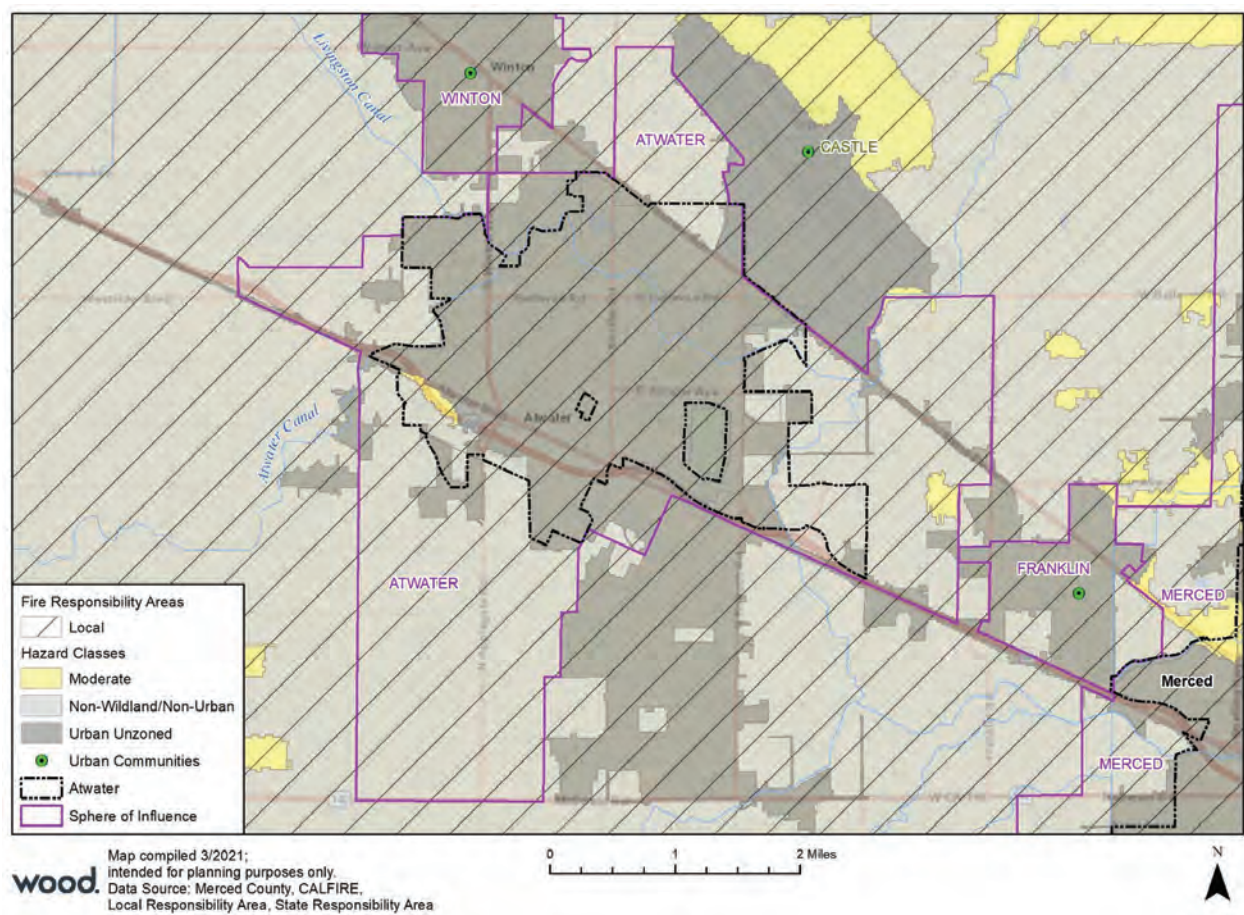
Table 2-12 Critical Facilities Exposed to Wildfire Threat Areas

FEMA Lifeline	Count
Moderate Wildfire Threat	
Transportation	2
Low Wildfire Threat	
Communications	1
Energy	2
Food, Water, Shelter	1
Safety and Security	1
Transportation	1
Total	9

Source: Merced County, HIFLD, CAL FIRE, FRAP, Wood GIS Analysis

Figure 2-5 shows the fire responsibility areas in the City of Atwater. Based on the analysis there are 5 residential buildings located with the moderate hazard area, with a total value of \$1,317,924. Two critical facilities, both categorized as Transportation Lifeline are located within the local responsibility moderate fire hazard area. Refer to Section 4 of the Base Plan for methodology and results of the countywide analysis.

Figure 2-2 City of Atwater Fire Responsibility Areas



Future Development

The results of the sphere of influence and wildfire analysis are shown Table 2-13 and Table 2-14.

Table 2-13 Sphere of Influence Areas Exposed Within Fire Severity Areas

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Population
SRA Moderate						
Agricultural	2	2	\$603,191	\$603,191	\$1,206,382	
Residential	2	2	\$208,515	\$104,258	\$312,773	7
Total	4	4	\$811,706	\$707,449	\$1,519,155	7

Source: Merced County Assessor, CALFIRE, Wood analysis, City of Atwater

Table 2-14 Sphere of Influence Areas Exposed Within Fire Threat Areas

Property Type	Improved Parcel Count	Building Count High	Building Count Moderate	Building Count Low	Total Building Count	Improved Value	Estimated Content Value	Total Value	Population
Agricultural	55	1	25	50	76	\$12,242,747	\$12,242,747	\$24,485,494	
Commercial	4	0	3	2	5	\$862,532	\$862,532	\$1,725,064	
Exempt	5	0	2	4	6	\$2,555,421	\$2,555,421	\$5,110,842	
Residential	98	0	37	71	108	\$14,729,881	\$7,364,941	\$22,094,822	359
Total	162	1	67	127	195	\$30,390,581	\$23,025,641	\$53,416,222	359

Source: Merced County Assessor, CALFIRE, Wood analysis, City of Atwater

3 CAPABILITY ASSESSMENT

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation outreach and partnerships, and other mitigation efforts. To develop this capability assessment, the jurisdictional planning representatives reviewed a matrix of common mitigation activities to inventory which of these policies or programs and shared any updates or changes through the Atwater Data Collection Guide. The team then supplemented this inventory by reviewing additional existing policies, regulations, plans, and programs to determine if they contribute to reducing hazard-related losses.

During the plan update process, this inventory was reviewed by the jurisdictional planning representatives and Wood consultant team staff to update information where applicable and note ways in which these capabilities have improved or expanded. Additionally, in summarizing current capabilities and identifying gaps, the jurisdictional planning representatives also considered their ability to expand or improve upon existing policies and programs as potential new mitigation strategies. The City of Atwater's capabilities are summarized below.

3.1 Regulatory Capability

The regulatory and planning capabilities table lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities. The table below indicates those that are in place in the City of Atwater.

Table 3-1 City of Atwater —Regulatory and Planning Capabilities

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General Plan	Yes	Adopted July 24, 2000
Zoning ordinance	Yes	Chapter 17.01
Subdivision ordinance	Yes	Chapter 16.01
Growth management ordinance	No	
Floodplain ordinance	Yes	Floodplain Management Ordinance Chapter 16.14.010
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	Yes	The 2019 California Code of Regulations, Title 24, Part 1 (California Administrative Code)
Fire department ISO rating	Yes	Rating: 3
Erosion or sediment control program	No	
Stormwater management program	Yes	
Site plan review requirements	Yes	Chapter 17.12 – Zoning Ordinance, Administration and General Conditions
Capital improvements plan	Yes	
Economic development plan	Yes	Economic Development & Special Projects, Atwater Redevelopment Agency, General Plan
Local emergency operations plan	Yes	Updated in 2017
Other special plans	No	
Flood insurance study or other engineering study for streams	Yes	
Elevation certificates (for floodplain development)	No	
Other		

City of Atwater General Plan, 2000 – The City of Atwater adopted its first General Plan in 1958. The most recent update began in 1992 and resulted in the adoption of the City of Atwater 2000 General Plan on July 24, 2000, with an anticipated horizon year of 2020. This General Plan defines the City's goals, objectives and policies that guide the physical growth, use and development of land under the jurisdictional authority of the City.

The purpose of the Public Health and Safety Element is to reduce or eliminate long term risk to people and property from natural or human caused hazards. This element focuses on establishing policies and programs to protect the community from risks associated with seismic, geologic, flood, and fire hazards. The Public Health and Safety Element is now expanded to include community health and community safety related issues that are more commonly associated with the built environment as affecting the health and safety of residents living within the City. The City of Atwater Public Health and Safety Element does not reference incorporation of the 2014 MJHMP. Integration of the 2014 MJHMP was not noted in any of the other City planning mechanisms.

City of Atwater Emergency Plan, 2017 – The Emergency Plan addresses the planned response to emergency situations associated with natural disasters, technological incidents, human caused events and

national security emergencies in or affecting the City of Atwater. The plan establishes the emergency management organization required to mitigate any significant emergency or disaster affecting the City; identifies the policies, responsibilities, and procedures required to protect the health and safety of communities, public and private property, and the environmental effects of natural, human caused and technological emergencies and disasters; and establishes the operational concepts and policies for disaster response and recovery.

City Fire Management Plan – The City of Atwater’s Fire Department provides fire protection and emergency medical response services within the City limits. The City of Atwater reorganized their Fire Department and entered into a Cooperative Fire Protection Agreement with the California Department of Forestry and Fire Protection (CAL FIRE) for the provision of fire protection services. CAL FIRE provides for the management of the fire department with a Fire Chief, Division Chief and Battalion Chiefs. The Fire Chief reports to the City Manager and to the elected City Council. The contract began in October 2008. The CAL FIRE agreement provides daily staffing at fire stations, dispatch, management, incident command, training, investigation, and fire prevention activities. The City of Atwater’s Fire Management Plan is a product of the implementation of the State Fire Plan. The State Fire Plan provides an analysis procedure utilizing, in part, computer based geographical information data that is validated by experienced fire managers to assess fire fuel hazards and risks in order to design and implement mitigating activities. The Fire Management Plan provides background information, fuels and fire data, proposed projects, and individual Battalion reports outlining mitigating activities commonly carried out each year.

Emergency Services Ordinance, Chapter 2.44 – The declared purposes of this chapter are to provide for the preparation and carrying out of plans for the protection of persons and property within the City in the event of an emergency; the direction of the emergency organization; and the coordination of the emergency functions of the City with all other public agencies, corporations, organizations and affected private persons. The ordinance establishes the Operational Area Council and designates the membership of the council. The council’s powers include the development of emergency and mutual aid plans and agreements and the ordinances and resolutions as necessary to implement the Multi-Hazard Functional Plan and any other such plans and agreements.

California Fire Code Chapter 15.28.010 – The City of Atwater adopts by reference as its fire code, the California Fire Code, 2010 Edition, and including among Appendices, Appendix Chapter 4 (Special Detailed Requirements Based on Use and Occupancy); Appendix Chapter B (Fire Flow Requirements for Buildings); Appendix Chapter C (Fire Hydrant Locations and Distribution); Appendix Chapter CC (Fire Hydrant Locations and Distribution); Appendix D (Fire Apparatus Access Roads); Appendix F (Hazard Ranking); Appendix H (Hazardous Materials Management Plans and Hazardous Materials Inventory Statements); Appendix I (Fire Protection system-Noncompliance Conditions); and Appendix J (Emergency Responder Radio Coverage), based on the 2009 International Fire Code as published by the International Code Council (ICC) and as adopted and amended by the California Building Standards Commission in the California Building Standards Code Title 24 of the California Code of Regulations.

Floodplain Management Ordinance Chapter 16.14.010 – It is the purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- Protect human life and health;
- Minimize expenditure of public money for costly flood control projects;
- Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- Minimize prolonged business interruptions;

- Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in areas of special flood hazard;
- Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future blighted areas caused by flood damage;
- Ensure that potential buyers are notified that property is in an area of special flood hazard; and,
- Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

3.2 Administrative and Technical Capability

The table below identifies City personnel with responsibilities for activities related to mitigation and loss prevention in the City of Atwater. Many positions are full time and/or filled by the same person. A summary of technical resources follows.

Table 3-2 City of Atwater —Personnel Capabilities

Personnel Resources	Yes/No	Department/Position	Comments
Planner/engineer with knowledge of land development/land management practices	Yes	City Community Development Department	
Engineer/professional trained in construction practices related to buildings and/or infrastructure	Yes	City Community Development Department	
Planner/engineer/scientist with an understanding of natural hazards	Yes	City Community Development Department	
Personnel skilled in GIS	No		
Full time building official	Yes	Chief Building Official	
Floodplain manager	Yes	City Community Development Department	
Emergency manager	Yes	City Administrator's Office; County Emergency Services Manager	
Grant writer	Yes	Administration	
Other personnel	Yes	Multiple agencies and departments with support personnel expanding capabilities for mitigation	
GIS Data Resources (Hazard areas, critical facilities, land use, building footprints, etc.)	No		
Warning Systems/Services (Reverse 9-11, cable override, outdoor warning signals)	No		
Other			

The City operates under a City Council/City Manager form of government. The City Council makes laws and sets policies, which are enforced and implemented by the City Manager, with the assistance of subordinate officers, department heads, and the City Clerk, City Treasurer and City Attorney. Municipal elections are held every two years in November of even-numbered years with City Council terms overlapping. The Mayor and two Council Members are elected at one election, and the other two Council Members, City Clerk and City Treasurer are elected at the next election.

The City of Atwater provides water, sewer, and storm drainage, as well as police, fire, and general government services.

The Atwater Elementary School District serves school-aged children in grades kindergarten through eighth grade (K-8). There are six elementary schools (K-6), one junior high school (7-8), and one school serves kindergarten to eighth grade (K-8). High school education is provided by the Merced Union High School District which has eight comprehensive high schools and one continuation school. The City also offers opportunities for post-secondary education with satellite campuses for Merced College, UC Merced and other graduate schools.

3.3 Fiscal Capability

The following table identifies financial tools or resources that the City could potentially use to help fund mitigation activities. There are currently no specific funding sources for hazard mitigation.

Table 3-3 City of Atwater —Available Financial Tools and Resources

Financial Resources	Accessible/ Eligible to Use	Has This Been Used for Mitigation in the Past?	Comments
Community Development Block Grants	Yes	No	
Capital improvements project funding	Yes	No	
Authority to levy taxes for specific purposes	Yes	No	Must be approved by voters
Fees for water, sewer, gas, or electric services, new development	Yes	No	
Incur debt through general obligation bonds	Yes	No	
Incur debt through special tax bonds	Yes	No	Requires approval by two-thirds of voters
Incur debt through private activities	Yes	No	Do not have any in place
Federal Grant Programs (Hazard Mitigation Grant Program)	Yes	No	Various Departments

3.4 Outreach and Partnerships

The Merced County Office of Emergency Services provides education and outreach on Disaster Preparedness for all of the jurisdictions within the County. This education program is in coordination and partnerships with county and the cities' departments with education programs including the Sheriff's Office, Police Departments, Fire Departments, Agricultural Commissioner, and the Department of Public Health.

During the 2021 planning process the following outreach efforts were identified:

- Ongoing newsletter
- Fire Prevention School Programs
- Presence and use of social media

Education and outreach efforts, as well as emergency response planning, will need to address the needs of low-income residents and the large Spanish-speaking population. In past emergencies, volunteers have organized spontaneously to help those with mobility issues.

3.4.1 Planning Commission

The Planning Commission reviews development proposals for compliance with the General Plan and makes recommendations to the City Council on long range plans and maps for the City and plans for public improvements, plans and development plans for proposed for property within the City, and zoning and rezoning of property within the City. The Commission develops and maintains a long range comprehensive General Plan of the Atwater planning area.

3.4.2 The City Public Works Committee

The Public Works Committee was established in April 1999. The purpose of the committee is to establish City Council liaison with the Public Works Department to facilitate communication in the interests of improving the overall delivery of public works services in the community.

The duties of the Committee are, but not limited to; the review and recommendation of issues related to the delivery of public works services and related engineering, water, sewer, government buildings, equipment maintenance, parks and parks facilities services. The Committee evaluates recommendations related to proposed programs, provides assistance and/or guidance to staff in the evaluation of policies, procedures, rules and regulations pertaining to the delivery of public works services and related engineering, water, sewer, government buildings, equipment maintenance, parks and parks facilities services; and assists staff with identifying and prioritizing activities related to the administration of the City's public works services.

3.4.3 The City Public Safety Committee

The Public Safety Committee was established in February 1999. The purpose of the committee is to establish City Council liaison with the Police and Fire Departments to facilitate communication in the interests of improving the overall delivery of public safety services in the community.

The duties of the Committee are, but not limited to, the review and recommendation of issues related to the delivery of police and fire services and related public safety services; to evaluate recommendations related to proposed programs; to provide assistance and/or guidance to staff in the evaluation of policies, procedures, rules and regulations pertaining to the delivery of police and fire services and related public safety services; and to assist staff with identifying and prioritizing activities related to the administration of the City's police and fire services.

3.5 Other Mitigation Efforts

In addition to the project identified in the City's Mitigation Action plan the City of Atwater's Fire Department conducts annual fire and life safety inspections for all businesses and Senate Bill 1205 occupancies (Apartments, Hotels, Assemblies and Schools). In addition, city-wide weed abatement is heavily enforced.

3.6 Opportunities for Enhancement

Based on the capabilities assessment, the City of Atwater has several existing mechanisms in place that already help to mitigate hazards. There are also opportunities for the City to expand or improve on their

policies, programs and fiscal capabilities and further protect the community. Future improvements may include providing training for staff members related to hazards or hazard mitigation grant funding in partnership with the County and Cal OES. Additional training opportunities will help to inform City staff members on how best to integrate hazard information and mitigation projects into their departments. Continuing to train City staff on mitigation and the hazards that pose a risk to the City of Atwater will lead to more informed staff members who can better communicate this information to the public.

4 MITIGATION STRATEGY

4.1 Goals and Objectives

The City of Atwater adopts the hazard mitigation goals and objectives developed by the Planning Team and described in Section 5 Mitigation Strategy of the Basin Plan.

4.2 Continued Compliance with the National Flood Insurance Program

The City has been an NFIP participating community since 1984. In addition to the mitigation actions identified herein the City will continue to comply with the NFIP. Floodplain management is under the purview of the Community Development Department City Engineer. This includes ongoing activities such as enforcing local floodplain development regulations, including issuing permits for appropriate development in Special Flood Hazard Areas and ensuring that this development mitigated in accordance with the regulations. This will also include periodic reviews of the floodplain ordinance to ensure that it is clear and up to date and reflects new or revised flood hazard mapping.

4.3 Progress on 2014 Actions

During the 2021 planning process the City of Atwater Planning Team reviewed all the mitigation actions from the 2014 plan. Of their ten (10) mitigation actions from 2014, three (3) of the actions are continuing and are implemented annually, demonstrating ongoing progress and building the community's resiliency to disasters. Five (5) were noted as being continuing not started and two (2) as deleted.

4.4 Mitigation Actions

The Planning Team for the City identified and prioritized the following mitigation actions based on risk assessments, goals, and objectives. Background information as well as information on how the action will be implemented and administered, such as ideas for implementation, responsible office, partners, potential funding, estimated cost, and timeline also are described.

Table 4-1 City of Atwater Mitigation Action Plan

ID	Goal(s) and Lifelines	Hazard(s) Mitigated	Description/Background/Benefits	Lead Agency and Partners	Cost Estimate and Potential Funding	Priority	Timeline	Status/Implementation Notes
1	1,7 NA	Multi-Hazard: Earthquake, Flood and Levee Failure, Severe Weather, Wildfire	Countywide Public Education Program. A natural hazards education and awareness program in Merced County would be a valuable tool for sharing information with residents. Implementation ideas include sharing information online and conducting workshops. The county will partner with special districts, the cities and other entities to provide awareness and education on hazards and steps to mitigate.	OES / CEO's Office	\$100,000 Federal Grants	High	Ongoing	Continue Not Started
2	1,2,4,6 NA	Multi-Hazard: Earthquake, Flood and Levee Failure, Severe Weather, Wildfire	Integrate Local Hazard Mitigation Plan into Safety Element of General Plan. Recognizing the potential duplication of effort over evaluation of the same issues, efforts to update the Health and Safety Element will be conducted in coordination with the multi-hazard mitigation plan and to also ensure AB2140 Compliance. Integration and coordination of both plans provides General Plan policy direction for development activity.	Community Development Agency	\$5,000 General Fund	Medium	Next General Plan review cycle	Continue In-Progress
3	1,7 Food, Water, Shelter	Earthquake	Non-structural Earthquake Mitigation Outreach. Interiors of existing structures can be retrofitted to reduce damage from seismic events. Outreach will include educating home and business owners about structural and non-structural retrofit techniques and how to seismically strengthen their homes and businesses. Specific techniques include	Public Works	\$100,000 Federal Grants	Medium	Ongoing	Continue Not Started

ID	Goal(s) and Lifelines	Hazard(s) Mitigated	Description/Background/Benefits	Lead Agency and Partners	Cost Estimate and Potential Funding	Priority	Timeline	Status/Implementation Notes
			secure furnishings, storage cabinets and utilities to prevent injuries and damages, such as anchoring, installing lathes, using flexible connections on gas and water lines, and bracing propane tanks and water heaters.					
4	1,2 Food, Water, Shelter	Earthquake	Countywide Inventory for Unreinforced Masonry Buildings - Use GIS a to map and track URM Buildings with appropriate tracking will lessen time during the recovery after an earthquake.	Public Works	\$15,000 – 20,000 Federal Grants	Medium	1 year	Continue Not Started
5	1,2,6 Food, Water, Shelter	Multi-Hazard: Earthquake, Flood and Levee Failure, Severe Weather, Wildfire	Periodically review building codes for updates and enhancements and ensure necessary capabilities for enforcement.	Building Department	Staff time Dept. Budget	Medium	1 year then ongoing	Continue Not Started
6	3, 4 Food, Water, Shelter	Drought	Promote Water Conservation Program. Drought is a serious issue that is faced in California. Water awareness of all citizens within the County is critical to the future of our water supply. Reminders, education and awareness will help keep the conservation importance in the forefront.	Public Works	\$100,000 Federal Grants	High	Ongoing	Continue In-Progress
7	3 Communications, Safety	Earthquake Severe Weather Dam Incidents	Atwater Police Department Emergency Power Replacement Project. Replace and install a new emergency power system to protect the City of Atwater 911	Police Department	\$100,000 - \$1,000,000 FEMA	High	6 Months	New in 2021

ID	Goal(s) and Lifelines	Hazard(s) Mitigated	Description/Background/Benefits	Lead Agency and Partners	Cost Estimate and Potential Funding	Priority	Timeline	Status/Implementation Notes
	and Security		Communications Center and Police Department from both a Public Safety Power Shutoff and a long-term interruption in utility service.		HMA Grants			
8	3 Safety and Security	Earthquake	Seismic Upgrade and Remodel of the Atwater Police Department Headquarters. The Atwater Police Department is housed in a building that is over 60 years old and not rated as an essential services building. Its construction consists of masonry block walls that may be unreinforced. Renovation would bring the building up to standard and protect the Department's ability to provide service.	Police Department	\$100,000 - \$1,000,000 FEMA HMA Grants	High	12-18 Months	New in 2021
9	1,2,7 Food, Water, Shelter	Earthquake	Review hazards and awareness of earthquakes in a public platform and educate the public on helpful procedures to mitigate losses and injuries. (i.e. duck and cover, non-structural techniques, inspection of structures for damage)	Police, Fire and Buildings	General Fund/CIP	High	3-5 years and then ongoing	New in 2021
10	4, 7 Food, Water, Shelter	Agricultural Pest and Disease	Public education of current seasonal threat using a public radio campaign	AG Commissioner, and Cities	Staff time Dept. Budget	Low	1-5 years	New in 2021

5 IMPLEMENTATION AND MAINTENANCE

Moving forward, the City will use the mitigation action table in the previous section to track progress on implementation of each project. Implementation of the plan overall is discussed in Section 6 in the Base Plan.

5.1 Incorporation into Existing Planning Mechanisms

The information contained within this plan, including results from the Vulnerability Assessment, and the Mitigation Strategy will be used by the City to help inform updates and the development of local plans, programs and policies. The Engineering Division may utilize the hazard information when implementing the City's Community Investment Program and the Planning and Building Divisions may utilize the hazard information when reviewing a site plan or other type of development applications. The City will also incorporate this MJHMP into the Safety Element of their General Plan, as recommended by Assembly Bill (AB) 2140.

As noted in Section 6 of the Base Plan, the LPT representatives from Atwater will report on efforts to integrate the hazard mitigation plan into local plans, programs and policies and will report on these efforts at the annual LPT plan review meeting.

5.2 Monitoring, Evaluation and Updating the Plan

The City will follow the procedures to monitor, review, and update this plan in accordance with Merced County as outlined in Section 6 of the Base Plan. The city will continue to involve the public in mitigation, as described in Section 6.2.1 of the Base Plan. The Police Chief, Public Works/Community Development Director and Battalion Chief will be responsible for representing the City in the County LPT, and for coordination with City staff and departments during plan updates. The City realizes it is important to review the plan regularly and update it every five years in accordance with the Disaster Mitigation Act Requirements as well as other State of California requirements.



1 CITY OF DOS PALOS

1.1 Community Profile

1.1.1 Mitigation Planning History and 2021 Process

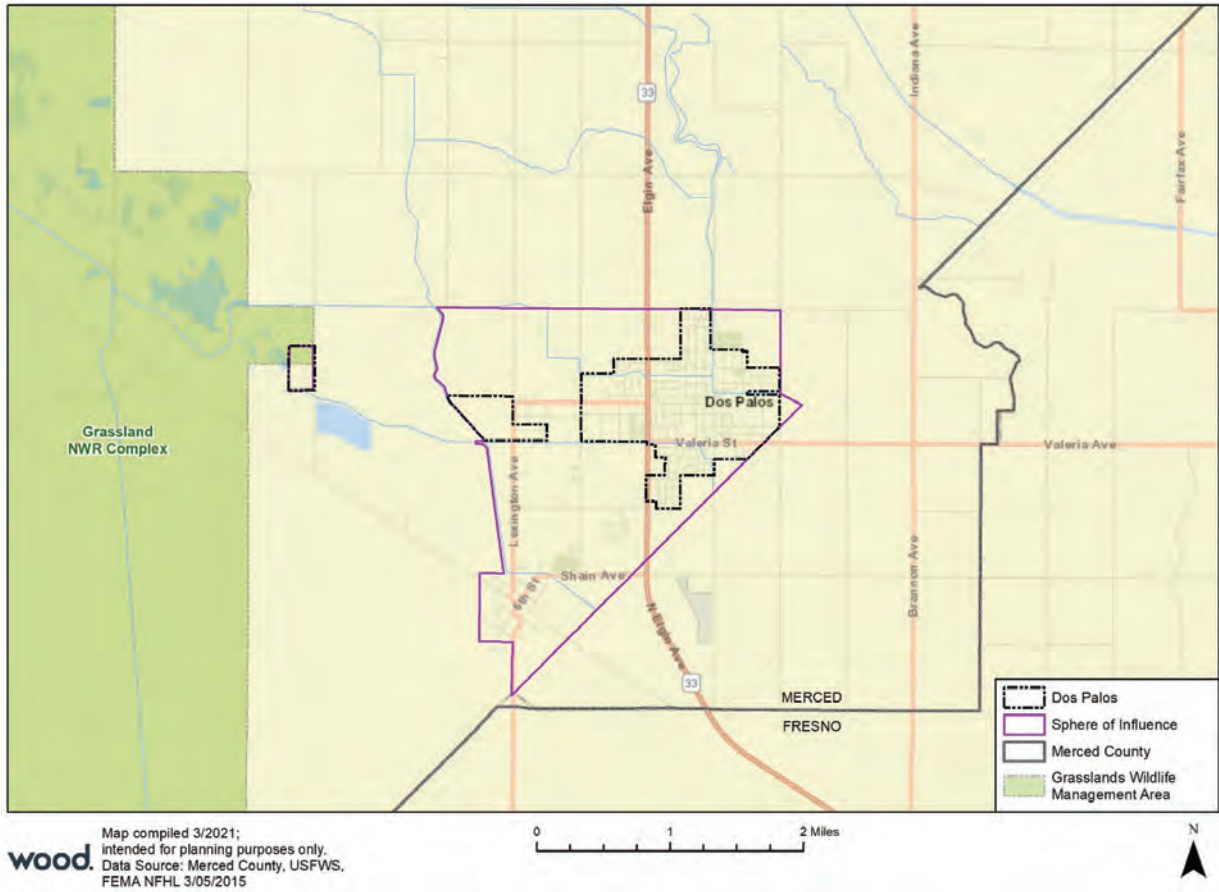
This annex was created during the development of the 2021 Merced County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update. This is the first jurisdictional mitigation annex for the City of Dos Palos.

The City's Local Planning Team (LPT) hold the responsibility for the development, implementation and maintenance of this annex. Members are listed in Appendix A. More details on the planning process followed and how the jurisdictions and stakeholders participated can be found in Section 3 Planning Process of the Base Plan, along with how the public was involved during the 2021 update.

1.1.2 Geography and Climate

The City of Dos Palos is situated 23 miles south-southwest of the City of Merced, the county seat. California State Route 33 bisects the City of Dos Palos, as shown in Figure 1-1. According to the United States Census Bureau, Dos Palos has a total area of 1.3 square miles. The climate in the City of Dos Palos cycles through a cool rainy winter season and a dry summer season. Summers are hot and dry, and winters are cool and wet, with most of the year's rain falling from late October through early April.

Figure 1-1 Dos Palos Planning Area



1.1.3 History

The area was first named “Dos Palos” during the 1820s by explorer Gabriel Moraga due to the location of two large, isolated poplar trees. This became a boundary marker for the “Rancho Sanjon de Santa Rita” Mexican Land Grant. In 1891 Bernhard Marks, a former school principal, convinced Henry “Cattle King” Miller to develop a small town they named “Dos Palos Colony”. By 1892 forty pioneer families had been brought west but were unable to find a good source of water causing many to leave. Miller, after being convinced by Marks, established a new town two miles away named Colony Center. In 1906 Dos Palos Colony was renamed South Dos Palos and Colony Center was renamed Dos Palos. The City of Dos Palos was incorporated in 1935.

1.1.4 Economy

Estimates of select economic characteristics for the City of Dos Palos are shown in Table 1-1.

Table 1-1 City of Dos Palos Economic Characteristics, 2015-2019

Characteristic	City of Dos Palos
Families below Poverty Level (%)	12.6%
All People below Poverty Level (%)	14.7%
Median Family Income	\$55,932
Median Household Income	\$56,716
Per Capita Income	\$21,488
Population in Labor Force	62.2%
Population Employed*	54.9%
Unemployment**	11.7%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

*Excludes armed forces. **Does not reflect unemployment numbers due to COVID-19 Pandemic

The tables below show the labor force breakdown by occupations and industry based on estimates from the 2015-2019 five-year American Community Survey.

Table 1-2 City of Dos Palos Employment by Industry, 2015-2019

Occupation	# Employed	% Employed
Educational services, and health care and social assistance	389	18.0%
Agriculture, forestry, fishing and hunting, and mining	335	15.5%
Manufacturing	267	12.3%
Retail trade	244	11.3%
Construction	237	10.9%
Transportation and warehousing, and utilities	194	9.0%
Professional, scientific, and management, and administrative and waste management services	102	4.7%
Other services, except public administration	97	4.5%
Public administration	83	3.8%
Information	75	3.5%
Wholesale trade	68	3.1%
Finance and insurance, and real estate and rental and leasing	62	2.9%
Arts, entertainment, and recreation, and accommodation and food services	13	0.6%

Occupation	# Employed	% Employed
Total	2,166	100%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/ *Excludes armed forces

Table 1-3 City of Dos Palos Employment by Occupation, 2015-2019

Occupation	# Employed	% Employed
Natural resources, construction, and maintenance occupations	635	29.3%
Production, transportation, and material moving occupations	479	22.1%
Management, business, science, and arts occupations	399	18.4%
Sales and office occupations	360	16.6%
Service occupations	293	13.5%
Total	2,166	100%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

*Excludes armed forces

1.1.5 Population

In May 2020, the State Department of Finance released preliminary population data for the state demographic report, the estimates did not include potential effects of the COVID-19 pandemic. According to the report the City of Dos Palos has a population of 5,546 persons as of January 1, 2020, and experienced a 0.1% loss previous year, leaving the population statically the same. Select demographic and social characteristics for the City of Dos Palos from the 2015-2019 American Community Survey and the California Department of Finance, are shown in Table 1-4.

Table 1-4 City of Dos Palos Demographic and Social Characteristics, 2015-2019

Characteristic	City of Dos Palos
Gender/Age	
Male	49.3%
Female	50.7%
Median age (years)	30
Under 5 years	10.2%
Under 18 years	30.2%
65 years and over	12.9%
Race/Ethnicity	
White	19.9%
Asian	0.6%
Black or African American	1.6%
American Indian/Alaska Native	0.0%
Hispanic or Latino (of any race)	72.4%
Native Hawaiian and Other Pacific Islander	0.0%
Some other race	0.0%
Two or more races	5.5%
Education*	
% High school graduate or higher	67.7%
% with Bachelor's Degree or Higher	11.3%
Social Vulnerability	
% with Disability	8.9%

Characteristic	City of Dos Palos
% Language other than English spoken at home	50.4%
% Speak English less than "Very Well"	26%
% of households with a computer with internet use	82.5%
% of households with no vehicle available	1.8%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

* Population 25 years and over

The following table with information from the American Community Survey 5-year estimates (2015-2019) is related to housing occupancy in the City of Dos Palos

Table 1-5 City of Dos Palos Housing Occupancy and Units, 2015-2019

Housing Characteristic	Estimate	Percentage
Housing Occupancy		
Total Housing Units	1,545	100%
Units Occupied	1,516	98.1%
Vacant	29	1.9%
Housing Units		
1-unit detached	1,447	93.7%
1-unit attached	13	0.8%
2 units	12	0.8%
3 or 4 units	43	2.8%
5-9 units	30	1.9%
10-19 units	0	0.0%
20 or more units	0	0.0%
Mobile Home	0	0.0%
Boat, RV, van etc.	0	0%
Housing Tenure		
Owner Occupied	959	63.3%
Renter Occupied	557	36.7%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

1.1.6 Development Trends

The City of Dos Palos experienced a slight decrease in 1-year population estimates from 2019 to 2020. There was also a decrease (-9%) in the number of housing units developed in the City from 1,700 in 2010 to 1,545 in 2019. The overall risk to hazards has not increased since the 2014 planning process.

The Sphere of Influence (SOI), shown in Figure 1-1, are areas the City plans to grow into and potentially slated for future development. Understanding the potential hazard exposure in the area can help to mitigate the impacts of events before development occurs in those areas. During this plan update process a parcel analysis was conducted using the SOI and overlaid with available hazard risk layers to determine where future development may be at risk of natural hazard events. Table 1-6 is the summary of the SOI total exposure for the City of Dos Palos.

Table 1-6 Sphere of Influence Total Exposure Summary

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value
Agricultural	30	35	\$2,921,905	\$2,921,905	\$5,843,810
Commercial	16	22	\$918,610	\$918,610	\$1,837,220
Exempt	22	99	\$1,000,971	\$1,000,971	\$2,001,942
Industrial	5	7	\$3,212,705	\$4,819,058	\$8,031,763
Mixed Use	2	2	\$3,360	\$1,680	\$5,040
Residential	462	515	\$45,083,220	\$22,541,610	\$67,624,830
Vacant Land	8	8	\$44,493	\$44,493	\$88,986
Total	545	688	\$53,185,264	\$32,248,327	\$85,433,591

Source: Merced County Assessor, Wood analysis, City of Dos Palos

During the 2021 planning process, the LPT noted receiving approval for a grant that will fund the construction of a new Water Treatment facility to support future development. Once the new facility is completed and operational it will support the development of residential and commercial projects.

2 HAZARD IDENTIFICATION AND SUMMARY

The City of Dos Palos LPT identified the hazards that affect the City and summarized their frequency of occurrence, spatial extent, potential magnitude, and significance specific to their community (see Table 2-1). There are no hazards that are unique to Dos Palos. The overall hazard significance takes into account the geographic area, probability and magnitude as a way to identify priority hazards for mitigation purposes. This is discussed further in the Vulnerability Assessment Section.

Table 2-1 City of Dos Palos — Significant Hazards

Hazard	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Drought	Extensive	Likely	Critical	Medium
Earthquake	Extensive	Occasional	Critical	Medium
Wildfire	Significant	Highly Likely	Negligible	Medium
Geographic Area Limited: Less than 10% of planning area Significant: 10-50% of planning area Extensive: 50-100% of planning area Probability of Future Occurrences Highly Likely: Near 100% chance of occurrence in next year or happens every year. Likely: Between 10 and 100% chance of occurrence in next year or has a recurrence interval of 10 years or less. Occasional: Between 1 and 10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years. Unlikely: Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.		Magnitude/Severity (Extent) Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid Significance Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact		

2.1 Vulnerability Assessment

The intent of this section is to assess Dos Palos' vulnerability that is separate from that of the planning area as a whole, which has already been assessed in Section 4 Hazard Identification and Risk Assessment in the Base Plan. This vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of medium or high significance that may vary from other parts of the planning area.

The information to support the hazard identification and risk assessment was based on a combination of County and jurisdiction specific information collected during the 2021 update. A Local Hazard Mitigation Plan Update Guide and associated worksheets was distributed to each participating municipality to complete during update process in 2021. Information collected was analyzed and summarized in order to identify and rank all the hazards that could impact anywhere within the County, as well as to rank the hazards and identify the related vulnerabilities unique to each jurisdiction.

Each participating jurisdiction was in support of the main hazard summary identified in the Base Plan (see Table 4-2). However, the hazard summary rankings for each jurisdictional annex may vary due to specific hazard risk and vulnerabilities unique to that jurisdiction. The information in this annex helps differentiate the jurisdiction's risk and vulnerabilities from that of the overall County.

Note: The hazard "Significance" reflects overall ranking for each hazard and is based on the City of Dos Palos' Planning Team member input from the Data Collection Guide and the risk assessment developed during the planning process (see Section 4 of the Base Plan), which included a more detailed qualitative and quantitative analysis with best available data.

The hazard summaries in Table 2-1 above reflect the hazards that could potentially affect City. The discussion of vulnerability for each of the following hazards is located in Section 2.3 Estimating Potential Losses. Based on this analysis, the priority hazards (Medium Significance) for mitigation are identified below:

- Drought
- Earthquake
- Wildfire

Drought is not addressed in this vulnerability assessment as the exposure is similar to the overall County exposure, and the potential for losses are difficult to quantify specific to the City of Dos Palos.

Other Hazards

Hazards assigned a significance rating of Low, and which do not differ significantly from the County ranking (e.g., Low vs. High) are not addressed further in this plan and are not assessed individually for specific vulnerabilities in this section. In the City of Dos Palos, those hazards include: dam incidents, drought, flood, severe weather (extreme heat, dense fog, heavy rain, high wind/tornado), subsidence, hazardous materials incidents, cyber attacks, agricultural pests and disease, and pandemics. The City does not have any special flood hazard areas (1% annual chance flood risk zones) mapped by the NFIP. While some areas of the City have drainage issues due to flat terrain and high groundwater tables, flood is considered a low significance hazard.

Additionally, the City's committee members decided to rate landslides as Not Applicable (N/A) to the planning area due to a lack of exposure, vulnerability, and no probability of occurrence.

2.2 Assets at Risk

This section considers Dos Palos' assets at risk, including values at risk, critical facilities and infrastructure, historic assets, economic assets and growth and development trends.

2.2.1 Values at Risk

The following data on property exposure is derived from the Merced County 2020 Parcel and Assessor data. This data should only be used as a guideline to overall values in the city as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is likely low and does not reflect current market value of properties. It is also important to note that in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss and is not included in the values below. Table 2-2 shows the exposure of properties (e.g., the values at risk) broken down by property type for the City of Dos Palos.

Table 2-2 City of Dos Palos Property Exposure by Type

Property Type	Parcel Count	Building Count	Improved Value	Content Value	Total Value
Commercial	104	154	\$16,913,918	\$16,913,918	\$33,827,836
Exempt	39	94	\$1,962,673	\$1,962,673	\$3,925,346
Industrial	9	9	\$1,043,139	\$1,564,709	\$2,607,848
Mixed Use	5	5	\$104,170	\$104,170	\$208,340
Residential	1,611	1,733	\$182,105,228	\$91,052,614	\$273,157,842
Vacant Land	6	6	\$40,429	\$40,429	\$80,858
Total	1,774	2,001	\$202,169,557	\$111,638,513	\$313,808,070

Source: Merced County Assessor, Wood analysis

2.2.2 Critical Facilities and Infrastructure

For the purposes of this plan, a critical facility is defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA sorts critical facilities into seven lifeline categories as shown in Figure 4-1 in the Base Plan.

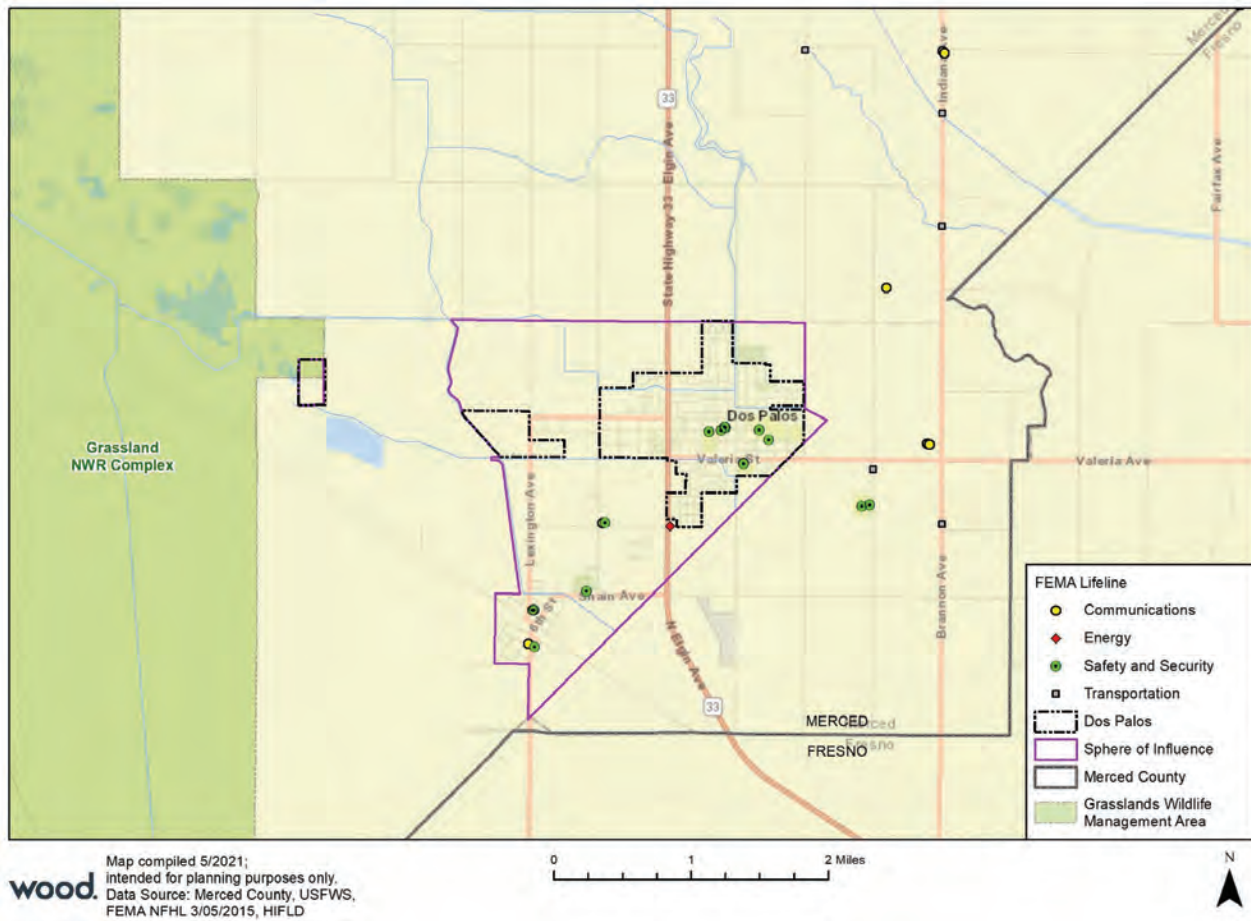
Table 2-3 shows a summary of the critical facilities analysis and Figure 2-2 shows the location of each critical facility within the City.

Table 2-3 City of Dos Palos Critical Facilities, by Lifeline

FEMA Lifeline	Count
Communications	1
Safety and Security	7
Total	8

Source: HIFLD, City of Dos Palos, Wood analysis

Figure 2-2 Dos Palos Critical Facilities, by FEMA Lifeline



2.2.3 Historic, Cultural and Natural Resources

According to the State of California Office of Historic Preservation, there are no historic properties listed on the National or State Historic Register. Refer to Section 4 of the Base Plan for a list of historic properties in Merced County.

Natural resources are important to include in benefit-cost analyses for future projects and may be used to leverage additional funding for projects that also contribute to community goals for protecting sensitive natural resources. Awareness of natural assets can lead to opportunities for meeting multiple objectives. For instance, protecting wetlands areas protects sensitive habitat as well as attenuates and stores floodwaters. The San Luis National Wildlife Refuge and Grassland Wildlife Management Area are located west of the City of Dos Palos. The Wildlife Refuge encompasses 26,800 acres of wetlands, riparian forests, natives grasslands and vernal pools. The Grassland Wildlife Management areas supports seasonally flooded marshlands, semi-permanent marshes and native grasslands. Both the Refuge and Wildlife Management Areas are located in flood hazard areas and benefits the surrounding area by absorbing floodwaters and recharging aquifers.

2.3 Estimating Potential Losses

2.3.1 Earthquake

The City of Dos Palos and surrounding areas historical earthquake activity is below California's state average. No known faults are located in the Dos Palos area. The nearest known fault is the Ortigalita Fault located in the western portion of the City and the only fault line within Merced County. The City of Dos Palos Local Emergency Operations Plan (EOP) also lists the following faults that may impact Dos Palos.

- Central Valley Coast Range Bling Thrust Fault – Located parallel to Interstate 5. Considered active, but not completely mappable at the surface. Responsible for the 1983 Coalinga Earthquake. Maximum magnitude measured was 6.8 Mw.
- Calaveras Fault – Active fault located near Hollister and 16 miles west of Pacheco Pass. Maximum magnitude measured was 6.2 Mw.
- Greenville Fault – Active fault located 30 miles northwest of Pacheco Pass and crosses near Livermore. Maximum magnitude measured was 6.9 Mw.
- San Andreas Fault – Largest and most active fault in the State. Located 24 miles west of Pacheco Pass. Earthquake will be long duration but distant ground motion for the City of Dos Palos. Maximum magnitude measured was 7.9 Mw.

There is no record of any seismic activity originating within the city; however, the County of Merced has been shaken by earthquakes originating elsewhere. There is documented evidence of six earthquakes that shook the area, those of 1872, 1906, 1952, 1966, 1984, and 1989. The LPT added a 3.4 magnitude earthquake occurred on March 31, 2016, with the epicenter 21 miles south-southwest of Los Banos. This was not considered a significant earthquake.

No damaging earthquakes greater than M 6.0 have been recorded in the City of Dos Palos or Merced County in over 200 years, though several have been very close. The most recent large earthquake near Merced County was 16 miles east north-east of King City at a magnitude of 5.3 on October 20, 2012. Several aftershocks followed the main earthquake, including a M3.1 aftershock. This quake was preceded by two earthquakes located approximately 100 miles from Merced County, the 1982 New Idria earthquake (M5.4) and the 1983 Coalinga quake (M6.5). There was low-level ground shaking reported.

Based on the earthquake shaking potential mapped for Merced County and the City of Dos Palos, due to the proximity to the San Andreas Fault, and the history of shaking with no surface rupture, means the probability of damaging seismic ground shaking in the City of Dos Palos is considered as occasional. Other hazards associated with earthquake activity, such as lateral spreading, surface cracking or differential setting, are considered unlikely to occur, although no studies have been conducted to determine the likelihood of these hazards.

2.3.2 Wildfires

Both urban and wildland fires conditions exist in Merced County and its cities which increases the chances for damage to property, loss of life and/or injury. In most of Merced County, the California Department of Forestry and Fire Protection (Cal FIRE) ranks fuel loading as low. Fuels are mainly crops and grasses. In the southwest corner, there are some brush, pine, and grass fuels, which are ranked as moderate fuel hazards, primarily in the area west of Interstate 5. The LPT noted the agricultural land within and around Dos Palos is vulnerable especially during dry seasons and could cause significant impacts on the local economy if a significant fire was to happen. Figure 2-3 shows the fire threat areas near the city; the majority of the risk is to west of the city within the grassland area. Based on the analysis there are no parcels or critical facilities within the fire threat areas. Figure 2-4 shows the fire responsibility areas in the City of Dos Palos. Refer to Section 4 of the Base Plan for methodology and results of the countywide analysis.

Figure 2-3 Wildfire Threat Areas in City of Dos Palos

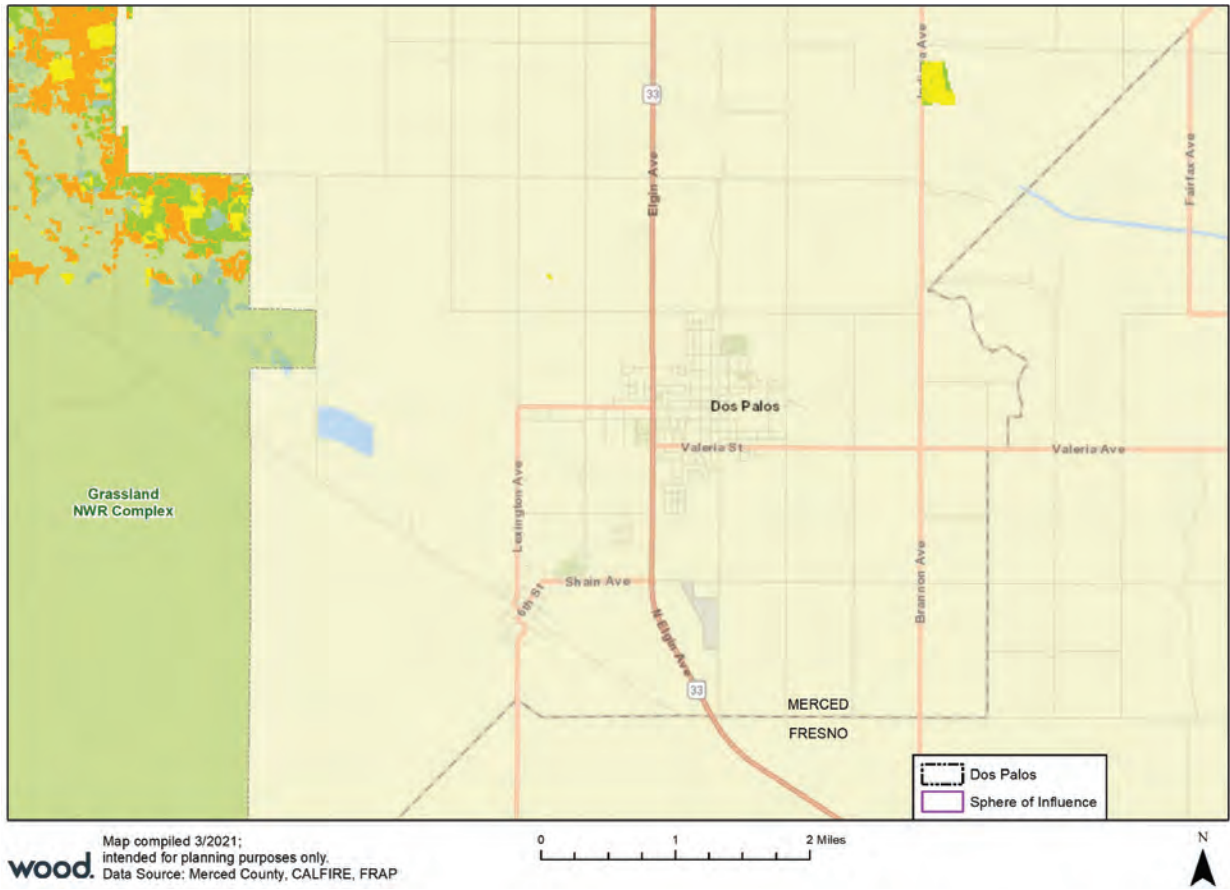
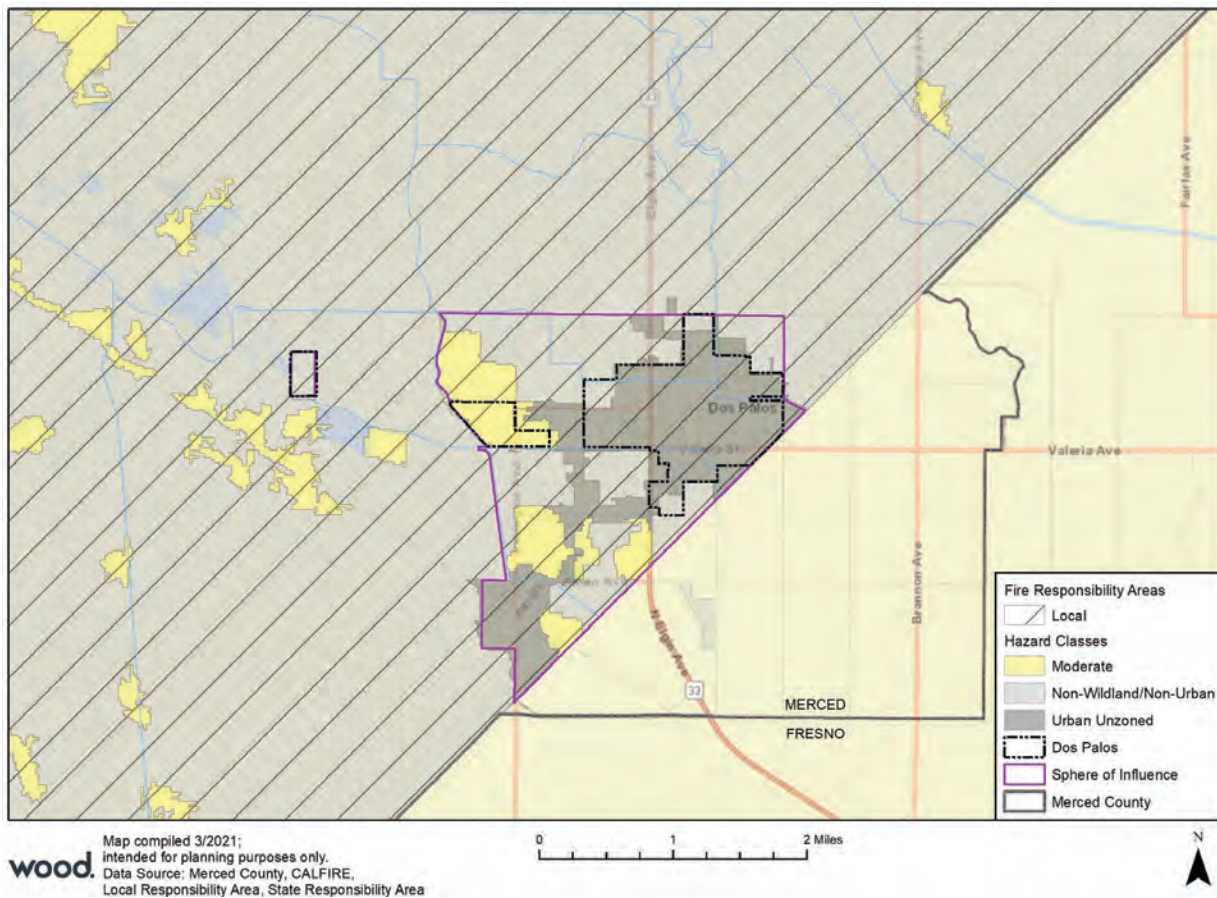


Figure 2-4 City of Dos Palos Fire Responsibility Areas



3 CAPABILITY ASSESSMENT

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation outreach and partnerships, and other mitigation efforts. To develop this capability assessment, the jurisdictional planning representatives reviewed a matrix of common mitigation activities to inventory which of these policies or programs and shared information through the Dos Palos Data Collection Guide. The team then supplemented this inventory by reviewing additional existing policies, regulations, plans, and programs to determine if they contribute to reducing hazard-related losses.

During the plan update process, this inventory was reviewed by the jurisdictional planning representatives and Wood consultant team staff to update information where applicable and note ways in which these capabilities have improved or expanded. Additionally, in summarizing current capabilities and identifying gaps, the jurisdictional planning representatives also considered their ability to expand or improve upon existing policies and programs as potential new mitigation strategies. The City of Dos Palos' capabilities are summarized below.

3.1 Regulatory Capability

The regulatory and planning capabilities table lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities. The table below indicates those that are in place in the City of Dos Palos.

Table 3-1 City of Dos Palos —Regulatory and Planning Capabilities

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General Plan	Yes	Adopted May 20, 1990
Zoning ordinance	Yes	
Subdivision ordinance	Yes	
Growth management ordinance	Yes	
Floodplain ordinance	Yes	
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	Yes	
Fire department ISO rating	Yes	
Erosion or sediment control program	No	
Stormwater management program	Yes	
Site plan review requirements	Yes	
Capital improvements plan	Yes	
Economic development plan	Yes	
Local emergency operations plan	Yes	
Other special plans	No	
Flood insurance study or other engineering study for streams	Yes	
Elevation certificates (for floodplain development)	No	
Other		

City of Dos Palos General Plan – The City of Dos Palos’ most recent General Plan was adopted May 20, 1991. This General Plan defines the City’s goals, objectives and policies that guide the physical growth, use and development of land under the jurisdictional authority of the City.

The goal of the Safety Element is to protect Dos Palos residents from unreasonable risk and reduce the impacts of natural hazards to the community (Dos Palos 1991). This element focuses on establishing policies and programs to protect the community from risks associated with seismic activity, subsidence, flooding, and fire and hazardous materials incidents. The Safety Element also identifies evacuation routes and peak load water supply requirements.

The City of Dos Palos Safety Element does not reference incorporation of the 2014 MJHMP. However, the City did not participate in the 2014 MJHMP; this is the first jurisdictional mitigation annex for the City of Dos Palos.

City of Dos Palos Emergency Plan, 2003 – The Emergency Plan addresses the planned response to emergency situations associated with natural disasters, technological incidents, human caused events and national security emergencies in or affecting the City of Dos Palos. The plan establishes the emergency management organization required to mitigate any significant emergency or disaster affecting the City; identifies the policies, responsibilities, and procedures required to protect the health and safety of communities, public and private property, and the environmental effects of natural, human caused and technological emergencies and disasters; and establishes the operational concepts and policies for disaster response and recovery.

National Flood Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Dos Palos joined the National Flood Insurance Program (NFIP) on May 25, 1978. The City does not have any special flood hazard areas (1% annual chance flood risk zones) mapped by the NFIP. NFIP Insurance data indicates that as of July 2021, there were 3 flood insurance policies in force in the City with \$553,000 of coverage. All of the policies are single family residential and located in the B, C, and X zone.

There has been 1 historical claim for flood losses totaling \$1,740. According to the FEMA Community Information System accessed July 27, 2021, the City has no Repetitive Loss properties or Severe Repetitive Loss properties as defined by FEMA.

3.2 Administrative and Technical Capability

The table below identifies city personnel with responsibilities for activities related to mitigation and loss prevention in the City of Dos Palos. Many positions are full time and/or filled by the same person. A summary of technical resources follows.

Table 3-2 City of Dos Palos —Personnel Capabilities

Personnel Resources	Yes/No	Department/Position	Comments
Planner/engineer with knowledge of land development/land management practices	Yes	City Engineer	
Engineer/professional trained in construction practices related to buildings and/or infrastructure	Yes	City Engineer	
Planner/engineer/scientist with an understanding of natural hazards	Yes	City Engineer	
Personnel skilled in GIS	Yes	GIS Coordinator	

Personnel Resources	Yes/No	Department/Position	Comments
Full time building official	No	City has a part time building official on staff	
Floodplain manager	Yes		
Emergency manager	No		
Grant writer	Yes	Department Heads	
Other personnel			
GIS Data Resources (Hazard areas, critical facilities, land use, building footprints, etc.)	Yes		
Warning Systems/Services (Reverse 9-11, cable override, outdoor warning signals)	Yes		Everbridge. Merced County Emergency Alert System
Other			

3.3 Fiscal Capability

The following table identifies financial tools or resources that the City could potentially use to help fund mitigation activities. There are currently no specific funding sources for hazard mitigation.

Table 3-3 City of Dos Palos —Available Financial Tools and Resources

Financial Resources	Accessible/ Eligible to Use	Has This Been Used for Mitigation in the Past?	Comments
Community Development Block Grants	Yes	No	
Capital improvements project funding	Yes	No	Council approval needed to establish CIP
Authority to levy taxes for specific purposes	Yes	No	Council/Public approval needed
Fees for water, sewer, gas, or electric services, new development	Yes	No	
Incur debt through general obligation bonds	No	No	
Incur debt through special tax bonds	Yes	No	
Incur debt through private activities	Yes	No	
Federal Grant Programs (Hazard Mitigation Grant Program)	No*	No	*City will have eligibility to apply for these funds after the FEMA approval and local adoption of this LHMP.

3.4 Outreach and Partnerships

The Merced County Office of Emergency Services provides education and outreach on Disaster Preparedness for all of the jurisdictions within the County. This education program is in coordination and partnerships with county and the cities' departments with education programs including the Sheriff's Office, Police Departments, Fire Departments, Agricultural Commissioner, and the Department of Public Health.

The City of Dos Palos has an ongoing water conservation program, first established in 2016 during statewide drought conditions, to mitigate the impacts of future drought events. The program sets specific

days and times for watering to reduce the frequency of water usage spikes and increase the water available for fire suppression.

3.4.1 Planning Commission

The Planning Commission reviews development proposals for compliance with the General Plan and makes recommendations to the City Council on long range plans and maps for the City and plans for public improvements, plans and development plans for proposed for property within the City, and zoning and rezoning of property within the City. The Commission develops and maintains a long range comprehensive General Plan of the Dos Palos planning area.

3.5 Opportunities for Enhancement

Based on the capabilities assessment, the City of Dos Palos has several existing mechanisms in place that already help to mitigate hazards. There are also opportunities for the city to expand or improve on their policies, programs and fiscal capabilities and further protect the community. Future improvements may include providing training for staff members related to hazards or hazard mitigation grant funding in partnership with the County and Cal OES. Additional training opportunities will help to inform City staff members on how best to integrate hazard information and mitigation projects into their departments. Continuing to train City staff on mitigation and the hazards that pose a risk to the City of Dos Palos will lead to more informed staff members who can better communicate this information to the public. In addition, the LPT noted increasing communication and partnerships with regional entities in inspecting buildings for the need to retrofit to meeting earthquake standards.

4 MITIGATION STRATEGY

4.1 Goals and Objectives

The City of Dos Palos adopts the hazard mitigation goals and objectives developed by the Planning Team and described in Section 5 Mitigation Strategy of the Basin Plan.

4.2 Continued Compliance with the National Flood Insurance Program

The City has been an NFIP participating community since 1978. In addition to the mitigation actions identified herein the City will continue to comply with the NFIP. Floodplain management is under the purview of the Department City Engineer. This includes ongoing activities such as enforcing local floodplain development regulations, including issuing permits for appropriate development in Special Flood Hazard Areas and ensuring that this development mitigated in accordance with the regulations. This will also include periodic reviews of the floodplain ordinance to ensure that it is clear and up to date and reflects new or revised flood hazard mapping.

4.3 Mitigation Actions

The Planning Team for the City identified and prioritized the following mitigation actions based on risk assessments, goals, and objectives. Background information as well as information on how the action will be implemented and administered, such as ideas for implementation, responsible office, partners, potential funding, estimated cost, and timeline also are described.

Table 4-1 City of Dos Palos Mitigation Action Plan

ID	Goal(s) and Lifelines	Hazard(s) Mitigated	Description/Background/ Benefits	Lead Agency and Partners	Cost Estimate and Potential Funding	Priority	Timeline	Status/Implementation Notes
1	1 Communi- cations	Earthquake, Wildfire	Radio upgrade for police department. Replace outdated mobile radios with dual-band radios that have the capability to communicate with the Merced County Sheriff's Office. If approved, radios could be purchased immediately. They are vital for communication during multi-jurisdiction hazardous events. This could potentially save lives. Currently, there is no ability to cross-communicate.	Police Dept. County Sheriff	\$50,000, Grants	Medium	3 -6 Months	New in 2021
2	1,2,3 Food, Water, Shelter	Drought, Earthquake, Wildfire	Construction of new water treatment plant with resiliency upgrades. Replace existing water treatment plant, which is over 50 years old and cannot keep up with the ever-growing demand for water in the area. Currently in the process of receiving grant money from the State for construction. The new plant will double the amount of water treated from 2-2.5 million gallons per day to approximately 4 million gallons per day and provide resiliency to drought. This will also increase available water for firefighting. Seismic mitigation measures will be incorporated into the upgraded treatment plant to reduce potential for damage and provide continuity of services.	Dept. of Utilities South Dos Palos and Midway	\$11 Million Grant funding from the State of California	High	2-3 years	New in 2021

5 IMPLEMENTATION AND MAINTENANCE

Moving forward, the city will use the mitigation action table in the previous section to track progress on implementation of each project. Implementation of the plan overall is discussed in Section 6 in the Base Plan.

5.1 Incorporation into Existing Planning Mechanisms

The information contained within this plan, including results from the Vulnerability Assessment, and the Mitigation Strategy will be used by the City to help inform updates and the development of local plans, programs and policies. The City will incorporate this MJHMP into the Safety Element of their General Plan, as recommended by Assembly Bill (AB) 2140.

As noted in Section 6 of the Base Plan, the LPT representatives from Dos Palos will report on efforts to integrate the hazard mitigation plan into local plans, programs and policies and will report on these efforts at the annual LPT plan review meeting.

5.2 Monitoring, Evaluation and Updating the Plan

The City will follow the procedures to monitor, review, and update this plan in accordance with Merced County as outlined in Section 6 of the Base Plan. The City will continue to involve the public in mitigation, as described in Section 6.2.1 of the Base Plan. The Police Chief or his/her designee will be responsible for representing the city in the County HMPT, and for coordination with City staff and departments during plan updates. The City realizes it is important to review the plan regularly and update it every five years in accordance with the Disaster Mitigation Act Requirements as well as other State of California requirements.



1 CITY OF GUSTINE

1.1 Community Profile

1.1.1 Mitigation Planning History and 2021 Process

This annex was created during the development of the 2021 Merced County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update. This is the first Jurisdictional Mitigation Annex for the City of Gustine.

The City's Local Planning Team (LPT) held the responsibility for implementation and maintenance of the plan. Members are listed in Appendix A. More details on the planning process follow and how the jurisdictions, service districts and stakeholders participated can be found in Section 3 Planning Process of the Base Plan, along with how the public was involved during the 2021 update.

1.1.2 Geography and Climate

The City of Gustine is situated 29 miles west of the City of Merced, the county seat, and borders Stanislaus County. The city is located at the intersection of State Route 33 and State Route 140 and near the intersection of Interstate 5 and State Route 140. According to the United States Census Bureau, Gustine has a total area of 1.6 square miles. The city is a continuously evolving community immersed in tradition with a history of food, farming and manufacturing in California.

The climate in the City of Gustine cycles through a cool rainy winter season and a dry summer season. Summers are hot and dry, and winters are cool and wet, with most of the year's rain falling from late October through early April.

1.1.3 History

The City of Gustine was established in the 1900s as a Southern Pacific Railroad station. The first post office was opened in 1907 and the city was incorporated in 1915. In 1970 Gustine became the first city in California to set up a 9-1-1 system.

1.1.4 Economy

Estimates of select economic characteristics for the City of Gustine are shown in Table 1-1.

Table 1-1 City of Gustine Economic Characteristics, 2015-2019

Characteristic	City of Gustine
Families below Poverty Level (%)	8.5%
All People below Poverty Level (%)	12.7%
Median Family Income	\$62,521
Median Household Income	\$53,667
Per Capita Income	\$30,742
Population in Labor Force	2,718
Population Employed*	50.2%
Unemployment Rate**	11.6%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

*Excludes armed forces. **Does not reflect unemployment numbers due to COVID-19 Pandemic

The tables below show the labor force breakdown by occupations and industry based on estimates from the 2015-2019 five-year American Community Survey.

Table 1-2 City of Gustine Employment by Industry, 2015-2019

Industry	# Employed	% Employed
Educational services, and health care and social assistance	432	18.0%
Agriculture, forestry, fishing and hunting, and mining	410	17.1%
Arts, entertainment, and recreation, and accommodation and food services	323	13.4%
Retail trade	292	12.1%
Manufacturing	214	8.9%
Construction	185	7.7%
Professional, scientific, and management, and administrative and waste management services	128	5.3%
Transportation and warehousing, and utilities	121	5.0%
Finance and insurance, and real estate and rental and leasing	102	4.2%
Public administration	76	3.2%
Other services, except public administration	74	3.1%
Wholesale trade	47	2.0%
Total	2,404	100%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

Table 1-3 City of Gustine Employment by Occupation, 2015-2019

Occupation	# Employed	% Employed
Natural resources, construction, and maintenance occupations	606	25.2%
Service occupations	537	22.3%
Management, business, science, and arts occupations	527	21.9%
Production, transportation, and material moving occupations	392	16.3%
Sales and office occupations	342	14.2%
Total	2,404	100%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

1.1.5 Population

In May 2020, the State Department of Finance released preliminary population data for the state demographic report, the estimates did not include potential effects of the COVID-19 pandemic. According to the report the City of Gustine has a population of 5,875 persons as of January 1, 2020, and experience a 0.1% gain previous year, leaving the population statically the same. Select demographic and social characteristics for the City of Gustine from the 2015-2019 American Community Survey and the California Department of Finance, are shown in Table 1-4.

Table 1-4 City of Gustine Demographic and Social Characteristics, 2015-2019

Characteristic	City of Gustine
Gender/Age	
Male	49.7%
Female	50.3%
Median age (years)	40.4

Characteristic	City of Gustine
Under 5 years	3.4%
Under 18 years	19.9%
65 years and over	14.4%
Race/Ethnicity	
White	44.8%
Asian	0.2%
Black or African American	0.0%
American Indian/Alaska Native	0.6%
Hispanic or Latino (of any race)	54.1%
Native Hawaiian and Other Pacific Islander	0.0%
Some other race	0.0%
Two or more races	0.3%
Education*	
% High school graduate or higher	76.7%
% with Bachelor's Degree or Higher	12.5%
Social Vulnerability	
% with Disability	17.8%
% Language other than English spoken at home	41.6%
% Speak English less than "Very Well"	24.8%
% of households with a computer with internet use	76.9%
% of households with no vehicle available	8.6%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

* Population 25 years and over

The following table with information from the American Community Survey 5-year estimates (2015-2019) is related to housing occupancy in the City of Gustine.

Table 1-5 City of Gustine Housing Occupancy and Units, 2015-2019

Housing Characteristic	Estimate	Percentage
Housing Occupancy		
Total Housing Units	2,249	100%
Units Occupied	2,054	91.3%
Vacant	195	8.7%
Housing Units		
1-unit detached	1,831	81.4%
1-unit attached	0	0.0%
2 units	75	3.3%
3 or 4 units	22	1.0%
5-9 units	89	4.0%
10-19 units	46	2.0%
20 or more units	19	0.8%
Mobile Home	167	7.4%
Boat, RV, van etc.	0	0%

Housing Characteristic	Estimate	Percentage
Housing Tenure		
Owner Occupied	1,261	61.4%
Renter Occupied	793	38.6%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

1.1.6 Development Trends

During the 2021 planning process the Planning Team noted that since the 2014 LHMP the City has annexed land for future development. The LPT noted the following annexation:

- 153 acres for residential development
- 40 acres west of the city for residential development (estimated 200 homes)
- 50 acres east of city for residential development

Between 2010 and 2019 the City experienced an 8% increase of total housing units. Increases in population also increases exposure to severe weather-related hazards and pandemics/epidemics, as well as earthquakes. This growth also puts more demands on water resources and can increase vulnerability to drought.

The Sphere of Influence (SOI) shown in Figure 2-1 are areas each City plans to grow into and potentially slated for future development. Understanding the potential hazard exposure in the area can help to mitigate the impacts of events before development occurs in those areas. During this plan update process parcel analysis was conducted using the SOI and overlaid with available hazard risk layers to determine where future development may be at risk of natural hazard events. Table 1-6 is the summary of the SOI total exposure for the City of Gustine.

Table 1-6 Sphere of Influence Total Exposure Summary

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value
Agricultural	71	98	\$12,899,778	\$12,899,778	\$25,799,556
Commercial	3	3	\$1,695,408	\$1,695,408	\$3,390,816
Exempt	3	3	\$0	\$0	\$0
Residential	20	22	\$2,410,194	\$1,205,097	\$3,615,291
Total	97	126	\$17,005,380	\$15,800,283	\$32,805,663

Source: Merced County Assessor, Wood analysis

2 HAZARD IDENTIFICATION AND SUMMARY

The City of Gustine Planning Team identified the hazards that affect the city and summarized their frequency of occurrence, spatial extent, potential magnitude, and significance specific to their community (see Table 2-1). There are no hazards that are unique to Gustine. The overall hazard significance takes into account the geographic area, probability and magnitude as a way to identify priority hazards for mitigation purposes. This is discussed further in the Vulnerability Assessment Section.

Table 2-1 City of Gustine —Hazard Profiles

Hazard	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Drought	Extensive	Likely	Limited	Medium
Earthquake	Significant	Likely	Catastrophic	Medium
Flood and Levee Failure	Significant	Occasional	Critical	Medium
Geographic Area Limited: Less than 10% of planning area Significant: 10-50% of planning area Extensive: 50-100% of planning area Probability of Future Occurrences Highly Likely: Near 100% chance of occurrence in next year or happens every year. Likely: Between 10 and 100% chance of occurrence in next year or has a recurrence interval of 10 years or less. Occasional: Between 1 and 10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years. Unlikely: Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.		Magnitude/Severity (Extent) Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid Significance Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact		

2.1 Vulnerability Assessment

The intent of this section is to assess Gustine vulnerability that is separate from that of the planning area as a whole, which has already been assessed in Section 4 Hazard Identification and Risk Assessment in the Base Plan. This vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of medium or high significance that may vary from other parts of the planning area.

The information to support the hazard identification and risk assessment was based on a combination of County and jurisdiction specific information collected during the 2021 update. A Local Hazard Mitigation Plan Update Guide and associated worksheets was distributed to each participating municipality or special district to complete during update process in 2021. Information collected was analyzed and summarized in order to identify and rank all the hazards that could impact anywhere within the County, as well as to rank the hazards and identify the related vulnerabilities unique to each jurisdiction.

Each participating jurisdiction was in support of the main hazard summary identified in the Base Plan (see Table 4-2). However, the hazard summary rankings for each jurisdictional annex may vary due to specific hazard risk and vulnerabilities unique to that jurisdiction. The information in this annex helps differentiate the jurisdiction's risk and vulnerabilities from that of the overall County.

Note: The hazard "Significance" reflects overall ranking for each hazard and is based on the City of Gustine's Planning Team member input from the Data Collection Guide and the risk assessment developed during the planning process (see Section 4 of the Base Plan), which included a more detailed qualitative and quantitative analysis with best available data.

The hazard summaries in Table 2-1 above reflect the hazards that could potentially affect City. The discussion of vulnerability for each of the following hazards is located in Section 2.3 Estimating Potential Losses. Based on this analysis, the priority hazards (Medium Significance) for mitigation are identified below:

- Drought
- Earthquake
- Flood and Levee Failure
-

While dam incidents and wildfire are rated as low, there are areas of risk near the city's SOI where development is likely to occur in the future. For this reason dam incidents and wildfire hazards are covered in the vulnerability assessment. Drought is not addressed in this vulnerability assessment as the exposure is similar to the overall County exposure, and the potential for losses are difficult to quantify specific to the City of Gustine.

Other Hazards

Hazards assigned a significance rating of Low or do not differ significantly from the county overall risk are not addressed further in this plan and are not assessed individually for specific vulnerabilities in this section. In the City of Gustine, those hazards include: severe weather (extreme heat, dense fog, heavy rain, high wind/tornado) subsidence, hazardous materials incidents, cyber attacks, agricultural pests and disease, and pandemics. As previously noted, dam incidents and wildfire hazards are also addressed.

Additionally, the City's committee members decided to rate landslides as Not Applicable (N/A) to the planning area due to a lack of exposure, vulnerability, and no probability of occurrence.

~~Wildfire is profiled in the vulnerability assessment to address wildfire threat in the City's SOI but was rated a low priority hazard given the City consists of urban areas and because there are few mapped moderate and low wildfire threat zones.~~

2.2 Assets at Risk

This section considers Gustine's assets at risk, including values at risk, critical facilities and infrastructure, historic assets, economic assets and growth and development trends.

2.2.1 Values at Risk

The following data on property exposure is derived from the Merced County 2020 Parcel and Assessor data. This data should only be used as a guideline to overall values in the city as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is likely low and does not reflect current market value of properties. It is also important to note that in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss and is not included in the values below. Table 2-2 shows the exposure of properties broken down by property type for the City Gustine.

Table 2-2 City of Gustine Property Exposure by Type

Property Type	Parcel Count	Building Count	Improved Value	Content Value	Total Value
Agricultural	3	3	\$249,806	\$249,806	\$499,612
Commercial	86	212	\$13,841,697	\$13,841,697	\$27,683,394
Exempt	21	22	\$1,947,230	\$1,947,230	\$3,894,460
Industrial	8	8	\$21,456,333	\$32,184,500	\$53,640,833
Mixed Use	3	3	\$55,055	\$55,055	\$110,110
Residential	1,749	1,857	\$252,615,603	\$126,307,802	\$378,923,405
Vacant Land	4	4	\$180,379	\$180,379	\$360,758
Total	1,874	2,109	\$290,346,103	\$174,766,468	\$465,112,571

Source: Merced County Assessor, Wood analysis

2.2.2 Critical Facilities and Infrastructure

For the purposes of this plan, a critical facility is defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA groups critical facilities into seven lifeline categories as shown in Figure 4-1 in the Base Plan.

Table 2-4 shows a summary of the critical facilities analysis. In addition to the summary listed in the table below, the LPT also include the following assets:

Table 2-3 City of Gustine Community Assets

Name of Asset	Type*	Replacement Value
Saputo Dairy Foods	EI	\$25,000,000
Pusateri Nut Company	EI	\$15,000,000
Dollar General	EI	\$10,000,000
Gustine City Hall	VF	\$10,000,000
Gustine Police Dept.	EI	\$10,000,000
Gustine Airport	VF	\$20,000,000
Gustine Fire Dept.	EI	\$20,000,000
Gustine Public Works	HM	\$20,000,000
Gustine Wastewater Treatment	HM/EI	\$30,000,000
Water Well 1	VF	\$10,000,000
Water Well 1	VF	\$10,000,000
Water Well 1	VF	\$10,000,000
Water Well 1	VF	\$10,000,000
Water Well 1	VF	\$10,000,000
Water Well 1	VF	\$10,000,000
Water Well 1	VF	\$10,000,000
City Water Lines	VF	\$50,000,000
Water Tank/Tower	VF	\$5,000,000
Sewer Lines	VF	\$50,000,000
Schmidt Park	NA	\$20,000,000
Miller Park	NA	\$10,000,000
CEF Jamero Park	NA	\$10,000,000

Name of Asset	Type*	Replacement Value
Burelli Ranch Park	NA	\$10,000,000
Gustine High School	VF	\$25,000,000
Gustine Middle School	VF	\$20,000,000
Gustine Elementary School	VF	\$20,000,000

Source: Gustine LPT

*EI: Essential Infrastructure; VI: Vulnerable Facilities; HM: Hazardous Materials Facilities; NA: Natural Assets

Table 2-4 City of Gustine Critical Facilities, by Lifeline

FEMA Lifeline	Count
Communications	6
Food, Water, Shelter	2
Hazardous Material	1
Safety and Security	8
Total	20

Source: HIFLD, City of Gustine, Wood analysis

2.2.3 Historic, Cultural and Natural Resources

The following historical resource is listed as a California Point of Interest by the State of California Office of Preservation:

- Merced County Justice Courthouse Building

Natural resources are important to include in benefit-cost analyses for future projects and may be used to leverage additional funding for projects that also contribute to community goals for protecting sensitive natural resources. Awareness of natural assets can lead to opportunities for meeting multiple objectives. For instance, protecting wetlands areas protects sensitive habitat as well as attenuates and stores floodwaters. The San Luis National Wildlife Refuge and Grassland Wildlife Management Area are located east of the City of Gustine. The Wildlife Refuge encompasses 26,800 acres of wetlands, riparian forests, natives grasslands and vernal pools. The Grassland Wildlife Management areas supports seasonally flooded marshlands, semi-permanent marshes and native grasslands. Both the Refuge and Wildlife Management Areas are located in flood hazard areas and benefits the surrounding area by absorbing floodwaters and recharging aquifers.

2.3 Estimating Potential Losses

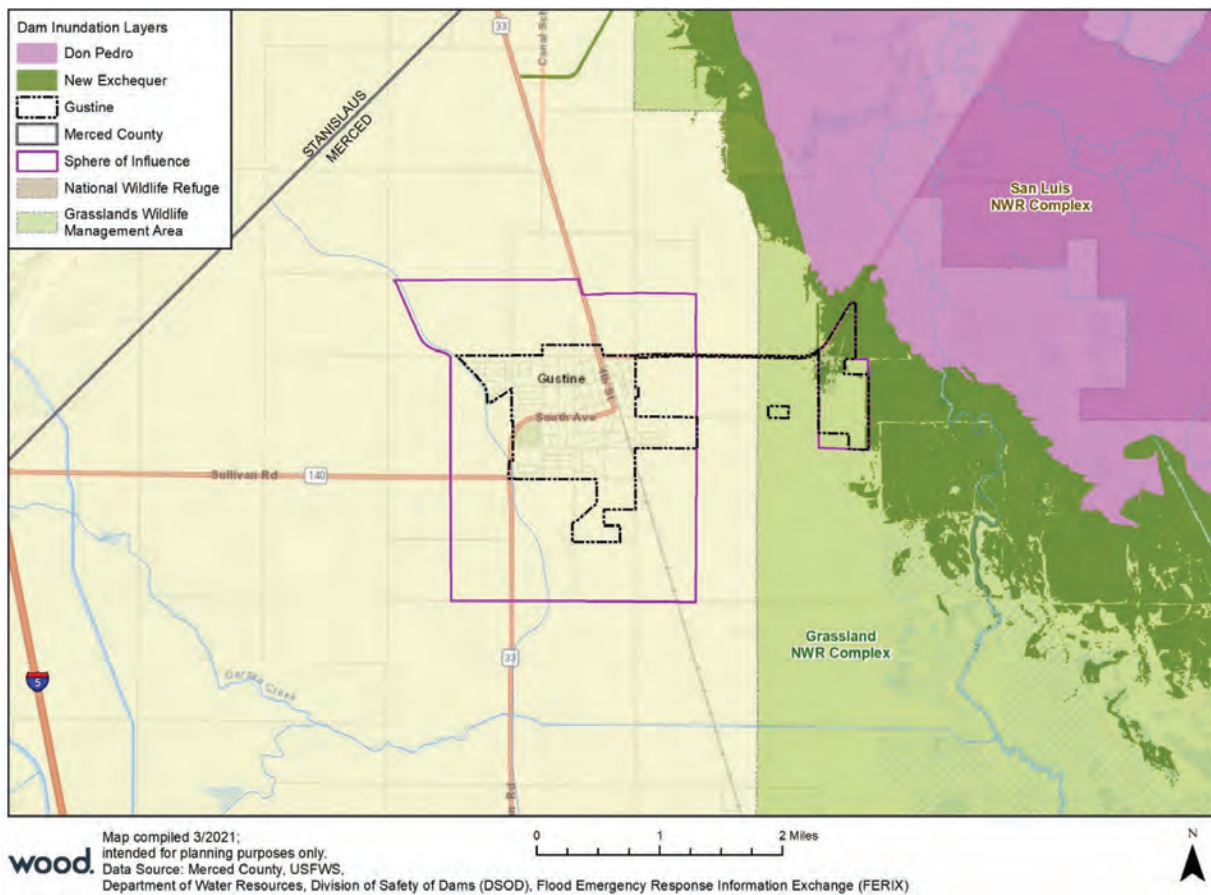
2.3.1 Dam Incidents

Protection from flood hazards created by dam failures is critical to the safety and well-being of Gustine residents. A dam vulnerability assessment was completed during the 2021 update, following the methodology described in Section 4 of the Base Plan. The analysis found the Gustine is outside the inundation areas of the Don Pedro and New Exchequer dams but the Gustine Municipal Airport in the eastern portion of the city is on the edge of the New Exchequer dam inundation area (see Figure 2-1).

Not represented on the inundation map is risk from the San Luis Dam. Best available data was used during the 2021 plan update, but complete inundation data was not available for the San Luis or Los Banos Dams due to the information being considered sensitive and restricted, per communication with

OES and the dam owners. According to the Emergency Action Plan for this dam a failure could result in flooding in Gustine to a depth range of 2-10 ft in less than 10 hours. For this reason, dam incidents were assessed in this annex, but not considered a low priority hazard for the City.

Figure 2-1 City of Gustine Dam Inundation Areas (excluding San Luis Dam)



2.3.2 Earthquake

The City of Gustine and surrounding areas historical earthquake activity is below California's state average. No known faults are located in the Gustine area. The nearest known fault is the Ortigalita Fault the only fault line within Merced County. According to the City's General Plan Safety Element, Gustine is unlikely to be the epicenter of an earthquake event but will likely experience shaking from an event. New development in the city is required to comply with current building standards for seismic safety.

There is no record of any seismic activity originating within the city; however, the County of Merced has been shaken by earthquakes originating elsewhere. There is documented evidence of six earthquakes that shook the area, those of 1872, 1906, 1952, 1966, 1984, and 1989.

No damaging earthquakes greater than M 6.0 have been recorded in the City of Gustine or Merced County in over 200 years, though several have been very close. The most recent large earthquake near Merced County was 16 miles east north-east of King City at a magnitude of 5.3 on October 20, 2012. Several aftershocks followed the main earthquake, including a M3.1 aftershock. This quake was preceded by two earthquakes located approximately 100 miles from Merced County, the 1982 New Idria earthquake (M5.4) and the 1983 Coalinga quake (M6.5). There was low level ground shaking and low local magnitude reported.

Based on the earthquake shaking potential mapped for Merced County and the City of Gustine, due to the proximity to the San Andreas Fault, and the history of shaking with no surface rupture, means the probability of damaging seismic ground shaking in the City of Gustine is considered as occasional. Other hazards associated with earthquake activity, such as lateral spreading, surface cracking or differential setting, are considered unlikely to occur, although no studies have been conducted to determine the likelihood of these hazards.

2.3.3 Flood and Levee Failure

The City of Gustine lies outside the 100-year and 500-year floodplain as designated by the Federal Emergency Management Agency (FEMA). While not within a floodplain, the eastern portion of the City and the City's SOI (shown in Figure 2-2), where the Gustine Municipal Airport is located, is on the edge of the 100-year or 1% annual flood chance hazard. Figure 2-3 shows the critical facilities proximity to 1% annual flood chance. As shown, 14 critical facilities were identified as being located in a floodplain.

Figure 2-2 City of Gustine Flood Hazard

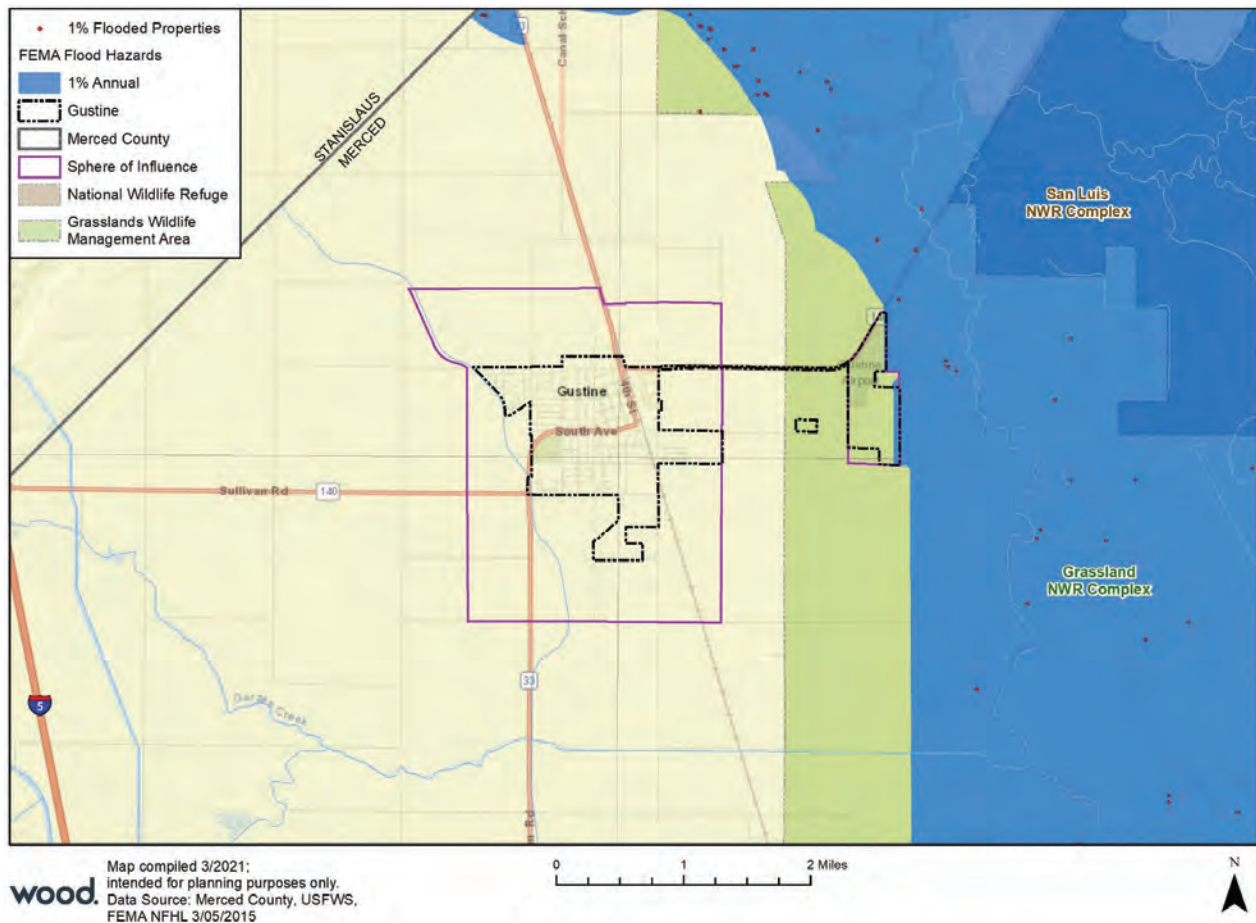
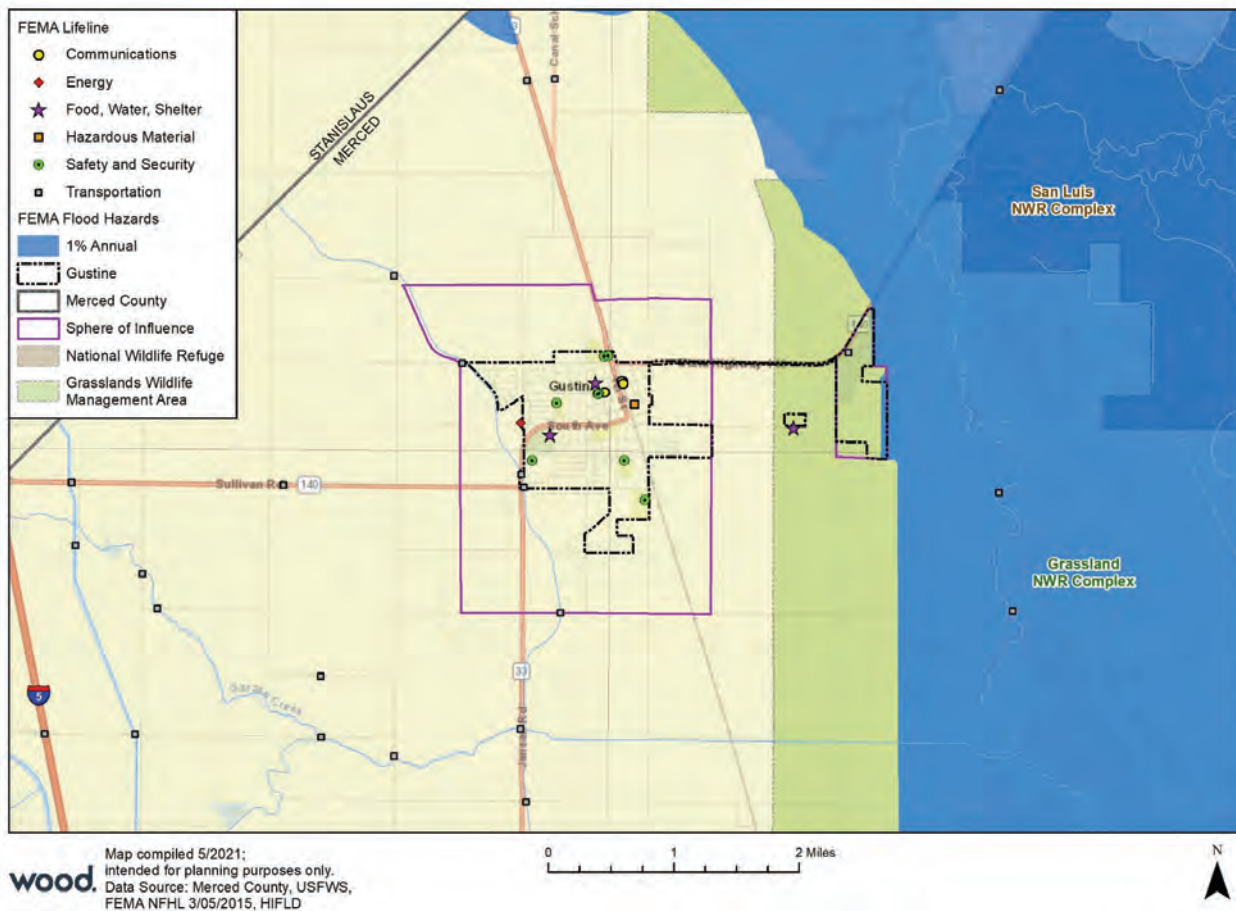


Figure 2-3 Critical Facilities and FEMA Flood Hazards



2.3.4 Wildfires

Weather components, such as temperature, relative humidity, wind, and lightning, also affect the potential for wildfire. High temperatures and low relative humidity dry out the fuels that feed the wildfire creating a situation where fuel will more readily ignite and burn more intensely. Both urban and wildland fires conditions exist in Merced County and its cities which increases the chances for damage to property, loss of life and/or injury. In most of Merced County, the California Department of Forestry and Fire Protection (Cal FIRE) ranks fuel loading as low.

Figure 2-4 shows the fire threat areas within and near the city. The fire threat areas mainly consist of low and moderate areas. The Municipal Airport and SOI on the eastern portion of the city limits has the most concentration of moderate threat areas and has a small area of high threat. Based on the analysis there are no parcels or critical facilities within the fire threat areas. Table 2-5 summarizes the values at risk and detail loss estimates within the fire threat areas.

Table 2-5 Properties Exposed to Wildfire Threat Areas

Property Type	Improved Parcel Count	Building Count Moderate	Building Count Low	Total Building Count	Improved Value	Estimated Content Value	Total Value	Population
Agricultural	1	0	1	1	\$92,402	\$92,402	\$184,804	
Commercial	1	0	8	8	\$1,612,681	\$1,612,681	\$3,225,362	
Exempt	4	3	1	4	\$0	\$0	\$0	
Residential	141	54	87	141	\$24,399,015	\$12,199,508	\$36,598,523	399
Total	147	57	97	154	\$26,104,098	\$13,904,591	\$40,008,689	399

Source: CAL FIRE, Merced County Assessor, Wood GIS analysis

Analysis on critical facilities located within fire threat areas was also completed. The results are summarized in Table 2-6.

Table 2-6 Critical Facilities Exposed to Wildfire Threat Areas

FEMA Lifeline	Count
Moderate Wildfire Threat	
Safety and Security	1
Low Wildfire Threat	
Safety and Security	1
Transportation	1
Total	3

Source: Merced County, HIFLD, CAL FIRE, FRAP, Wood GIS Analysis

Figure 2-1 Wildfire Threat Areas in City of Gustine

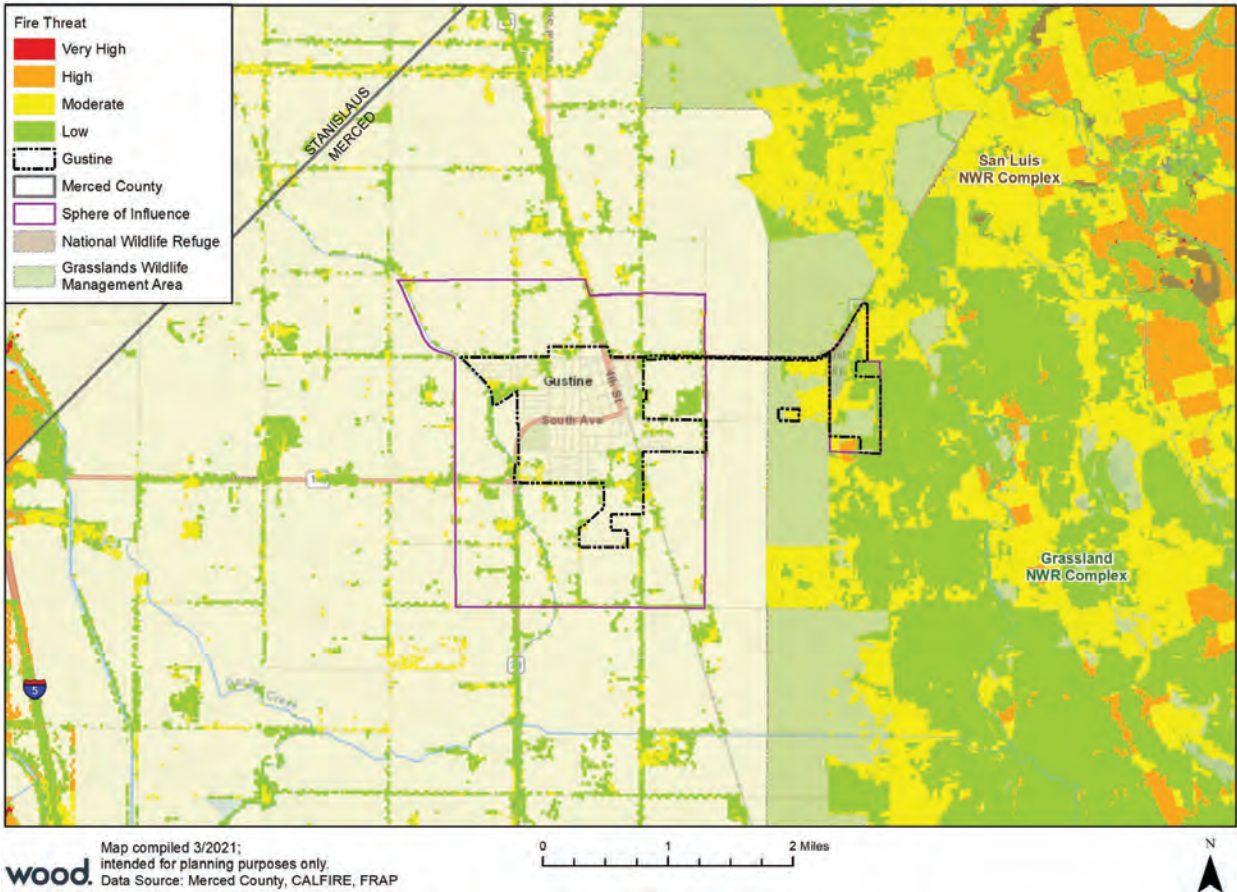


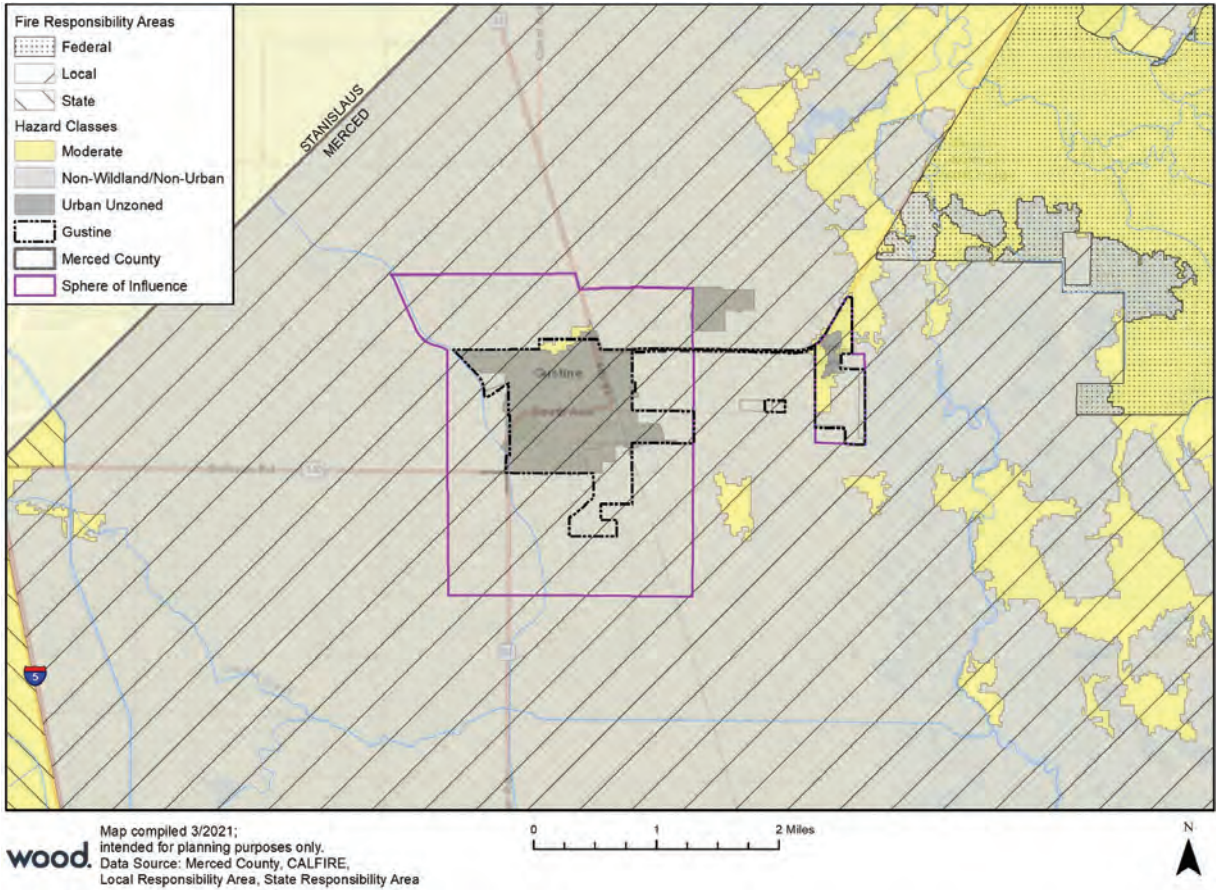
Figure 2-5 shows the fire responsibility areas in the City of Gustine and Table 2-7 summarizes the results from the GIS analysis. No critical facilities were identified as being located within the local responsibility fire hazard area. Refer to Section 4 of the Base Plan for methodology and results of the countywide analysis.

Table 2-7 City of Gustine Properties within Fire Responsibility Areas

Property Type	Improved Parcel Count	SRA Moderate Building Count	Total Building Count	Improved Value	Estimated Content Value	Total Value	Population
Exempt	2	2	2	\$0	\$0	\$0	
Residential	15	15	15	\$3,806,609	\$1,903,305	\$5,709,914	42
Total	17	17	17	\$3,806,609	\$1,903,305	\$5,709,914	42

Source: CAL FIRE, Merced County Assessor, Wood GIS analysis

Figure 2-2 City of Gustine Fire Responsibility Areas



Future Development

The results of the SOI and wildfire analysis is shown in Table 2-8 and Table 2-9.

Table 2-8 Sphere of Influence Areas Exposed Within Fire Severity Areas

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Population
SRA Moderate						
Commercial	1	1	\$74,452	\$74,452	\$148,904	
Residential	1	2	\$142,860	\$71,430	\$214,290	7
Total	2	3	\$217,312	\$145,882	\$363,194	7

Source: Merced County Assessor, Wood analysis

Table 2-9 Sphere of Influence Areas Exposed Within Fire Threat Areas

Property Type	Improved Parcel Count	Building Count Moderate	Building Count Low	Total Building Count	Improved Value	Estimated Content Value	Total Value	Population
Agricultural	23	3	27	30	\$4,591,318	\$4,591,318	\$9,182,636	
Commercial	2	1	1	2	\$1,672,979	\$1,672,979	\$3,345,958	
Exempt	2	0	2	2	\$0	\$0	\$0	
Residential	8	1	9	10	\$1,263,255	\$631,628	\$1,894,883	33
Total	35	5	39	44	\$7,527,552	\$6,895,925	\$14,423,477	33

Source: Merced County Assessor, Wood analysis

3 CAPABILITY ASSESSMENT

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation outreach and partnerships, and other mitigation efforts. To develop this capability assessment, the jurisdictional planning representatives reviewed a matrix of common mitigation activities to inventory which of these policies or programs and shared any updates or changes through the Gustine Data Collection Guide. The team then supplemented this inventory by reviewing additional existing policies, regulations, plans, and programs to determine if they contribute to reducing hazard-related losses.

During the plan update process, this inventory was reviewed by the jurisdictional planning representatives and Wood consultant team staff to update information where applicable and note ways in which these capabilities have improved or expanded. Additionally, in summarizing current capabilities and identifying gaps, the jurisdictional planning representatives also considered their ability to expand or improve upon existing policies and programs as potential new mitigation strategies. The City of Gustine's capabilities are summarized below.

3.1 Regulatory Capability

The regulatory and planning capabilities table lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities. The table below indicates those that are in place in the City of Gustine.

Table 3-1 City of Gustine —Regulatory and Planning Capabilities

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General Plan	Yes	
Zoning ordinance	Yes	
Subdivision ordinance	Yes	
Growth management ordinance	No	
Floodplain ordinance	No	
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	Yes	
Fire department ISO rating	Yes	
Erosion or sediment control program	No	
Stormwater management program	Yes	
Site plan review requirements	Yes	
Capital improvements plan	Yes	
Economic development plan	Yes	
Local emergency operations plan	Yes	
Other special plans	No	
Flood insurance study or other engineering study for streams	No	
Elevation certificates (for floodplain development)	No	
Other		

City of Gustine General Plan, 2002 – The General Plan defines the City’s goals, objectives and policies that guide the physical growth, use and development of land under the jurisdictional authority of the City.

The purpose of the Safety Element (Section 9) is to reduce or eliminate long term risk to people and property from natural or human caused hazards. This element focuses on establishing policies and programs to protect the community from risks associated with seismic and geologic, dam failure, canals and drainage ponds, flooding, hazardous materials, aquatic insects, and urban and wildland fire hazards.

The City of Gustine General Plan Safety Element does not reference incorporation of the 2014 MJHMP, as this is the first Mitigation Annex for the City.

National Flood Insurance Program – The City of Gustine is not a participant in the NFIP and has been sanctioned since December 2, 2009. This means that residents are not able to obtain flood insurance from the NFIP. The City has minimal flood risk and the effective FEMA flood hazard mapping does not show any Special Flood Hazard Area (SFHA) or 1% annual chance flooding within city limits, except for a small area near the airport. This has been the reason for not joining the NFIP, but as part of this plan update the City will revisit the cost and benefit of joining, including working with CA DWR and FEMA to understand the implications of the sanction designation.

3.2 Administrative and Technical Capability

The table below identifies city personnel with responsibilities for activities related to mitigation and loss prevention in the City of Gustine. Many positions are full time and/or filled by the same person. A summary of technical resources follows.

Table 3-2 City of Gustine —Personnel Capabilities

Personnel Resources	Yes/No	Department/Position	Comments
Planner/engineer with knowledge of land development/land management practices	Yes	Contract Planner	
Engineer/professional trained in construction practices related to buildings and/or infrastructure	Yes	Contract Engineer	
Planner/engineer/scientist with an understanding of natural hazards	Yes	Contract Planner/Engineer	
Personnel skilled in GIS	Yes	Contract Planner/Engineer	
Full time building official	No		
Floodplain manager	Yes	Public Works Director	
Emergency manager	Yes	Chief of Police	
Grant writer	Yes	Contract	
Other personnel			
GIS Data Resources (Hazard areas, critical facilities, land use, building footprints, etc.)	Yes	Contract Planner	
Warning Systems/Services (Reverse 9-11, cable override, outdoor warning signals)	Yes	Contract Dispatch with Livingston Police Department	Code Red
Other			

3.3 Fiscal Capability

The following table identifies financial tools or resources that the City could potentially use to help fund mitigation activities. There are currently no specific funding sources for hazard mitigation.

Table 3-3 City of Gustine —Available Financial Tools and Resources

Financial Resources	Accessible/ Eligible to Use	Has This Been Used for Mitigation in the Past?	Comments
Community Development Block Grants	Yes	No	
Capital improvements project funding	Yes	No	
Authority to levy taxes for specific purposes	Yes	No	
Fees for water, sewer, gas, or electric services, new development	Yes	No	
Incur debt through general obligation bonds	Yes	No	
Incur debt through special tax bonds	Yes	No	
Incur debt through private activities	No	No	
Federal Grant Programs (e.g. Hazard Mitigation Grant Program)	Yes	Yes	The City has used funding to install pumps at the airport to mitigate flooding hazards.

3.4 Outreach and Partnerships

The Merced County Office of Emergency Services provides education and outreach on Disaster Preparedness for all of the jurisdictions within the County. This education program is in coordination and partnerships with county and the cities' departments with education programs including the Sheriff's Office, Police Departments, Fire Departments, Agricultural Commissioner, and the Department of Public Health

The Gustine Planning Team notes the following ongoing outreach efforts in the city:

- Outreach specific to responsible water use
- School Resource office conducts earthquake and fire safety seminars
- City flyers on disaster preparedness

3.4.1 Planning Commission

The Planning Commission reviews development proposals for compliance with the General Plan and makes recommendations to the City Council on long range plans and maps for the City and plans for public improvements, plans and development plans for proposed for property within the City, and zoning and rezoning of property within the City. The Commission develops and maintains a long range comprehensive General Plan of the Gustine planning area.

3.5 Opportunities for Enhancement

Based on the capabilities assessment, the City of Gustine has several existing mechanisms in place that already help to mitigate hazards. There are also opportunities for the city to expand or improve on their

policies, programs and fiscal capabilities and further protect the community. Future improvements may include providing training for staff members related to hazards or hazard mitigation grant funding in partnership with the County and Cal OES. Additional training opportunities will help to inform City staff members on how best to integrate hazard information and mitigation projects into their departments. Continuing to train City staff on mitigation and the hazards that pose a risk to the City of Gustine will lead to more informed staff members who can better communicate this information to the public.

In addition, the LPT noted City staff will review current equipment inventory to determine best practices in equipment needed to mitigate hazards. After inventory, City staff will recommend the purchase of equipment needed.

4 MITIGATION STRATEGY

4.1 Goals and Objectives

The City of Gustine adopts the hazard mitigation goals and objectives developed by the Planning Team and described in Section 5 Mitigation Strategy of the Basin Plan.

4.2 Mitigation Actions

The Planning Team for the City identified and prioritized the following mitigation actions based on risk assessments, goals, and objectives. Background information as well as information on how the action will be implemented and administered, such as ideas for implementation, responsible office, partners, potential funding, estimated cost, and timeline also are described.

Table 4-1 City of Gustine Mitigation Action Plan

ID	Goal(s) and Lifelines	Hazard(s) Mitigated	Description/Background/Benefits	Lead Agency and Partners	Cost Estimate and Potential Funding	Priority	Timeline	Status/Implementation Notes
1	1,2,3 Safety and Security	Flood and Levee Failure	Develop and enhance storm-water drainage improvements to reduce frequent flooding. Projects may involve upgrade gutter and drainage systems, basins, trunk lines, auxiliary pipes and interconnections. For example, connect a drain pipe loop around the city and install street drainage gutters in the downtown area	Public Works, Development Services	\$100,000-\$1,500,000 Grants, General Fund	High	36-48 Months	New in 2021
2	2,3 Safety and Security	Earthquake	Perform building specific seismic vulnerability assessment of City-owned critical facilities (building and infrastructure such as water towers and airplane hangars) constructed prior to 1980 and take action to upgrade or retrofit as needed.	Public Works, Development Services	\$500,000-\$1,500,000 Grants, General Fund	Medium	36-48 Months	New in 2021
3	2,3,4 Food, Water, Shelter	Drought	Investigate Drought Monitoring, Risk, and Management Options. Develop and implement a water conservation plan that seeks to reduce the nonessential use of water to conserve county water supplies. The conservation plan would establish mandatory water restrictions within Merced County to discourage waste. Lastly, incorporate treatment of recycled water for potable consumption. To reduce the likelihood of drought impacts occurring again in the future, develop drought	Public Works County and all jurisdictions	\$500,000-\$100,000,000 Grants, General Fund	High	48-60 Months	New in 2021

ID	Goal(s) and Lifelines	Hazard(s) Mitigated	Description/Background/ Benefits	Lead Agency and Partners	Cost Estimate and Potential Funding	Priority	Timeline	Status/Implementation Notes
			plans that outline proactive strategies that can be implemented before, during, and after drought to increase societal and environmental resiliency and enhance drought response and recovery capabilities.					
4	2,3,4 Food, Water, Shelter	Flood and Levee Failure	Explore cost/benefit of joining the NFIP and gain an understanding of the sanction designation through further discussions with Ca DWR and FEMA.	Public Works, Development Services	Staff time	Low	2022	New in 2021

5 IMPLEMENTATION AND MAINTENANCE

Moving forward, the city will use the mitigation action table in the previous section to track progress on implementation of each project. Implementation of the plan overall is discussed in Section 6 in the Base Plan.

5.1 Incorporation into Existing Planning Mechanisms

The information contained within this plan, including results from the Vulnerability Assessment, and the Mitigation Strategy will be used by the City to help inform updates and the development of local plans, programs and policies. The City will incorporate this MJHMP into the Safety Element of their General Plan, as recommended by Assembly Bill (AB) 2140.

As noted in Section 6 of the Base Plan, the LPT representatives from Gustine will report on efforts to integrate the hazard mitigation plan into local plans, programs and policies and will report on these efforts at the annual LPT plan review meeting.

5.2 Monitoring, Evaluation and Updating the Plan

The City will follow the procedures to monitor, review, and update this plan in accordance with Merced County as outlined in Section 6 of the Base Plan. The City will continue to involve the public in mitigation, as described in Section 6.2.1 of the Base Plan. The City Manager will be responsible for representing the city in the County LPT, and for coordination with City staff and departments during plan updates. The City realizes it is important to review the plan regularly and update it every five years in accordance with the Disaster Mitigation Act Requirements as well as other State of California requirements.



1 CITY OF LIVINGSTON

1.1 Community Profile

1.1.1 Mitigation Planning History and 2021 Process

This annex was updated during the development of the 2021 Merced County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update. This Jurisdictional Annex builds upon the previous version of Livingston Annex as part of the 2014 Merced County MJHMP. A review of jurisdictional priorities found no significant changes in priorities since the last update.

The City's Local Planning Team (LPT) held the responsibility for implementation and maintenance of the plan. Members are listed in Appendix A. More details on the planning process followed and how the jurisdictions, service districts and stakeholders participated can be found in Section 3 Planning Process of the Base Plan, along with how the public was involved during the 2021 update.

1.1.2 Geography and Climate

The City of Livingston in Merced County is situated approximately 14 miles northwest of the City of Merced, the county seat. Livingston is one of the smaller cities in the County of Merced and is located in the heart of the San Joaquin Valley, 70 miles northwest of Fresno. Livingston is located in the center of California, about two hours from the cities of San Francisco, Oakland, Sacramento and Yosemite National Park. Monterey and San Jose are accessible in one and a half hours and within one hour of San Joaquin's Valley's major cities of Stockton and Fresno. The City is located in the western portion of the County with Highway 99 running through the city limits. According to the United States Census Bureau, Livingston is a total area of 3.7 square miles and has an elevation of 131 feet above sea level. Much of this area is farmland that has been annexed either pre-emptively, or in anticipation of future growth. The actual City of Livingston is much smaller.

The climate in the City of Livingston cycles through a cool rainy winter season and a dry summer season as does much of Merced County. Livingston lies in the fertile San Joaquin Valley. Like the rest of the valley, it has long, dry summers and depends on irrigation water. The winters are mild, alternating between fog, rain, and sun, with occasional frost. This makes for long growing seasons, with a low risk of mold, storms, drought or other bad weather interfering with crops.

The following climate information is from the Southwest Climate and Environmental Information Collaborative (SCENIC) and the climate data station located in Los Banos, which is the closest station to Livingston. The annual average precipitation for the City of Livingston is 8.8 inches with the most precipitation, on average, occurring in January. The warmest month of the year on average is July, with an average high temperature of 96°F. The highest recorded temperature was 114°F in June 1950. On average, the coolest month of the year is December. The lowest recorded temperature was 14°F in December 1990. On average, there are 95 days per year where the maximum temperature exceeds 90°F and 24 days per year where the minimum temperature falls below 32°F.

1.1.3 City History

The town was originally named after Dr. David Livingstone, a British explorer of Africa who was an international celebrity in the late 1800's. The first acknowledged settler of Livingston in 1862 was David

Baldwin Chedester, a wagon master of a wagon train from Iowa. He supplied food and produce to the railroad gangs building the railroad. Edward Olds, an ex-member of the railway gang, set up a saloon and clothing store on the banks of the Merced River in November 1871. The only other existing building was a grain warehouse built in 1868 by William Little who owned 2,500 acres of land for grain and grazing. Development into a town site was stimulated by railway gang workers, gold seekers, and farmers. Before there was a town, there was only the railway station of Cressey named after the pioneer family who owned 7,500 acres. The City of Livingston was incorporated on September 11, 1922 under the laws of the State of California.

Although the town's original streets were laid out when the railroad arrived in the 1870's, real growth in the town began when irrigation water became available in the early 1900's. Like its neighbors Turlock, Hilmar, and Atwater, much of the settlement was accomplished through the colony system. Land speculators bought large tracts of land and then subdivided them and sold the subdivisions to farmers on credit. In 1872, the town lost the election as the new county seat to Merced by 200 votes. In 1873, in a petition for a new post office, the final letter "E" was inadvertently deleted, and the town officially became Livingston. Livingston experienced a period of slow growth until land speculators and promoters such as the Hunter Land Company and land hungry families from as far away as Iowa began to admire the area. By 1909, because water was on the land through the process of irrigation, Livingston was able to achieve a period of steady growth. Livingston was incorporated in 1922 with Charles Daman as its first mayor.

1.1.4 Economy

The top industries in the City are related to manufacturing, educational services and health care and social assistance, and agriculture. Livingston's economy is intertwined with the economy of Merced County. Merced County is one of the most productive agricultural areas in the State with over \$3 billion worth of agricultural products generated in 2019. Agriculture will continue to be economically important to Livingston as well. The main agricultural products produced in the Livingston area include:

- **Chickens and Turkeys** - The Foster Farms poultry company headquarters and main processing plant are located in Livingston. The chicken ranches import most of their feed from other parts of the United States. The tallest building in the area is the Foster Farms grain elevator located in Delhi, right outside the Livingston City limits
- **Dairy** - Merced County is the second largest dairy producer in California, right behind Tulare County. The Joseph Gallo Dairy, just outside Livingston, has the single largest dairy herd in the United States. Neighboring towns (especially Hilmar) have many more dairy cattle. According to statistics from the California Department of Food and Agriculture, Merced County had 305 operating dairies in 2006, down from the 327 dairies in 2005 and 335 dairies in 2000. While the number of dairies has gone down, the number of milk cows increased by 4,000 during that 12-month period. Dairy farmers and industry experts say recent increases in feed costs, tightened environmental regulations and growing pressure to sell land for development are among the factors that could be pushing some dairies to close.
- **Grapes** - Joseph Gallo, Ernest and Julio Gallo, the Arkelian family, and many family farmers grow grapes for wine, the table and raisin-making. Ernest and Julio Gallo have a major grape pressing operation near Livingston.
- **Sweet Potatoes** - Ninety percent of the sweet potatoes grown west of the Rockies are grown and packed in Livingston, Delhi and Atwater. The sweet potatoes benefit from the sandy soil in the area.
- **Other Crops** - Other crops grown in the Livingston area include barley, wheat, corn, soybeans, onions, strawberries, blueberries, blackberries, raspberries, melons, peaches and alfalfa. Most of the peach orchards have been replaced by almonds. The alfalfa, soybeans and corn are grown to support the dairies.

Table 1-1 and Table 1-2 show how the City of Livingston's labor force breaks down by occupation and industry based on estimates from the 2015-2019 5-year American Community Survey.

Table 1-1 City of Livingston Employment by Occupation, 2015-2019 ACS 5-Year Estimates

Occupation	# Employed	% Employed
Management, business, science, and arts occupations	1,205	18.4%
Service occupations	982	15.0%
Sales and office occupations	1,413	21.6%
Natural resources, construction, and maintenance occupations	1,149	17.5%
Production, transportation, and material moving occupations	1,803	27.5%
Total	6,552	100%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

*Excludes armed forces

Table 1-2 City of Livingston Employment by Industry Sector, 2015-2019 ACS 5-Year Estimates

Industry	# Employed	% Employed
Manufacturing	1,369	20.9%
Educational services, and health care and social assistance	1,244	19.0%
Agriculture, forestry, fishing and hunting, and mining	777	11.9%
Transportation and warehousing, and utilities	561	8.6%
Retail trade	559	8.5%
Professional, scientific, and management, and administrative and waste management services	473	7.2%
Arts, entertainment, and recreation, and accommodation and food services	470	7.2%
Construction	345	5.3%
Wholesale trade	310	4.7%
Other services, except public administration	191	2.9%
Finance and insurance, and real estate and rental and leasing	157	2.4%
Public administration	96	1.5%
Information	0	0.0%
Total	6,552	100%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

Estimates of select economic characteristics for the City of Livingston are shown in Table 1-3.

Table 1-3 City of Livingston Economic Characteristics, 2015-2019 ACS 5-Year Estimates

Characteristic	% Employed
Families below Poverty Level (%)	15.4%
All People below Poverty Level (%)	16.4%
Median Family Income	\$58,268
Median Household Income	\$54,886
Per Capita Income	\$18,238
Population in Labor Force	7,068
Population Employed*	6,552
Unemployment Rate	4.9%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

*Excludes armed forces

1.1.5 Population

The total estimated City population in 2019 was 14,228 up 35.9% from 10,473 people counted during the previous census in 2010. Select demographic and social characteristics for the City of Livingston are summarized in the tables below based on the U.S. Census Bureau's American Community Survey, 5-Year Estimates, 2015-2019.

Table 1-4 City of Livingston Demographic and Social Characteristics, 2015-2019 ACS 5-Year Estimates

Characteristic	
Gender/Age	
Male	6,772
Female	7,456
Median age (years)	29.9
Under 5 years	1,132
Under 18 years	4,269
65 years and over	1,519
Race/Ethnicity	
White	3,596
Asian	3,033
Black or African American	17
American Indian/Alaska Native	151
Hispanic or Latino (of any race)	10,456
Education	
% High school graduate or higher	57.40%
Disability Status	
% of Population 5 years and over with a disability	11.80%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

Table 1-5 Housing Occupancy and Units

Housing Characteristic	Estimate	Percentage
Housing Occupancy		
Total Housing Units	3,699	100%
Units Occupied	3,607	97.5%
Vacant	92	2.5%
Housing Units		
1-unit detached	3,078	83.2%
1-unit attached	54	1.5%
2 units	107	2.9%
3 or 4 units	28	0.8%
5-9 units	172	4.6%
10-19 units	31	0.8%
20 or more units	72	1.9%
Mobile Home	157	4.2%
Boat, RV, van etc.	0	0.0%
Housing Tenure		
Owner Occupied	1,922	53.3%
Renter Occupied	1,685	46.7%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

1.1.6 Development Trends

Livingston has long been recognized for its friendly small-town atmosphere, which is a valued characteristic that is desirable to maintain. In order to maintain a sustainable community, it must find a way to attract a variety of industries, local and region serving commercial development, and provide housing opportunities that will appeal to all demographic categories ranging from university students and faculty to retirees and young families. In order to achieve these objectives, the General Plan focuses on a number of basic themes that are reflected in goals and policies.

Although agriculture will continue to play a major role in the community, Livingston is a community in transition and transformation, driven by new commercial and residential developments. Livingston's two major interchanges on Highway 99 will be the major economic development drivers in the future. An additional interchange at Sultana Drive has recently been completed and will eventually be in the City. Over the last several years, additional businesses have located along the freeway.

The goals of the City of Livingston, as stated in the 2025 General Plan, include the following:

- Protect the health, safety, and welfare of the residents;
- Ensure development that preserves the community character and is in harmony with the City's unique small-town environment;
- Deliver high quality, responsive City services in an efficient and effective manner;
- Develop and encourage a culturally diverse community; and,
- Promote an economically diversified commercial and industrial economy to ensure the future financial stability of the City.

Livingston began the process of updating their General Plan in March 2020. The General Plan provides the opportunity for additional residents, commercial retail, commercial services, and public services in areas at build-out. There are plans light industrial, manufacturing, and other services that will increase employment opportunities uses as well.

City of Livingston Goals for Future

- Promote the development of a wholesome and attractive City resulting from orderly development and preservation of its natural beauty.
- Provide a wide array of business outreach, innovation and competitiveness support services and resources to new and expanding businesses to stimulate job and investment growth.
- Provide a clear, clean and open visual image of the community that reflects the highest standards of design for public and private commercial, residential, institutional and industrial development.
- Attract and support globally competitive companies; Livingston will expand employer access to local workforce development resources that develop workers with necessary technical and job-ready skills.
- Establish a Business Education Initiative that brings business, government, and education together to form partnerships to ensure future prosperity for students and young people by creating a full range of unique, results oriented programs to address the needs of business and students.
- Promote buildings and public infrastructure development that are practical, aesthetically pleasing and in harmony with the environment and surrounding landscape.
- Provide an atmosphere in which people can live in good health, move safely about the community (even at night) and feel confident that they and their property are protected from criminal harm, flood and other natural hazards and man-made disasters.

In terms of changes in development since the 2014 planning process, the City of Livingston experienced a 11% increase in total housing units between 2010 and 2019. Of the total housing units 83% are single-family homes. This is the greatest increase of total housing units during this time period in Merced

County. Additionally, according the 2040 General Plan Existing Conditions and Trends Workbook, the majority of new housing development over the last eight years (or since approximately 2010) was constructed between 2017 and 2019. Some of these new residential developments are located north and northeast of the City. Overall, the increases in development and population also increases exposure to severe weather-related hazards and pandemics/epidemics, as well as earthquakes. This growth also puts more demands on water resources and can increase vulnerability to drought.

2 HAZARD IDENTIFICATION AND SUMMARY

Although the City of Livingston is located in an area where there are few obvious hazards, potential hazards do exist. The main objective of hazard identification is to document potential hazards that must be considered when making decisions on the location, type, and density of development. The official Planning Team for the City of Livingston identified hazards that affect the City and developed hazard profiles based upon the risk assessment, past events, and their potential impacts to the community. The overall hazard significance takes into account the geographic area, probability and magnitude as a way to identify priority hazards for mitigation purposes. This is discussed further in the Vulnerability Assessment Section for the significant hazards that have unique impacts on Livingston, where applicable.

Table 2-1 City of Livingston —Hazard Profiles

Hazard	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Dam Incident	Limited	Occasional	Limited	Medium
Drought	Extensive	Likely	Limited	Medium
Earthquake	Limited	Occasional	Limited	Medium
Flood and Levee Failure	Limited	Occasional	Negligible	Medium
Severe Weather: Heavy Rain	Extensive	Highly Likely	Critical	High
Geographic Area Limited: Less than 10% of planning area Significant: 10-50% of planning area Extensive: 50-100% of planning area Probability of Future Occurrences Highly Likely: Near 100% chance of occurrence in next year or happens every year. Likely: Between 10 and 100% chance of occurrence in next year or has a recurrence interval of 10 years or less. Occasional: Between 1 and 10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years. Unlikely: Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.		Magnitude/Severity (Extent) Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid Significance Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact		

Source: Planning Team

2.1 Vulnerability Assessment

The intent of this section is to assess Livingston's vulnerability separate from that of the planning area as a whole, which has already been assessed in the Hazard Identification and Risk Assessment in the Base Plan. This vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of medium or high significance that may vary from other parts of the planning area.

The information to support the hazard identification and risk assessment was based on a combination of the previous LHMP for the City and County and jurisdiction specific information collected during the 2021 update. A Local Hazard Mitigation Plan Update Guide and associated worksheets was distributed to each participating municipality or special district to complete during update process in 2021. Information collected was analyzed and summarized in order to identify and rank all the hazards that could impact anywhere within the County, as well as to rank the hazards and identify the related vulnerabilities unique to each jurisdiction.

Each participating jurisdiction was in support of the main hazard summary identified in the Base Plan (see Table 5.2). However, the hazard summary rankings for each jurisdictional annex may vary due to specific hazard risk and vulnerabilities unique to that jurisdiction. The information in this annex helps differentiate the jurisdiction's risk and vulnerabilities from that of the overall County.

Note: The hazard "Significance" reflects overall ranking for each hazard and is based on the City's Planning Team member input from the Data Collection Guide and the risk assessment developed during the planning process (see Chapter 4 of the Base Plan), which included a more detailed qualitative and quantitative analysis with best available data.

The hazard summaries in Table 2-1 above reflect the hazards that could potentially affect City. The discussion of vulnerability for each of the following hazards is located in Section 2.3 Estimating Potential Losses. The priority hazards of Medium or High significance for the City of Livingston are identified below.

- Dam Incidents
- Drought
- Earthquake
- Flood and Levee Failure
- Severe Weather: Heavy Rain

Drought and severe weather hazards are not addressed in this vulnerability assessment as the exposure is similar to the overall County exposure, and the potential for losses are difficult to quantify specific to the City of Livingston.

2.1.1 Other Hazards

Hazards assigned a significance rating of Low and those which do not differ significantly from the County ranking (e.g., Low vs. High) are not addressed further in this plan and are not assessed individually for specific vulnerabilities in this section. In the City of Livingston, those hazards include subsidence, hazardous materials incidents, cyber-attacks, agricultural pests and disease, pandemics, and wildfire. Additionally, the City's LPT decided to rate landslides as Not Applicable (N/A) to the planning area due to a lack of exposure, vulnerability, and no probability of occurrence.

Wildfire is profiled in the vulnerability assessment to address wildfire threat in the City's SOI but was rated a low priority hazard given the City consists of urban areas and because there are few mapped moderate and low wildfire threat zones.

2.2 Assets at Risk

This section considers the City of Livingston's assets at risk, including values at risk, critical facilities and infrastructure, historic assets, economic assets and growth and development trends.

2.2.1 Values at Risk

The following data on property exposure is derived from the Merced County 2020 Parcel and Assessor data. This data should only be used as a guideline to overall values in the City as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is likely low and does not reflect current market value of properties. It is also important to note that in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss and is not included in the values below. Table 2-2 shows the exposure of properties (e.g., the values at risk) broken down by property type for the City of Livingston.

Table 2-2 Property Exposure for the City of Livingston by Property Types

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value
Agricultural	8	9	\$713,550	\$713,550	\$1,427,100
Commercial	82	235	\$75,954,862	\$75,954,862	\$151,909,724
Exempt	48	114	\$8,331,817	\$8,331,817	\$16,663,634
Industrial	19	33	\$103,753,191	\$155,629,787	\$259,382,978
Mixed Use	3	4	\$53,004	\$53,004	\$106,008
Residential	3,177	3,605	\$519,238,129	\$259,619,065	\$778,857,194
Vacant Land	7	7	\$142,582	\$142,582	\$285,164
Total	3,344	4,007	\$708,187,135	\$500,444,666	\$1,208,631,801

Source: Wood GIS analysis, Merced County Assessor's Office

2.2.2 Critical Facilities and Infrastructure

A critical facility may be defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA sorts critical facilities into seven lifeline categories as shown in Figure 4-1 in the Base Plan.

A summary of critical facilities by FEMA Lifeline Category in Livingston is listed in Table 2-7.

Table 2-3 City of Livingston Critical Facilities by FEMA Lifeline Category

FEMA Lifeline	Number of Facilities
Communications	6
Energy	1
Food, Water, Shelter	3
Hazardous Material	3
Safety and Security	14
Transportation	5
Total	32

Source: HIFLD

A more detailed list of select critical facilities identified by the planning team from the 2014 Merced County HMP can be found in Table 2-8 below. This table lists the critical facilities and other community assets identified by the Planning Team as important to protect in the event of a disaster. Within the City of Livingston, the following are considered critical facilities:

- Livingston Fire Department Stations.
- Livingston Police Department building.
- Livingston City Hall.
- Water supply lines and wells.
- Wastewater treatment plant, pumping stations, and trunk lines.
- Major electrical transmission lines and substations.
- Major communication lines and microwave transmission facilities.

Critical facilities also include major roadways which may serve as principal evacuation routes.

Table 2-4 City of Livingston Community Assets

Description of Facility		Square Footage	Replacement Value (\$) *	Contents Value (\$) *
Livingston Fire House		3,016	211,257	43,732
Branch Library		3,044	371,275	71,376
Veteran's Memorial		3,400	220,693	0
City Hall				
Livingston Community Center	Community Center			
Recreation Center				
Corp Yard				
Public Works				
Equipment	Barbeque		7,547	3,280
Storage		0	5,658	4,841
City Office Buildings	3 locations	7,750	0	303,452
Parks and Recreation				

Source: Livingston Planning Team 2014 Merced County HMP

*Note: all dollar values are from the 2014 plan after being adjusted for inflation to 2021 values.

2.2.3 Historic, Cultural, and Natural Resources

There are no locations located in Livingston which are recorded by the National Register of Historic Places, however there could be many locations throughout the City which hold cultural significance for the residents of Livingston. Natural resources are important to include in benefit-cost analyses for future projects and may be used to leverage additional funding for projects that also contribute to community goals for protecting sensitive natural resources. Awareness of natural assets can lead to opportunities for meeting multiple objectives. For instance, protecting wetlands areas protects sensitive habitat as well as attenuates and stores floodwaters.

2.3 Estimating Potential Losses

2.3.1 Dam Incidents

Protection from flood hazards created by dam failures is critical to the safety and wellbeing of Livingston residents. Dam failures can result from a number of natural or man-made causes, such as earthquakes, erosion, improper siting, improper maintenance, rapidly rising flood waters, and structural/design flaws.

The ability to provide warning for potential victims of flooding from dam failure is influenced by the type of dam constructed, the frequency of inspections for structural integrity, the flood wave arrival time, the ability to notify persons downstream and their need to evacuate. Aside from loss of life, damage to property and displacement of people, hydroelectric facilities on dams that fail would suffer damage. This could have an impact on life support systems in communities outside the immediate hazard areas. A failure of one of the dams operated by the Merced Irrigation District (MID) that generate electricity could affect supply to the CAADC site, within which the Castle Medical Center is located. Should more of the City choose MID as its electricity supplier and distributor, those customers would likewise be affected.

Figure 2-1 depicts potential dam failure inundation areas that would affect Livingston. Failure of the Don Pedro or McSwain dams would affect the northwestern portions of the City. Potential failure of the New Exchequer dam would result in complete inundation of the City. Representatives from the Army Corps of Engineers have stated that a dam inundation area map is currently not available for Castle Reservoir. Table 2-5 through Table 2-7 summarize Livingston's exposure to dam inundation.



Figure 2-1 Livingston Dam Inundation

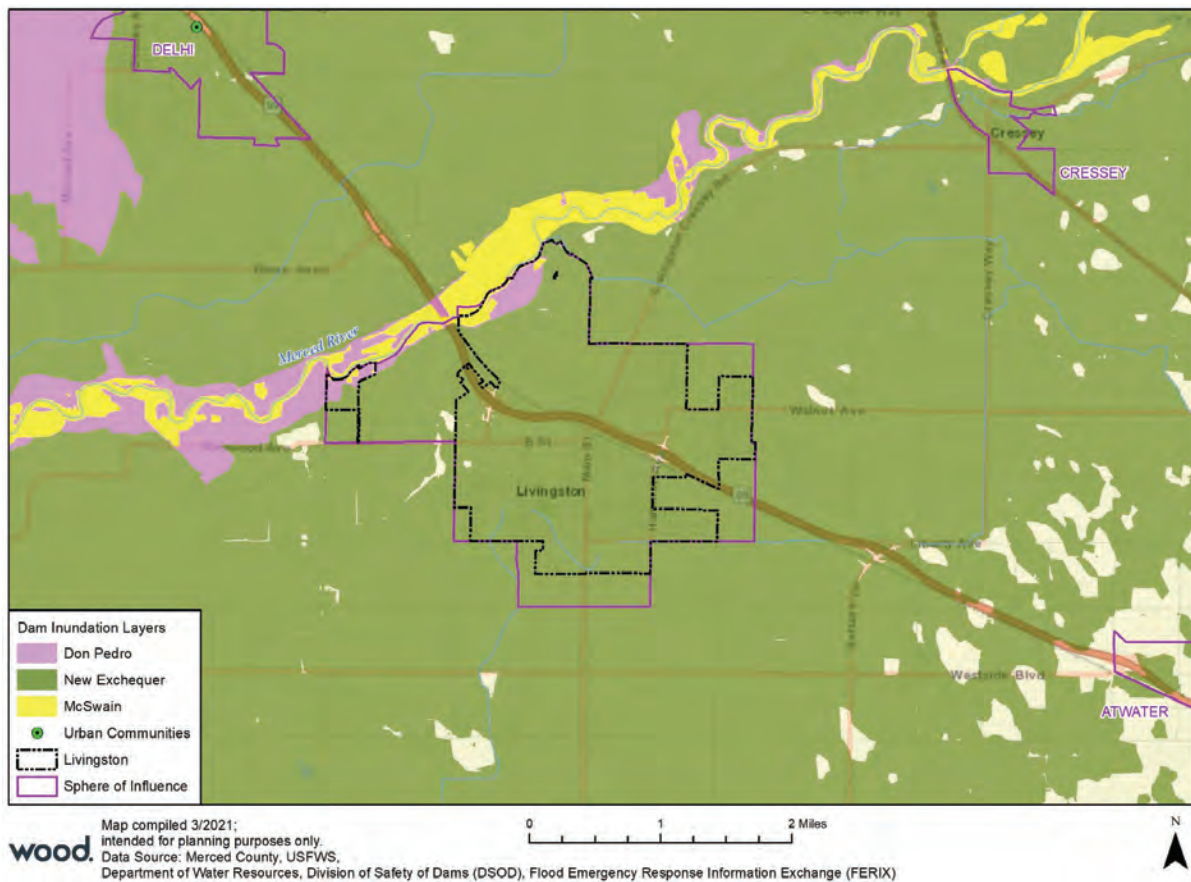


**Table 2-5 New Exchequer Dam Inundation**

Property Type	Improved Parcel County	Building Count	Population
Agricultural	8	9	
Commercial	79	231	
Exempt	48	113	
Industrial	19	33	
Mixed Use	3	4	16
Residential	3,176	3,604	14,200
Vacant Land	7	7	
Total	3,340	4,001	14,216

Source: California DSOS, National Inventory of Dams, Merced County Assessor's Office

Table 2-6 Don Pedro Dam Inundation

Property Type	Improved Parcel County	Building Count
Agricultural	1	1
Total	1	1

Source: California DSOS, National Inventory of Dams, Merced County Assessor's Office

Table 2-7 McSwain Dam Inundation

Property Type	Improved Parcel County	Building Count
Agricultural	1	1
Total	1	1

Source: California DSOS, National Inventory of Dams, Merced County Assessor's Office

2.3.1.1 Future Development

The results of the SOI and dam analysis are shown in Table 2-8 through Table 2-10.

Table 2-8 Sphere of Influence Areas Exposed to New Exchequer Inundation

Property Type	Improved Parcel County	Building Count	Population
Agricultural	17	20	
Commercial	2	12	
Exempt	1	1	
Industrial	3	5	
Mixed Use	1	1	3
Residential	35	44	146
Total	59	83	149

Source: California DSOS, National Inventory of Dams, Merced County Assessor's Office

Table 2-9 Sphere of Influence Areas Exposed to Don Pedro Inundation

Property Type	Improved Parcel County	Building Count
Agricultural	1	3
Total	1	3

Source: California DSOS, National Inventory of Dams, Merced County Assessor's Office

**Table 2-10 Sphere of Influence Areas Exposed to McSwain Inundation**

Property Type	Improved Parcel Count	Building Count
Agricultural	1	1
Total	1	1

Source: California DS

2.3.2 Earthquakes

The City of Livingston's distance to fault zones in the region, including the Ortigalita, Calaveras, San Andreas and Hayward Faults, places it within 'Maximum Expectable Earthquake Intensity Zone III' where 'High Severity, Most Probable Damage' could result should an earthquake occur in the region. There is no record of any seismic activity originating within the City; however, the City of Livingston has been shaken by earthquakes originating elsewhere. There is documented evidence of six earthquakes that shook the area, those of 1872, 1906, 1952, 1966, 1984, and 1989. Major damage occurred in Livingston in 1906, with minor damage recorded throughout the county from other occurrences.

No damaging earthquakes greater than M6.0 has been recorded in the City of Livingston or Merced County in over 200 years, though several have been very close. The most recent large earthquake near Merced County, and the City of Livingston, was 16 miles east north-east of King City at a magnitude of 5.3 on October 20, 2012. Several aftershocks followed the main earthquake, including a M3.1 aftershock. This quake was preceded by two earthquakes located approximately 100 miles from Merced County, the 1982 New Idria earthquake (M5.4) and the 1983 Coalinga quake (M6.5). There was low level ground shaking and low local magnitude reported.

Based on the earthquake shaking potential mapped for the City of Livingston, the proximity to the San Andreas Fault and the history of shaking but no surface rupture, the probability of damaging seismic ground shaking in the City of Livingston is considered as likely. Other hazards associated with earthquake activity, such as lateral spreading, surface cracking or differential setting, are considered unlikely to occur, although no studies have been conducted to determine the likelihood of these hazards.

2.3.3 Flood and Levee Failure

The primary types of flood events in Merced County that may impact the City of Livingston are riverine and urban. Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area, upstream, or from winter snowmelt.

Most of the Northwest corner of Livingston lies within the 100-year floodplain designated by the Federal Emergency Management Agency (FEMA). The area in the northern portion of the city limits falls in the 100-year floodplain. The City of Livingston participates in the National Flood Program. Figure 2-2 and Figure 2-3 reflect the flood potential impact areas in and around the City of Livingston based on the 100-year floodplain. The hazard potential for future flooding is likely.



Figure 2-2 City of Livingston 100-Year Floodplain

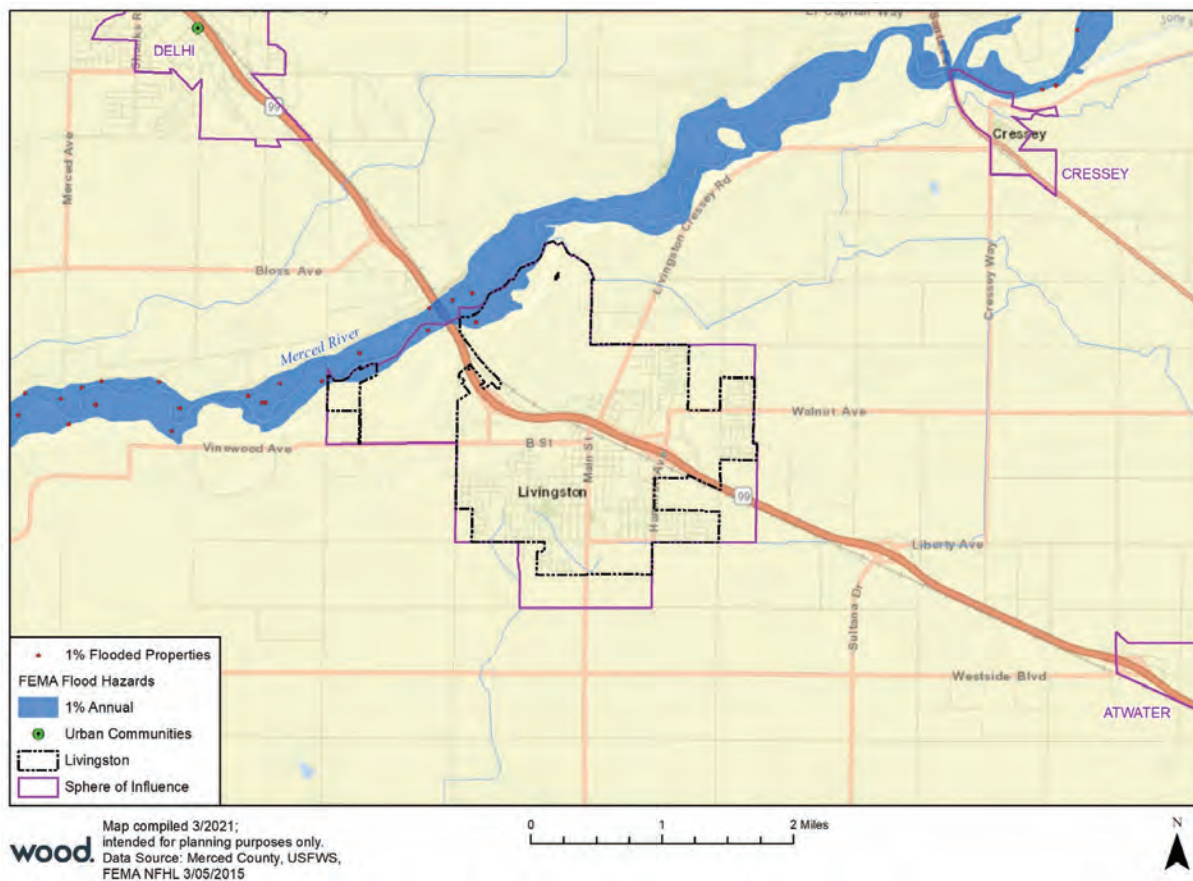




Figure 2-3 City of Livingston 200-Year Flood USACE Comprehensive Study

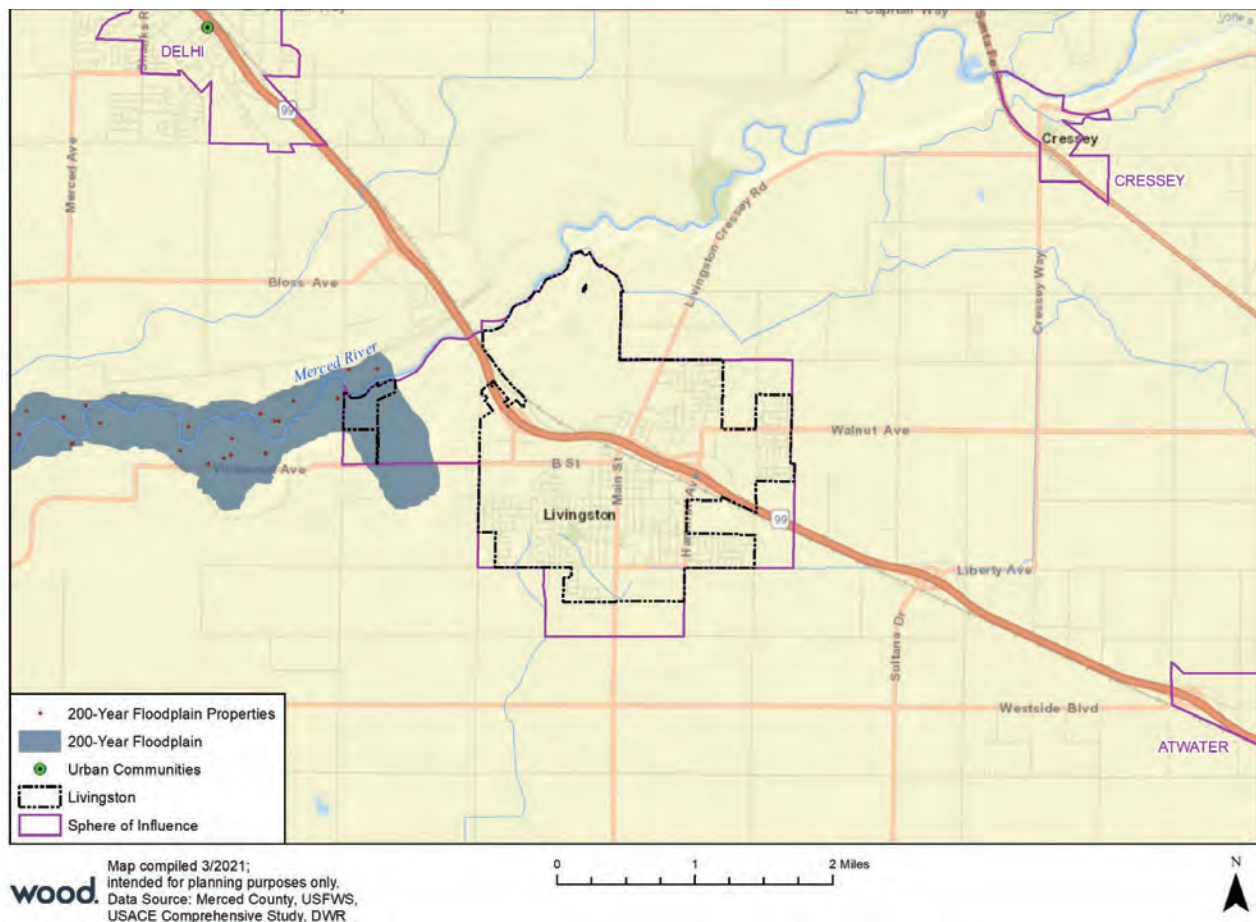


**Table 2-11 City of Livingston FEMA 1% Annual Chance Flood Hazard, by Property Type**

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Estimated Loss	Population
Agricultural	1	1	\$7,441	\$7,441	\$14,882	\$3,721	
Total	1	1	\$7,441	\$7,441	\$14,882	\$3,721	0

Source: Merced County Assessor's Office; National Flood Hazard Layer Effective 12/2/2008; FEMA; Wood analysis

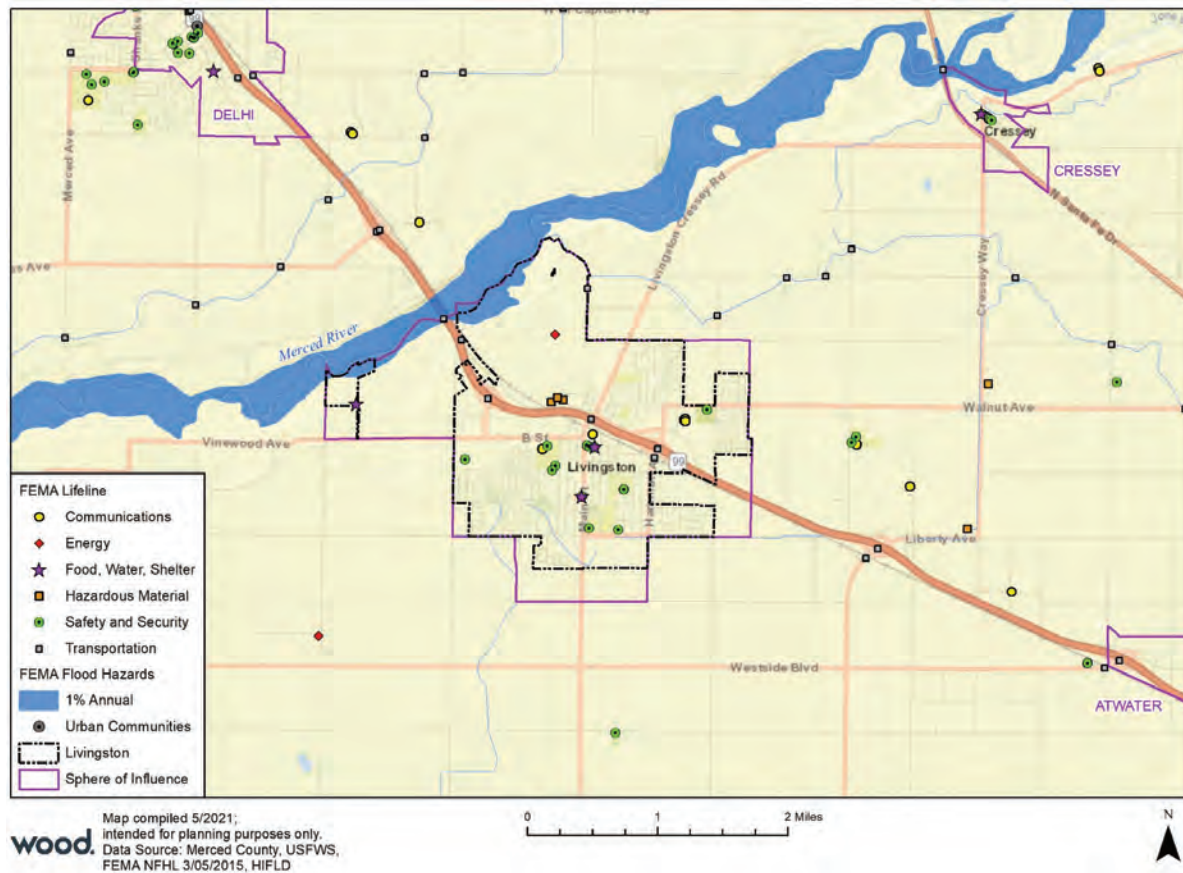
Based on this analysis, the City of Livingston has 1 improved parcel located within the 100-year floodplain for a total value of over \$14,882. No parcels were found to be located in within the 500-year floodplain.

2.3.3.1 Critical Facilities at Risk

Critical facilities are those community components that are most needed to withstand the impacts of disaster as previously described. There are critical facilities located within the City of Livingston which are also in the floodplain, as shown in Figure 2-4. The impact to the wider community could be great if these facilities are damaged or destroyed during a flood event.



Figure 2-4 Critical Facilities at Risk of 1% Annual Flood Hazard





2.3.3.2 Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Livingston joined the National Flood Insurance Program (NFIP) on May 25, 1978. NFIP Insurance data indicates that as of July 2021, there were 4 flood insurance policies in force in the City with \$665,000 of coverage. All of the policies are single family residential and located in the B, C, and X zone.

There have been no historical claims for flood losses in Livingston. According to the FEMA Community Information System accessed July 23, 2021, the City has no Repetitive Loss properties or Severe Repetitive Loss properties.

2.3.3.3 Future Development

The results of the SOI and flood analysis are shown in Table 2-12.

Table 2-12 Sphere of Influence Areas Exposed to 1% Annual Chance Flood Hazard

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Estimated Loss	Population
Agricultural	1	1	\$103,862	\$103,862	\$207,724	\$51,931	
Total	1	1	\$103,862	\$103,862	\$207,724	\$51,931	0

Source: Merced County Assessor's Office; National Flood Hazard Layer Effective 12/2/2008; FEMA; Wood analysis

2.3.4 Wildfire

Weather components, such as temperature, relative humidity, wind, and lightning, also affect the potential for wildfire. High temperatures and low relative humidity dry out the fuels that feed the wildfire creating a situation where fuel will more readily ignite and burn more intensely. Both urban and wildland fires conditions exist in Merced County and its cities which increases the chances for damage to property, loss of life and/or injury. In most of Merced County, the California Department of Forestry and Fire Protection (Cal Fire) ranks fuel loading as low. Fuels are mainly crops and grasses. In the southwest corner, there are some brush, pine, and grass fuels, which are ranked as moderate fuel hazards, primarily in the area west of Interstate 5.

There have not been any state or federal disaster declarations in the City of Livingston or Merced County related to wildfire in the past. The LPT noted that although there are many fire starts, the fuels are "flashy" and fires are usually quickly put out. Properties in the City vulnerable to wildfire threat areas are summarized in Table 2-13.

**Table 2-5 Properties Exposed to Wildfire Threat Areas**

Property Type	Improved Parcel Count	Building Count Very High	Building Count High	Building Count Moderate	Building Count Low	Total Building Count	Improved Value	Estimated Content Value	Total Value	Population
Agricultural	3	0	0	1	2	3	\$206,335	\$206,335	\$412,670	
Commercial	8	0	0	1	10	11	\$24,166,802	\$24,166,802	\$48,333,604	
Exempt	4	0	0	2	2	4	\$1,970,108	\$1,970,108	\$3,940,216	
Industrial	6	0	0	1	18	19	\$8,724,473	\$13,086,710	\$21,811,183	
Mixed Use	1	0	0	0	1	1	\$40,000	\$40,000	\$80,000	4
Residential	191	0	0	54	137	191	\$56,115,683	\$28,057,842	\$84,173,525	753
Vacant Land	1	0	0	0	1	1	\$85,000	\$85,000	\$170,000	
Total	214	0	0	59	171	230	\$91,308,401	\$67,612,796	\$158,921,197	756

Source: CAL FIRE, Merced County Assessor, Wood GIS analysis



Figure 2-1 Wildfire Threat Areas in City of Livingston

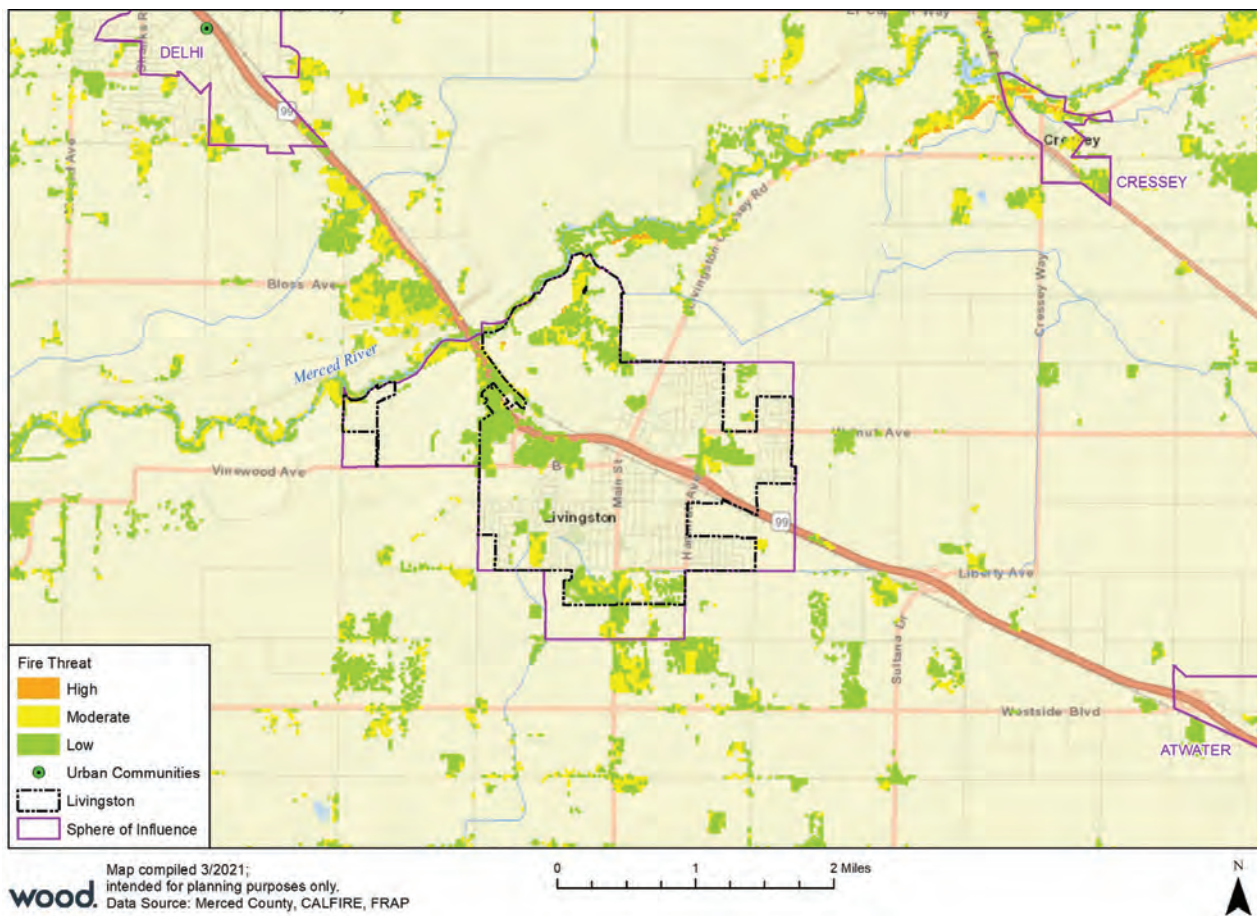




Table 2-14 shows the results of the critical facility analysis by fire threat area.

Table 2-6 Critical Facilities Exposed to Wildfire Threat Areas

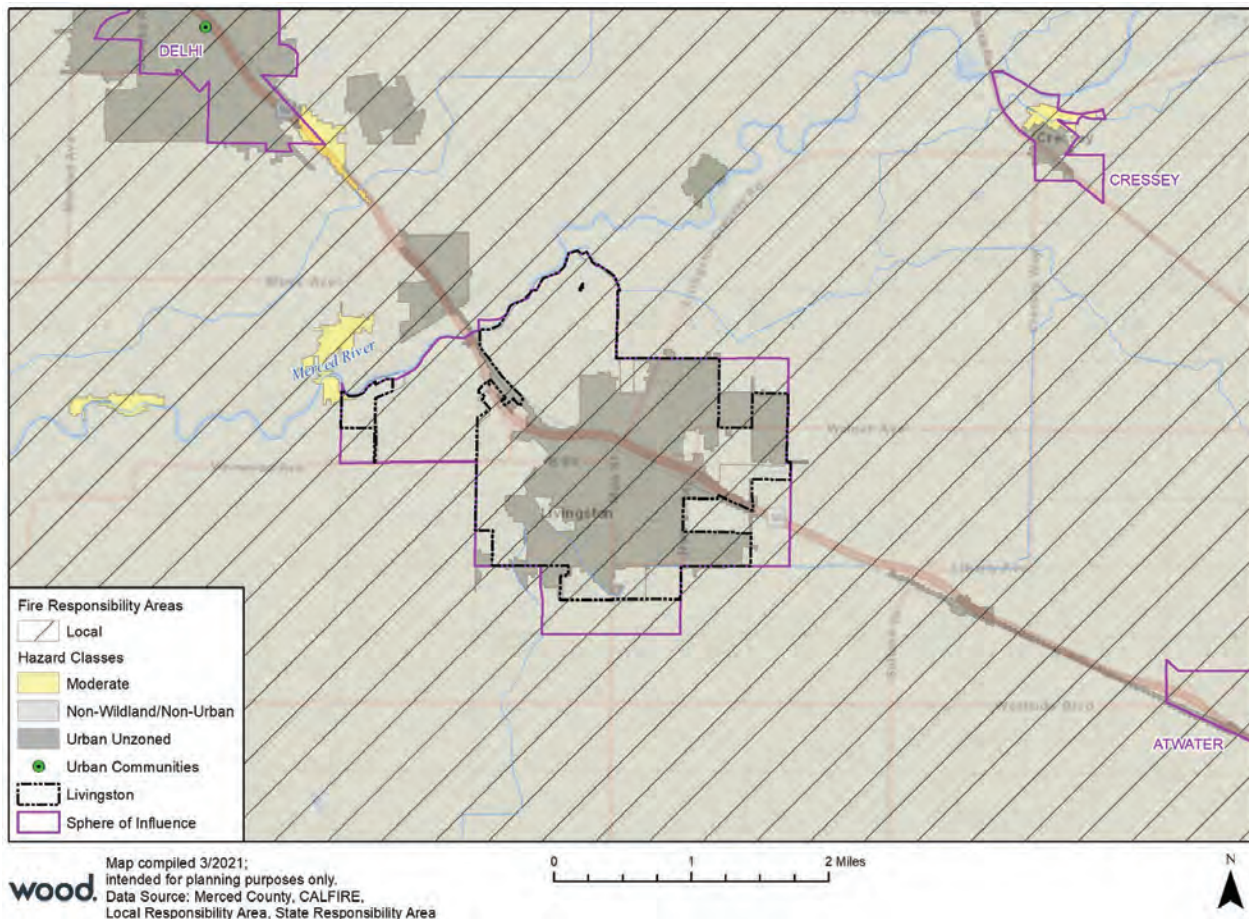
FEMA Lifeline	Count
Low Wildfire Threat	
Communications	2
Total	2

Source: Merced County, HIFLD, CAL FIRE, FRAP, Wood GIS Analysis

Figure 2-6 shows the fire responsibility areas in the City of Livingston. Refer to Section 4 of the Base Plan for methodology and results of the countywide analysis.



Figure 2-2 City of Livingston Fire Responsibility Areas





2.3.4.1 Future Development

The results of the SOI and wildfire analysis are shown Table 2-15 and Table 2-16.

Table 2-7 Sphere of Influence Areas Exposed Within Fire Threat Areas

Property Type	Improved Parcel Count	Building Count High	Building Count Moderate	Building Count Low	Total Building Count	Improved Value	Estimated Content Value	Total Value	Population
Agricultural	4	0	3	3	6	\$748,751	\$748,751	\$1,497,502	
Commercial	1	0	0	2	2	\$3,485,270	\$3,485,270	\$6,970,540	
Industrial	2	0	0	4	4	\$595,669	\$893,504	\$1,489,173	
Residential	3	0	0	3	3	\$286,779	\$143,390	\$430,169	10
Total	10	0	3	12	15	\$5,116,469	\$5,270,914	\$10,387,383	10

Source: CAL FIRE, Merced County Assessor, Wood GIS analysis

3 CAPABILITY ASSESSMENT

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation outreach and partnerships, and other mitigation efforts. To develop this capability assessment, the jurisdictional planning representatives reviewed a matrix of common mitigation activities to inventory which of these policies or programs and shared any updates or changes through the Livingston Data Collection Guide. The team then supplemented this inventory by reviewing additional existing policies, regulations, plans, and programs to determine if they contribute to reducing hazard-related losses.

During the plan update process, this inventory was reviewed by the jurisdictional planning representatives and Wood consultant team staff to update information where applicable and note ways in which these capabilities have improved or expanded. Additionally, in summarizing current capabilities and identifying gaps, the jurisdictional planning representatives also considered their ability to expand or improve upon existing policies and programs as potential new mitigation strategies. The City of Livingston's capabilities are summarized below.

3.1 Regulatory Capability

The regulatory and planning capabilities table lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities. The table below indicates those that are in place in the City of Livingston.

Figure 3-1 City of Livingston —Regulatory and Planning Capabilities

Regulatory Tool	Yes/No	Comments
General Plan	Y	1999 General Plan, Safety Element (geologic/seismic hazards, structural hazards, wildland and urban fire hazards, flooding, dam failure inundation, noise). The City announced the update the City's General Plan in March 2020. The Livingston 2040 General Plan Update is expected to take two years to develop. The updated plan can



Regulatory Tool	Yes/No	Comments
		incorporate the 2021 – 2026 Merced County MJHMP and City of Livingston Annex by reference.
Zoning ordinance	Y	Title 5, Zoning Regulations
Subdivision ordinance	Y	Title 6, Subdivision Regulations
Growth management ordinance	N	
Floodplain ordinance	Y	Title 4, Building Regulations, Chapter 5 Floodplain Management
Other special purpose ordinance (stormwater, steep slope, wildfire)	Y	Title 9, Public Ways and Property, Chapter 12, Urban Stormwater Quality Management
Building code	Y	Title 4, Building Regulations, Title 7, Fire Regulations and Department of Public Safety
Fire department ISO rating	Y	ISO Rating 4
Erosion or sediment control program	Y	Title 4, Building Regulations, Chapter 6, Grading, Erosion and Sedimentation Control Title 9, Public Ways and Property, Chapter 12, Urban Stormwater Quality Management
Stormwater management program	Y	Title 9, Public Ways and Property, Chapter 12, Urban Stormwater Quality Management Storm Water Management Program (FY 2006-2007) (MS4) (Water Quality Order No. 2003-0005-DWQ) Storm Drainage Master Plan (No Date) Joint program with the Merced Irrigation District (MID); MID owns and operates several canals around the City (e.g., Arena and Livingston Canals) that offer stormwater drainage capabilities for stormwater originating in City.
Site plan review requirements	Y	Title 5, Zoning Regulations, Chapter 5.6.7, Site Plan and Design Review
Capital improvements plan	Y	Capital Improvements summarized in the City's 2021-2022 Budget (e.g., police department dispatch upgrade, diesel sweeper, road improvements [Winton Parkway Widening, Hammatt Road Overpass], Wells 8 & 9) 2007 Domestic Wastewater Treatment Plant Expansion Site Plan
Economic development plan	N	
Local emergency operations plan	N	The City follows the County's emergency response procedures and the Merced County 2007 Emergency Operations Plan.
Other special plans	Y	2007 Water Distribution System Master Plan 2015 Urban Water Management Plan
Flood insurance study or other engineering study for streams	Y	Flood Insurance Study (December 2, 2008)
Elevation certificates (for floodplain development)	Y	Title 4, Building Regulations, Chapter 5 Floodplain Management, Section 4.5.5.1, Standards of Construction (Elevation and Floodproofing verification is provided by the Floodplain Administrator)
Other		

Source: Planning Team; City of Livingston Website

City of Livingston General Plan (1999) - The City of Livingston approved its General Plan revision in December 1999. The City is currently preparing the Livingston 2040 General Plan, which is anticipated to



be completed by 2022. This General Plan defines the City's goals, objectives and policies that guide the physical growth, use and development of land under the jurisdictional authority of the City.

The purpose of the Safety Element is to reduce or eliminate long term risk to people and property from natural or human caused hazards. This element focuses on establishing policies and programs to protect the community from risks associated with emergency planning, fire protection, law enforcement, and flooding. The Safety Element is being expanded in the 2040 General Plan to cover additional natural hazards and safety related issues that are more commonly associated with the built environment as affecting the health and safety of residents living within the City. These include geologic and seismic hazards, flooding, wildfire, drought, noise, hazardous materials, and future hazard trends that may occur in the City related to climate change (e.g., extended drought, more high heat days, more frequent wildfires). The City of Livingston Safety Element does not reference incorporation of the 2014 MJHMP. Also, integration of the 2014 MJHMP was not noted in any of the other City planning mechanisms. However, the City is currently updating their General Plan and can incorporate the 2021 MJHMP by reference in the Safety Element.

Livingston Fire Department – The City of Livingston Fire Department is managed through a contractual agreement with the County. The agreement consists of staffing for one CALFIRE full time position and 15 volunteer members in the City. The Department consists of one station, owned by the County, and this station serves residential, commercial, and industrial structures.

Disaster Preparation and Response Management and Coordination Ordinance, Title 1, Administration Chapter 20 - The declared purposes of this chapter are to provide for the preparation and carrying out of plans for the protection of persons and property within the City in the event of an emergency; the direction of the emergency organization; and the coordination of the emergency functions of the City with all other public agencies, corporations, organizations and affected private persons. The council's powers include the development of emergency and mutual aid plans and agreements and the ordinances and resolutions as necessary to implement the City's Emergency Plan and any other such plans and agreements.

Fire Regulations and Department of Public Safety, Title 7, Chapter 2 – This chapter establishes a department of public safety for the City. It directs the City's Fire Marshal with the responsibility for enforcement of the building standards adopted by the state fire marshal as published in the California Building Code (CBC) relating to fire and panic safety, such as plan reviews and inspections for buildings in regards to the building permit. It also requires the Fire Marshal to assess conformity with the Health And Safety Code, California Fire Code, National Fire Protection Standards, Title 19 and Title 24 California Code of Regulations and other state regulations within the scope of the California state Fire Marshal's office.

Floodplain Management Ordinance Title 4, Chapter 5 - It is the purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- Protect human life and health;
- Minimize expenditure of public money for costly flood control projects;
- Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- Minimize prolonged business interruptions;
- Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in areas of special flood hazard;
- Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future blighted areas caused by flood damage;
- Ensure that potential buyers are notified that property is in an area of special flood hazard; and,



- Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

3.2 Administrative and Technical Capability

The table below identifies City personnel with responsibilities for activities related to mitigation and loss prevention in the City of Livingston. Many positions are full time and/or filled by the same person. A summary of technical resources follows.

Table 3-1 City of Livingston —Personnel Capabilities

Personnel Resources	Yes/No	Department/Position
Planner/engineer with knowledge of land development/land management practices	Y	Community Development, Planning Division,
Engineer/professional trained in construction practices related to buildings and/or infrastructure	Y	Community Development, Engineering Division Public Works Department, Engineering Division
Planner/engineer/scientist with an understanding of natural hazards	Y	Community Development, Engineering Division
Personnel skilled in GIS	N	
Full time building official	Y	Community Development, Building Division, Building Inspector, Building Technician
Floodplain manager	Y	Community Development, Building Division, Floodplain Administrator
Emergency manager	Y	Police Department, Police Chief is Designated Emergency Manager
Grant writer	N	
Other personnel	N	
GIS Data Resources (Hazard areas, critical facilities, land use, building footprints, etc.)	N	
Warning Systems/Services (Reverse 9-11, cable override, outdoor warning signals)	N	
Other		

Source: City of Livingston Website; Planning Team; OES

Merced County has a full-time GIS coordinator who assists the cities and districts in the county with GIS data needs. Merced County, in conjunction the cities of Merced, Atwater, Los Banos, Livingston, Gustine, Dos Palos, emergency fire, law enforcement, health, and Emergency Medical Service agencies, launched the Emergency Notification System (ENS) – a technical capability service allowing residents throughout the entire county to be alerted of an emergency or an important community alert in their area. The improved Merced County Emergency Notification System (ENS) will allow residents throughout the county alternate ways of being contacted during an emergency, such as cell phones, business phones, home phones, emails, text messages or hearing-impaired receiving devices. More importantly, individuals can choose how they will be notified and in what preference order. When an emergency message is issued about a potential safety hazard or concern, messages will be sent to all standard voice and text communication devices registered in the system, including home phones, cell phones, e-mail, and more. Residents and businesses with listed telephone numbers are already included in the system. Those residents having only a cell phone or wanting to be contacted through different methods can provide the information using the registration link at www.co.merced.ca.us/alert.

The City has a Council/Manager form of government. Under this municipal governmental form, the citizens elect four members of the City Council for four-year overlapping terms and a Mayor (who is also



considered a City Council Member) for a two-year term. City Council members choose the mayor pro tempore from among themselves. The City Manager is appointed by the five-member City Council by majority vote and serves at the "pleasure" of the governing body. He/she acts as the City's Chief Executive Officer as well as its Budget and Financial Officer.

3.3 Fiscal Capability

The following table identifies financial tools or resources that the City could potentially use to help fund mitigation activities. There are currently no specific funding sources for hazard mitigation.

Table 3-2 City of Livingston —Available Financial Tools and Resources

Financial Resources	Accessible/ Eligible to Use	Has this been used for mitigation in the past?
Community Development Block Grants	Yes	No
Capital improvements project funding	Yes	No
Authority to levy taxes for specific purposes	Yes	No
Fees for water, sewer, gas, or electric services, new development	Yes	No
Incur debt through general obligation bonds	Yes	No
Incur debt through special tax bonds	Yes	No
Incur debt through private activities	Yes	No
Federal Grant Programs (Hazard Mitigation Grant Program)	Yes	Yes

Source: Planning Team

3.4 Outreach and Partnerships

The Merced County Office of Emergency Services provides education and outreach on Disaster Preparedness for all of the jurisdictions within the County. This education program is in coordination and partnerships with county and the cities' departments with education programs including the Sheriff's Office, Police Departments, Fire Departments, Agricultural Commissioner, and the Department of Public Health.

3.4.1 Planning Commission

The Planning Commission performs the duties described in the present or any future zoning ordinances and subdivision regulations of the City's Municipal Code. This includes any similar ordinance, statute, rule or regulation of the State, County or this City pertaining to the districting, zoning or dividing the city into districts or zones and regulating the construction of improvements, the use, division or minor subdivision of property within the City. The City Council provides the Planning Commission with its directions and assigns tasks. The Planning Commission is charged with the responsibility of studying the needs of the City in which they advise and recommend to the City Council concerning the establishment, modifications and change of zones or districts, and designations of the uses to which property contained therein may be prohibited, restricted, and regulated and other duties as may be delegated by the City Council.



3.4.2 Former Livingston Redevelopment Agency

The Former Livingston Redevelopment Agency is a blended component unit of the City of Livingston, although technically it is a separate government unit under California law. It was established in 1985 pursuant to the Community Redevelopment Law of the California Health and Safety Code to eliminate urban blight and administer the City's redevelopment activities and projects. California's Community Redevelopment Law (Chapter 710, Statutes of 1951) was enacted by the California Legislature with the objective of redeveloping those areas found in many communities that have suffered from unsafe, unfit, deteriorated, and economically dislocated properties. Members of the City Council sit on the Livingston Redevelopment Agency Board.

3.4.3 Community Development Department

The Community Development Department oversees all development within the City of Livingston. This includes the overall design of the City as well as specific commercial, residential, and industrial site plans, building designs, community aesthetics, and property maintenance. The Community Development Department is divided into four divisions or departments: Building Division, Engineering, Division, Housing Division, and the Planning Division. They also oversee Planning Commission, which acts in an advisory capacity to the City Council on land use and development issues.

3.5 Other Mitigation Efforts

The City of Livingston Human Resources and Risk Management Division is responsible for all personnel functions of the City. This Division is also responsible for the City's risk management and the City's liability insurance, property insurance, and other insurance programs that relate to natural hazards and property protections.

3.6 Opportunities for Enhancement

Based on the capabilities assessment, the City of Livingston has several existing mechanisms in place that already help to mitigate hazards. There are also opportunities for the City to expand or improve on their policies, programs and fiscal capabilities and further protect the community. Future improvements may include providing training for staff members related to hazards or hazard mitigation grant funding in partnership with the County and Cal OES. Additional training opportunities will help to inform City staff members on how best to integrate hazard information and mitigation projects into their departments. Continuing to train City staff on mitigation and the hazards that pose a risk to the City of Livingston will lead to more informed staff members who can better communicate this information to the public.

4 MITIGATION STRATEGY

4.1 Goals and Objectives

The City of Livingston adopts the hazard mitigation goals and objectives developed by the Planning Team and described in Section 5 Mitigation Strategy of the Base Plan.



4.2 Continued Compliance with the National Flood Insurance Program

The City has been an NFIP participating community since 1978. In addition to the mitigation actions identified herein the City will continue to comply with the NFIP. Floodplain management is under the purview of the Community Development Department and City Engineer (Floodplain Administrator) within the Engineering Division. This includes ongoing activities such as enforcing local floodplain development regulations, including issuing permits for appropriate development in Special Flood Hazard Areas and ensuring that this development mitigated in accordance with the regulations. This will also include periodic reviews of the floodplain ordinance to ensure that it is clear and up to date and reflects new or revised flood hazard mapping.

4.3 Progress on 2014 Mitigation Actions

During the 2021 planning process the City of Livingston Planning Team reviewed all the mitigation actions from the 2014 plan. Of their eight (8) mitigation actions from 2014, six (6) of the actions are continuing, and two (2) actions in-progress demonstrating ongoing progress and building the community's resiliency to hazards. One new action was identified in 2021.

4.4 Mitigation Actions

The Planning Team for the City identified and prioritized the following mitigation actions based on risk assessments, goals, and objectives. Background information as well as information on how the action will be implemented and administered, such as ideas for implementation, responsible office, partners, potential funding, estimated cost, and timeline also are described.


Table 4-1 City of Livingston Mitigation Action Plan

ID	Goal(s) and Lifelines	Hazard(s) Mitigated	Description/Background/Benefits	Lead Agency and Partners	Cost Estimate and Potential Funding	Priority	Timeline	Status/Implementation Notes
1	1,7 Safety and Security	Multi-Hazard: Dam Incident, Earthquake, Flood and Levee Failure Severe Weather, Wildfire	Participation in Countywide Public Education Program. A natural hazards education and awareness program in Merced County would be a valuable tool for sharing information with residents. Implementation ideas include sharing information online and conducting workshops. The county will partner with special districts, the cities and other entities to provide awareness and education on hazards and steps to mitigate.	OES / CEO's Office	\$100,000 Federal Grants	High	Ongoing	Continue Not Started
2	1,2,4,6 Safety and Security	Multi-Hazard: Earthquake, Flood and Levee Failure, Severe Weather, Wildfire	Integrate Local Hazard Mitigation Plan into Safety Element of General Plan. Recognizing the potential duplication of effort over evaluation of the same issues, efforts to update the Health and Safety Element will be conducted in coordination with the multi-hazard mitigation plan and to also ensure AB2140 Compliance. Integration and coordination of both plans provides General Plan policy direction for development activity.	Community Development Agency	\$5,000 General Fund	Medium	Next General Plan review cycle	Continue Not Started
3	1,7 Safety and Security	Earthquake	Non-structural Earthquake Mitigation Outreach. Existing structures can be retrofitted to better withstand damage from seismic events. Outreach will include educating home and	Public Works	\$100,000 Federal Grants	Medium	Ongoing	Continue Not Started



ID	Goal(s) and Lifelines	Hazard(s) Mitigated	Description/Background/Benefits	Lead Agency and Partners	Cost Estimate and Potential Funding	Priority	Timeline	Status/Implementation Notes
			business owners about structural and non-structural retrofit techniques and how to seismically strengthen their homes and businesses. Specific techniques include secure furnishings, storage cabinets and utilities to prevent injuries and damages, such as anchoring, installing lathes, using flexible connections on gas and water lines, and bracing propane tanks and water heaters.					
4	1,2 Safety and Security	Earthquake	Countywide Inventory for Unreinforced Masonry Buildings - Use GIS a to map and track URM's Countywide. An accurate inventory of URM Buildings with appropriate tracking will lessen time during the recovery after an EQ.	Public Works	\$15,000 – 20,000 Federal Grants	Medium	1 year	Continue Not Started
5	1,2,6 Food, Water, Shelter	Multi-Hazard: Earthquake, Flood and Levee Failure, Severe Weather, Wildfire	Periodically review building codes for updates and enhancements and ensure necessary capabilities for enforcement.	Building Department	Staff time Dept. Budget	Medium	1 year then ongoing	Continue Not Started
6	1,2,7 Safety and Security	Flood and Levee Failure	Flood Insurance Promotion. City staff will promote benefits of flood insurance.	Planning Department	Staff Time Dept. Budget	High	Ongoing	Continue Not Started



ID	Goal(s) and Lifelines	Hazard(s) Mitigated	Description/Background/Benefits	Lead Agency and Partners	Cost Estimate and Potential Funding	Priority	Timeline	Status/Implementation Notes
7	1,4,7 Safety and Security	Severe Weather	Severe Weather Preparedness Campaign. This project would add to and enhance the existing, campaigns that share information on Severe Weather Hazards: Fog, Freeze, Location of Warming Centers, Heat Related Illness, All Hazards Preparedness information, etc.; The county will work with special districts, the cities and other entities.	Livingston Fire Department	\$100,000 Federal Grants	High	Ongoing	Continue In-Progress
8	1,2,4,5,7 Food, Water, Shelter	Drought	Promote Water Conservation Program. Drought is a serious issue that is faced in California. Water awareness of all citizens within the City and the County is critical to the future of our water supply. Reminders, education and awareness will help keep the conservation importance in the forefront.	Public Works	\$100,000 Federal Grants	High	Ongoing	Continue In-Progress
9	1,2,3 Food, Water, Shelter	Flood and Levee Failure	Upgrade of storm sewer lift station/SCADA. Upgrade motors, pumps, electrical panel and have SCADA system connected to mitigate potential for urban stormwater flooding.	Public Works	\$250,000, Federal Grant FEMA HMA Grant	High	6 months – 1 year	New in 2021



5 IMPLEMENTATION AND MAINTENANCE

Moving forward, the City will use the mitigation action table in the previous section to track progress on implementation of each project. Implementation of the plan overall is discussed in Section 6 in the Base Plan.

5.1 Incorporation into Existing Planning Mechanisms

The information contained within this plan, including results from the Vulnerability Assessment, and the Mitigation Strategy will be used by the City to help inform updates and the development of local plans, programs and policies. The Engineering Division may utilize the hazard information when implementing the City's Community Investment Program and the Planning and Building Divisions may utilize the hazard information when reviewing a site plan or other type of development applications. The City will also incorporate this MJHMP into the Safety Element of their Livingston 2040 General Plan, as recommended by Assembly Bill (AB) 2140.

As noted in Section 6 of the Base Plan, the HMPT representatives from the City will report on efforts to integrate the hazard mitigation plan into local plans, programs and policies and will report on these efforts at the annual HMPT plan review meeting.

5.2 Monitoring, Evaluation, and Updating the Plan

The City will follow the procedures to monitor, review, and update this plan in accordance with Merced County as outlined in Section 6 of the Base Plan. The City will continue to involve the public in mitigation, as described in Section 6.2.1 of the Base Plan. The Public Works Department lead will be responsible for representing the city in the County HMPT, and for coordination with City staff and departments during plan updates. The City realizes it is important to review the plan regularly and update it every five years in accordance with the Disaster Mitigation Act Requirements as well as other State of California requirements.



1 CITY OF LOS BANOS

1.1 Community Profile

1.1.1 Mitigation Planning History and 2021 Process

This annex was updated during the development of the 2021 Merced County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update. This Jurisdictional Annex builds upon the previous version of Los Banos Annex as part of the 2014 MJHMP. A review of jurisdictional priorities found no significant changes in priorities since the last update.

The City's Local Planning Team (LPT) held the responsibility for implementation and maintenance of the plan. Members are listed in Appendix A. More details on the planning process follow and how the jurisdictions, service districts and stakeholders participated can be found in Section 3 Planning Process of the Base Plan, along with how the public was involved during the 2021 update.

1.1.2 Geography and Climate

The City of Los Banos in Merced County is situated 12 miles southwest of the City of Merced, the county seat. Los Banos is one of the larger cities in the County of Merced and is in the heart of the San Joaquin Valley, 70 miles northwest of Fresno. Los Banos is in the center of California, about two hours from the cities of San Francisco, Oakland, Sacramento, and Yosemite National Park. Monterey and San Jose are accessible in one and a half hours and within one hour of San Joaquin's Valley's major cities of Stockton and Fresno. The City is located in the western portion of the County west of Highway 165 and just north of Highway 152. Some have called Los Banos "The Crossroads" because State Highways 33, 152, and 165 pass through the City; Interstate 5 skirts its western boundaries and it's an easy 30 minute drive to Highway 99. According to the United States Census Bureau, Los Banos has a total area of 10.12 square miles – 98.78% of it is land and 1.22% is water with an elevation of 118 feet above sea level.

The climate in the City of Los Banos is characterized by summers which are hot and dry and cool, wet winters, with most of the year's rain falling from late December through March.

The annual average precipitation for the City of Los Banos is 9.1 inches with the most precipitation, on average, occurring in January. The warmest month of the year on average is July. The highest recorded temperature was 112°F in 2006. On average, the coolest month of the year is January. The lowest recorded temperature was 13°F in 2007.

1.1.3 History

The name "Los Banos" came from a Franciscan monk's missionary trips to the valley from Mission San Juan Bautista back in the early 1800's. On the route from San Juan Bautista, Padre Felipe Arroyo de la Cuesta discovered pools of water in the rocks at the summit of the mountains in a little creek bed that flowed down into the San Joaquin Valley. At these baths or pools he camped overnight with his band of friendly Indians from the Mission. Reports of these baths led to the local ranchers naming the creek "El Arroyo de Los Banos del Padre Arroyo." The name of those spring baths became "Los Banos Crick."

In 1873 a pioneer to the area named Gus Kreyenhagen ran a trading post near Los Banos Creek. The Post Office Department decided to establish a Post Office at the trading post and named it after the creek, hence the name "Los Banos." Henry Miller arrived in San Francisco in 1850 with \$6.00 in his pocket. After working as a butcher, he became aware of the need for a better grade of cattle than that which was available at that time in California. He came to the San Joaquin Valley and began his land acquisitions and

cattle empire. He acquired land on both sides of the San Joaquin River ultimately owning that land for a distance of 120 miles. In 1871 he formed the San Joaquin and Kings River Canal and Irrigation Company. He is credited with being the first to introduce the crops of cotton, rice and alfalfa to the valley. Agriculture remains the number one industry in and around Los Banos and this is due mainly to the early success of Henry Miller. He owned over 3,000,000 acres of land, stretching through Idaho, Oregon, Nevada and California. In Los Banos, Miller brought the railroad to town, constructed a bank, company store and many other building improvements. In addition, he planned and developed housing areas for local citizens and enhanced the quality of life in many ways. Miller created the May Day celebration, which still is observed in Los Banos, as a way of thanking his employees for their hard work and dedication. By the age of 89, when Henry Miller died in 1916, he had given millions of dollars to numerous worthy causes. Today the City of Los Banos is proud to honor his vision and legacy.

1.1.4 Economy

The City of Los Banos' vision is to be a family-oriented community that maintains its small-town atmosphere while accommodating growth. Traditionally, the City of Los Banos has attracted agricultural-based industries and has relied on these types of industries for employment.

Through a collaborative effort of the County of Merced, cities of Atwater, Dos Palos, Gustine, Livingston, Los Banos, Merced, and Merced County, the Merced County Economic Development Team, prepared a Comprehensive Economic Development Strategy (CEDS) adopted in May 2014. The Merced County Economic Development Team developed a strategic plan which engaged the county, cities, and other organizations in Merced County in developing an economic development strategic action plan with priority activities and projects. The adopted CEDS met the requirements of the Economic Development Administration (EDA) requirements and aligned with the goals and objectives adopted in the City of Los Banos General Plan.

Estimates of select economic characteristics for the City of Los Banos are shown in Table 1-1.

Table 1-1 City of Los Banos Economic Characteristics, 2015-2019

Characteristic	City of Los Banos
Families below Poverty Level (%)	15.3%
All People below Poverty Level (%)	18.0%
Median Family Income	\$70,204
Median Household Income	\$62,874
Per Capita Income	\$22,880
Population in Labor Force	62.7%
Population Employed*	54.3%
Unemployment**	13.3%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

*Excludes armed forces. **Does not reflect unemployment numbers due to COVID-19 Pandemic

The most common industries within a five-mile radius of Los Banos are educational services and health care with a combined average of 15.7 percent of workers, closely followed by retail trade with 15.5% of workers. Many other industries include construction, arts, entertainment, and recreation, and accommodation and food services, and manufacturing. The tables below show the labor force breakdown by occupations and industry based on estimates from the 2015-2019 five-year American Community Survey.

Table 1-2 City of Los Banos Employment by Industry, 2015-2019

Occupation	# Employed	% Employed
Educational services, and health care and social assistance	2,290	15.70%
Retail trade	2,271	15.50%
Construction	2,003	13.70%
Arts, entertainment, and recreation, and accommodation and food services	1,569	10.70%
Manufacturing	1,509	10.30%
Professional, scientific, and management, and administrative and waste management services	1,174	8.00%
Agriculture, forestry, fishing and hunting, and mining	1,104	7.60%
Transportation and warehousing, and utilities	937	6.40%
Other services, except public administration	591	4.00%
Public administration	533	3.60%
Wholesale trade	302	2.10%
Information	199	1.40%
Finance and insurance, and real estate and rental and leasing	139	1.00%
Total	14,621	100%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

*Excludes armed forces

Table 1-3 City of Los Banos Employment by Occupation, 2015-2019

Occupation	# Employed	% Employed
Sales and office occupations	3,349	22.90%
Natural resources, construction, and maintenance occupations	3,118	21.30%
Service occupations	2,855	19.50%
Production, transportation, and material moving occupations	2,756	18.80%
Management, business, science, and arts occupations	2,543	17.40%
Total	14,621	100%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

*Excludes armed forces

1.1.5 Population

In May 2020, the State Department of Finance released preliminary population data for the state demographic report, the estimates did not include potential effects of the COVID-19 pandemic. According to the report the City of Los Banos has a population of 41,923 persons as of January 1, 2020 and gained 636 residents from the previous year. Select demographic and social characteristics for the City of Los Banos from the 2015-2019 American Community Survey and the California Department of Finance, are shown in Table 1-4.

Table 1-4 City of Los Banos Demographic and Social Characteristics, 2015-2019

Characteristic	City of Los Banos
Gender/Age	
Male	50.0%
Female	50.0%
Median age (years)	30.1

Characteristic	City of Los Banos
Under 5 years	8.9%
Under 18 years	34.6%
65 years and over	9.5%
Race/Ethnicity	
White	20.2%
Asian	2.7%
Black or African American	2.4%
American Indian/Alaska Native	0.4%
Hispanic or Latino (of any race)	71.7%
Native Hawaiian and Other Pacific Islander	0.8%
Some other race	0.0%
Two or more races	1.7%
Education*	
% High school graduate or higher	69.7%
% with Bachelor's Degree or Higher	10.5%
Social Vulnerability	
% with Disability	11.1%
% Language other than English spoken at home	55.6%
% Speak English less than "Very Well"	32.0%
% of households with a computer with internet use	79.4%
% of households with no vehicle available	5.4%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

* Population 25 years and over

The following table with information from the American Community Survey 5-year estimates (2015-2019) is related to housing occupancy in the City of Los Banos.

Table 1-5 City of Los Banos Housing Occupancy and Units, 2015-2019

Housing Characteristic	Estimate	Percentage
Housing Occupancy		
Total Housing Units	11,293	100%
Units Occupied	10,777	95.4%
Vacant	516	4.6%
Housing Units		
1-unit detached	9638	85.3%
1-unit attached	306	2.7%
2 units	141	1.2%
3 or 4 units	372	3.3%
5-9 units	275	2.4%
10-19 units	109	1.0%
20 or more units	139	1.2%
Mobile Home	278	2.5%
Boat, RV, van etc.	35	0.3%

Housing Characteristic	Estimate	Percentage
Housing Tenure		
Owner Occupied	6121	56.8%
Renter Occupied	4656	43.2%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

1.1.6 Development Trends

Los Banos has long been recognized for its friendly small-town atmosphere, which is a valued characteristic that is desirable to maintain. The 2030 General Plan defines one overarching vision for the city: to be a vibrant, safe, and attractive city with community character and an improved economy, new job opportunities, affordable housing, improved public services and facilities, an excellent circulation system, and a superb quality of life. In order to achieve this objective, the General Plan focuses on a number of basic themes that each contain goals and policies to help achieve the vision. The themes as stated in the General Plan, include the following:

- Economic Development
- Land Use
- Circulation
- Parks, Open Space, and Resources
- Noise
- Safety
- Public Facilities and Utilities

Following the adoption of the General Plan, a population projection was prepared by the Merced County Association of Governments (MCAG). MCAG projections cover the entire 30-year period from 2010 to 2040. The projections for Los Banos were augmented by growth rates used in the Environmental Impact Report for the University of California Site Selection, to account for the anticipated population increase generated by UC Merced, located at Lake Yosemite north of Merced. Based on MCAG's projections, the City of Los Banos is expected to grow from its 1998 Department of Finance (DOF) estimated population of 21,992 to a population of 59,900 in 2040.

The following table summarizes the land uses at build-out of the General Plan. The General Plan provides the opportunity for up to 17,000 additional residents in areas at build-out. There are plans for new jobs in commercial retail, commercial services, light industrial, manufacturing, public services, and other employment uses as well.

Figure 1-1 Development Under the General Plan (Acres)

3-3: Development Under the General Plan (Acres)		
Land Use	Total Buildout	Percent of Total
Residential	4,270	12
Low Density Residential	3,670	11
Medium Density Residential	590	2
High Density Residential	10	<1
Mixed Use	180	1
Mixed Use	10	<1
Neighborhood Commercial	170	<1
Commercial/Office Professional	2,610	7
Commercial	760	2
Office Professional	520	1
Employment Park	820	2
Industrial	510	1
Others	10,370	30
Agriculture/Rural	7,820	22
Parks, Trails & Open Space	1,320	4
Civic/Institutional	490	1
SR-152 Bypass	750	2
Total	34,870	100.0

Build-out estimates are not official growth projections and do not represent City policy. Actual population, square footage, or number of dwelling units could be lower or higher than these estimates based on a number of factors. Buildout may vary overall or within individual land use designations due to:

- The need to preserve the agricultural base, grazing lands, and other types of open space;
- Infrastructure availability, including transportation facilities, public services, and facilities;
- The need to limit development due to flood risk, fire risk, geologic and soils constraints, presence of habitat and biological resources, and presence of other important natural resources; and
- Other factors, as described in the General Plan, community plans, specific plans, and City codes and ordinances.

The City has also developed estimates of average density and intensity to use in calculating 2030 General Plan buildout land use. The City has based buildout estimates on past recorded development activity, recent development plan submittals, regional and statewide population and employment growth forecasts, and other factors. These estimates help the city in anticipating, guiding, and absorbing the

pressures of future growth in the coming decades. The city is currently in the process of an update to the General Plan looking out to 2040, with a target of plan adoption in 2021.

In terms of development since the 2014 MJHMP, the City experienced a slight decrease (-1%) in total housing units. As noted in Table 1-5 above, 85% of the total housing units in City are single family homes. The overall risk to hazards has not increased or changed since the 2014 plan.

2 HAZARD IDENTIFICATION AND SUMMARY

The City of Los Banos Planning Team identified the hazards that affect the city and summarized their frequency of occurrence, spatial extent, potential magnitude, and overall significance specific to their community (see Table 2-1). There are no hazards that are unique to Los Banos. The overall hazard significance takes into account the geographic area, probability and magnitude as a way to identify priority hazards for mitigation purposes. This is discussed further in the Vulnerability Assessment Section.

Table 2-1 City of Los Banos —Hazard Profiles

Hazard	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Drought	Extensive	Likely	Limited	Medium
Earthquake	Significant	Likely	Significant	Medium
Flood and Levee Failure	Limited	Likely	Limited	Medium
Severe Weather	Limited	Highly Likely	Limited	Medium
Wildfire	Significant	Highly Likely	Negligible	Medium
Geographic Area Limited: Less than 10% of planning area Significant: 10-50% of planning area Extensive: 50-100% of planning area Probability of Future Occurrences Highly Likely: Near 100% chance of occurrence in next year or happens every year. Likely: Between 10 and 100% chance of occurrence in next year or has a recurrence interval of 10 years or less. Occasional: Between 1 and 10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years. Unlikely: Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.		Magnitude/Severity (Extent) Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid Significance Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact		

2.1 Vulnerability Assessment

The intent of this section is to assess Los Banos' vulnerability that is separate from that of the planning area as a whole, which has already been assessed in Section 4 Hazard Identification and Risk Assessment in the Base Plan. This vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of medium or high significance that may vary from other parts of the planning area.

The information to support the hazard identification and risk assessment was based on a combination of the previous LHMP for the City and County and jurisdiction specific information collected during the 2021 update. A Local Hazard Mitigation Plan Update Guide and associated worksheets was distributed to each participating municipality or special district to complete during the update process in 2021. Information collected was analyzed and summarized in order to identify and rank all the hazards that could impact anywhere within the County, as well as to rank the hazards and identify the related vulnerabilities unique to each jurisdiction.

Each participating jurisdiction was in support of the main hazard summary identified in the Base Plan (see Table 4-2). However, the hazard summary rankings for each jurisdictional annex may vary due to specific hazard risk and vulnerabilities unique to that jurisdiction. The information in this annex helps differentiate the jurisdiction's risk and vulnerabilities from that of the overall County.

Note: The hazard "Significance" reflects overall ranking for each hazard and is based on the City of Los Banos Planning Team member input from the Data Collection Guide and the risk assessment developed during the planning process (see Section 4 of the Base Plan), which included a more detailed qualitative and quantitative analysis with best available data.

The hazard summaries in Table 2-1 above reflect significant hazards that could potentially affect City. The discussion of vulnerability for each of the following hazards is located in Section 2.3 Estimating Potential Losses, but only hazards are profiled where there was specific data available. Those hazards of Medium or High significance for the City of Los Banos are identified below.

- Drought
- Earthquake
- Flood and Levee Failure
- Severe Weather
- Wildfire

Drought and severe weather hazards are not addressed in this vulnerability assessment as the exposure is similar to the overall County exposure, and the potential for losses are difficult to quantify specific to the City of Los Banos.

Other Hazards

Hazards assigned a significance rating of Low and those which do not differ significantly from the County ranking (e.g., Low vs. High) are not addressed further in this plan and are not assessed individually for specific vulnerabilities in this section. In the City of Los Banos, those hazards include: dam incidents, subsidence, hazardous materials incidents, cyber-attacks, agricultural pests and disease, and pandemics. Drought and severe weather are hazards of medium significance in the City, but the specific vulnerabilities for the City of Los Banos do not differ significantly from the County, and as noted above it is therefore not addressed further in this annex.

Additionally, the City's committee members decided to rate landslides as Not Applicable (N/A) to the planning area due to a lack of exposure, vulnerability, and no probability of occurrence.

2.2 Assets at Risk

This section considers Los Banos' assets at risk, including values at risk, critical facilities and infrastructure, historic assets, economic assets and growth and development trends.

2.2.1 Values at Risk

The following data on property exposure is derived from the Merced County 2020 Parcel and Assessor data. This data should only be used as a guideline to overall values in the city as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is likely low and does not reflect current market value of properties. It is also important to note that in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss and is not included in the values below. Table 2-2 shows the exposure of properties (e.g., the values at risk) broken down by property type for the City of Los Banos.

Table 2-2 City of Los Banos Property Exposure by Type

Property Type	Parcel Count	Improved Value	Content Value	Total Value
Agricultural	6	\$519,029	\$519,029	\$1,038,058
Commercial	441	\$287,223,390	\$287,223,390	\$574,446,780
Exempt	189	\$15,571,378	\$15,571,378	\$31,142,756
Industrial	23	\$29,327,893	\$43,991,840	\$73,319,733
Mixed Use	9	\$175,156	\$175,156	\$350,312
Residential	11,554	\$2,158,859,942	\$1,079,429,971	\$3,238,289,913
Vacant Land	31	\$530,525	\$530,525	\$1,061,050
Total	12,253	\$2,492,207,313	\$1,427,441,289	\$3,919,648,602

Source: Merced County Assessor, Wood analysis

2.2.2 Critical Facilities and Infrastructure

For the purposes of this plan, a critical facility is defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA sorts critical facilities into seven lifeline categories as shown in Figure 4-1 in the Base Plan.

Table 2-3 shows a summary of the critical facilities analysis. critical facilities and other community assets as important to protect in the event of a disaster. Within the City of Los Banos, the following are considered critical facilities:

- Los Banos Fire Department Stations.
- Los Banos Police Department building.
- Los Banos City Hall.
- Water supply lines and wells.
- Wastewater treatment plant, pumping stations, and trunk lines.
- Major electrical transmission lines and substations.
- Major communication lines and microwave transmission facilities.

Critical facilities also include major roadways which may serve as principal evacuation routes. The table that follows lists the critical facilities and other community assets identified by the county's Planning Team as important to protect in the event of a disaster.

Table 2-3 City of Los Banos—Critical Facilities and Community Assets

Description of Facility	Square Footage (sq. ft.)	Replacement Value (\$)	Contents Value (\$)
Los Banos City Hall	10,119	1,108,353	554,424

Description of Facility		Square Footage (sq. ft.)	Replacement Value (\$)	Contents Value (\$)
Los Banos Police Department	Police Station, Police Annex – Station, Activities League	12,849	1,826,731	1,454,537
Fire Department	Fire Station #1 and #2, Storage Building	15,343	1,932,729	425,849
Miller & Lux Building	Office Building	7,726	2,172,403	27,744
Airport – 1000 Airport Rd.	Office & Lounge (Port. Ofc), Hangar Bldg & Hangars #2, #3, and #4, Animal Shelter (Port. Ofc), Kennel, Pilot Lounge	23,783	1,237,971	42,617
Child Development Center		10,000	1,744,209	10,624
Los Banos Community Center	Community Center	2,300	12,006,050	261,531
Recreation Center		3,000	215,514	
Scripps College		2,790	323,687	5,051
Corp Yard	Garage, Office Building, Vehicle Storage	8,172	199,070	147,710
Public Works	Garage, Water Tanks (2)	15,420	2,426,281	825,593
	Pump Stations (1,2,4-9), Pump Building (Sewer Plant-Loc 21), Booster Pump	11,403	1,943,014	0
	Wastewater Treatment, Storage (2)	2,400	28,188,043	112,381
Equipment	Light Poles, Light Poles with Cameras, Communication Tower, Access Gates, Contractor's Equipment, H. Miller Bronze Statue	0	2,506,173	0
Single Family Homes (3)		3781	298,795	0
City Office Buildings	3 Locations	2810	261,628	2,763
Parks and Recreation	Baseball Field Lights/Towers, Restroom, Announcer Booth, Concession Stand, Maintenance Shed	3580	357,900	16,147
Private Parking Garage			16,807	
Lab		70	8,713	12,506

Source: Los Banos Planning Team

2.2.3 Historic, Cultural and Natural Resources

The following historical resources are located in the City of Los Banos:

- Bank of Los Banos Building – National Register (listed 8/24/1979)
- Church of St. Joseph – National Register (listed 7/8/2004)
- San Luis Gonzaga Archeological District – National Register (listed 5/7/1973)

Natural resources are important to include in benefit-cost analyses for future projects and may be used to leverage additional funding for projects that also contribute to community goals for protecting sensitive natural resources. Awareness of natural assets can lead to opportunities for meeting multiple objectives. For instance, protecting wetlands areas protects sensitive habitat as well as attenuates and stores floodwaters. Nearby to the City are the San Luis National Wildlife Refuge and Grassland Wildlife Management Area are located to the east. The Wildlife Refuge encompasses 26,800 acres of wetlands,

riparian forests, natives grasslands and vernal pools. The Grassland Wildlife Management areas supports seasonally flooded marshlands, semi-permanent marshes and native grasslands. Both the Refuge and Wildlife Management Areas are located in flood hazard areas and benefits the surrounding area by absorbing floodwaters and recharging aquifers.

2.3 Estimating Potential Losses

2.3.1 Earthquake

The City of Los Banos' distance to fault zones in the region, including the Ortigalita, Calaveras, San Andreas and Hayward Faults, places it within 'Maximum Expectable Earthquake Intensity Zone III' where 'High Severity, Most Probable Damage' could result should an earthquake occur in the region. There is no record of any seismic activity originating within the City; however, the Los Banos area has been shaken by earthquakes originating elsewhere. There is documented evidence of six earthquakes that shook the area, those of 1872, 1906, 1952, 1966, 1984, and 1989. Major damage occurred in Los Banos in 1906, with minor damage recorded throughout the county from other occurrences.

No damaging earthquakes greater than M6.0 have been recorded in the City of Los Banos or Merced County in over 200 years, though several have been very close. The most recent large earthquake near Merced County, and the City of Los Banos, was 16 miles east north-east of King City with a magnitude of 5.3 on October 20, 2012. Several aftershocks followed the main earthquake, including a M3.1 aftershock. This quake was preceded by two earthquakes located approximately 100 miles from Merced County, the 1982 New Idria earthquake (M5.4) and the 1983 Coalinga quake (M6.5). There was low level ground shaking and low local magnitude reported.

Based on the earthquake shaking potential mapped for the City of Los Banos, the proximity to the San Andreas Fault and the history of shaking but no surface rupture, the probability of damaging seismic ground shaking in the City of Los Banos is considered as likely. Other hazards associated with earthquake activity, such as lateral spreading, surface cracking, or differential setting, are considered unlikely to occur, although no studies have been conducted to determine the likelihood of these hazards.

2.3.2 Flood and Levee Failure

The primary types of flood events in Merced County that may impact the City of Los Banos are riverine and urban. Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area, upstream, or from winter snowmelt. Failed dams can create floods that are catastrophic to life and property as a result of the tremendous energy of the released water.

Most of Los Banos lies outside the 100-year floodplain designated by the Federal Emergency Management Agency (FEMA). Several smaller areas in the southeastern portion of the city limits fall short of being in the 100-year floodplain as well as some small areas to the north of the city limits. The City of Los Banos participates in the National Flood Program; however, the FEMA Flood Insurance Study (Number 06047CV000C) reports 'Merced County includes the Cities of Dos Palos and Los Banos, which do not contain any Special Flood Hazard Areas (SFHAs) and are non-flood prone.' The following page reflects the flood potential impact areas around the City of Los Banos, with the 100-Year and 200-Year floodplains illustrated in Figure 2-1 and Figure 2-2 respectively. Available history, data, and surveys by FEMA, indicates the City of Los Banos is not in the floodplain and would rarely have the hazard potential for future flooding.

Figure 2-1 City of Los Banos 100-Year Floodplain

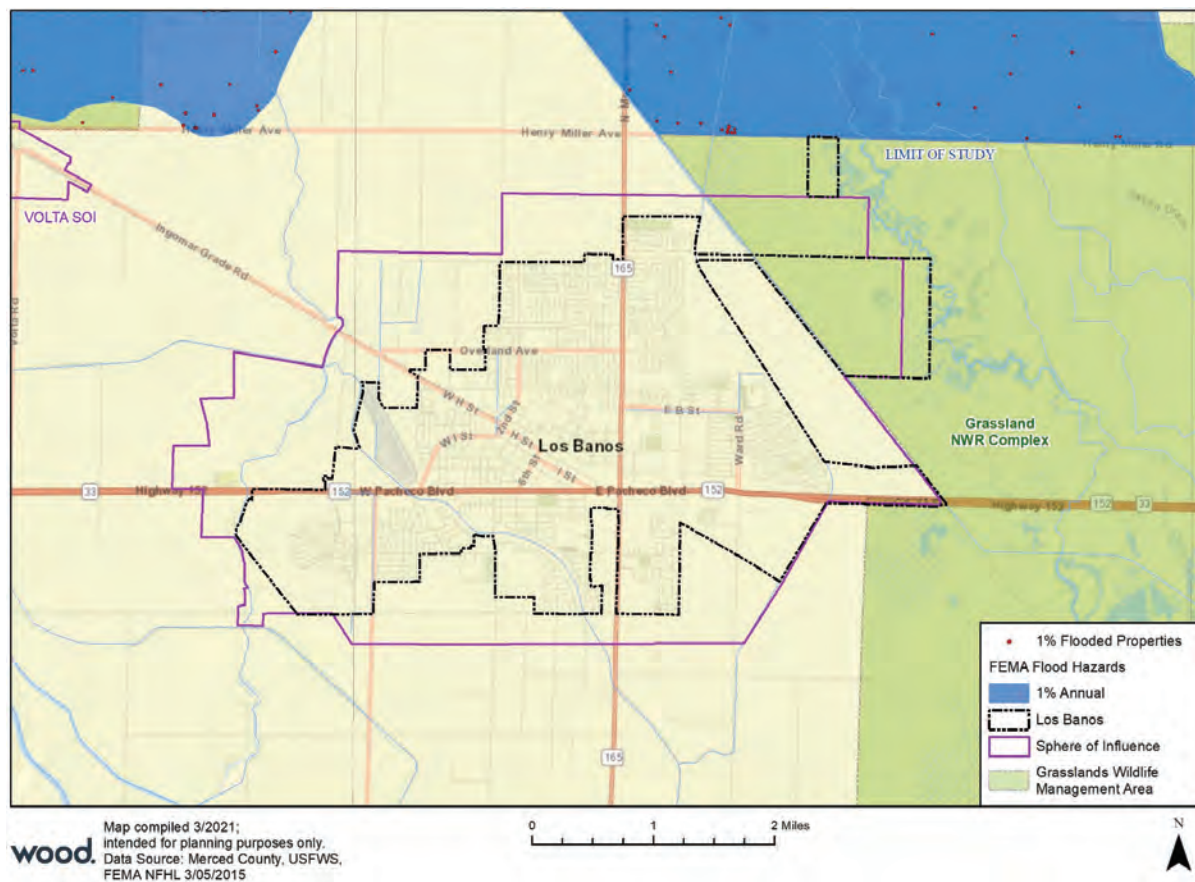
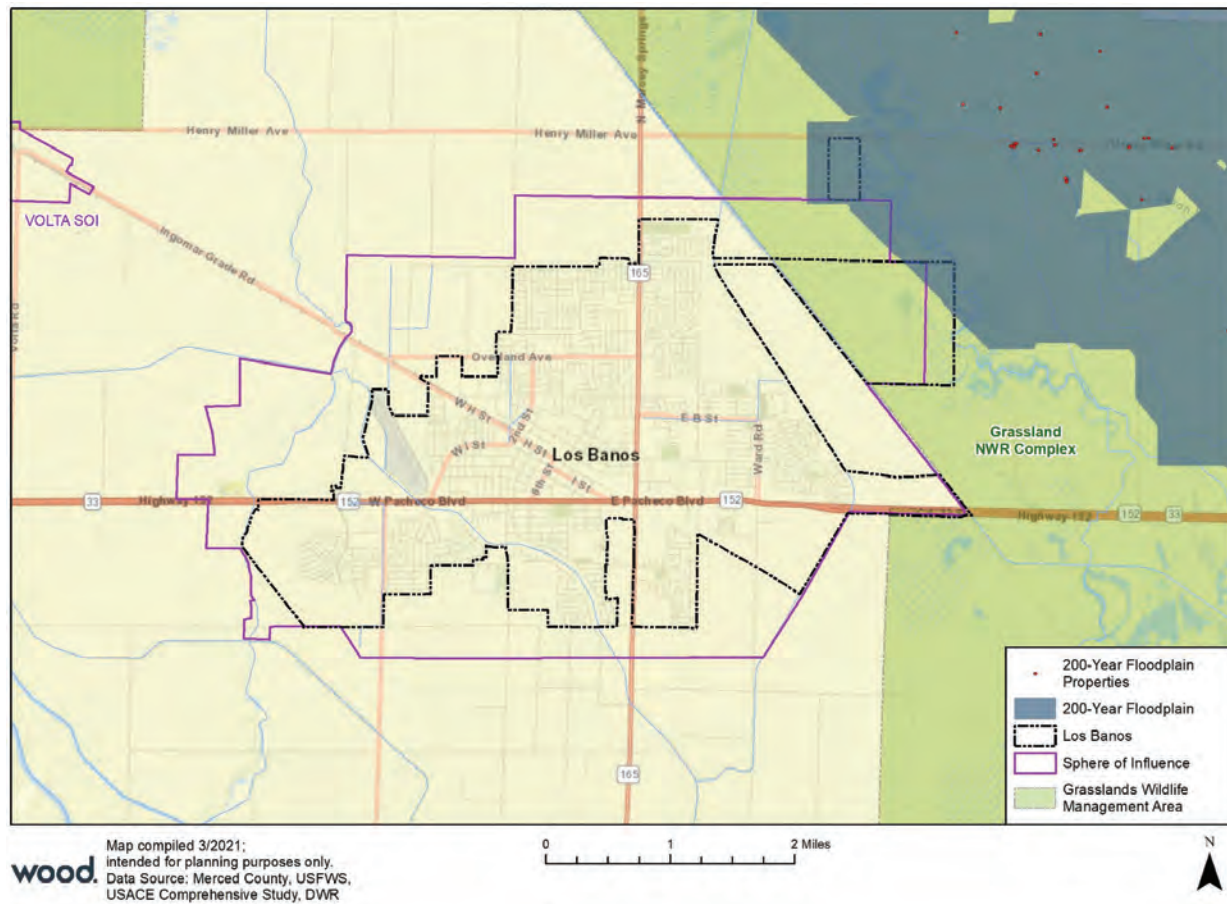


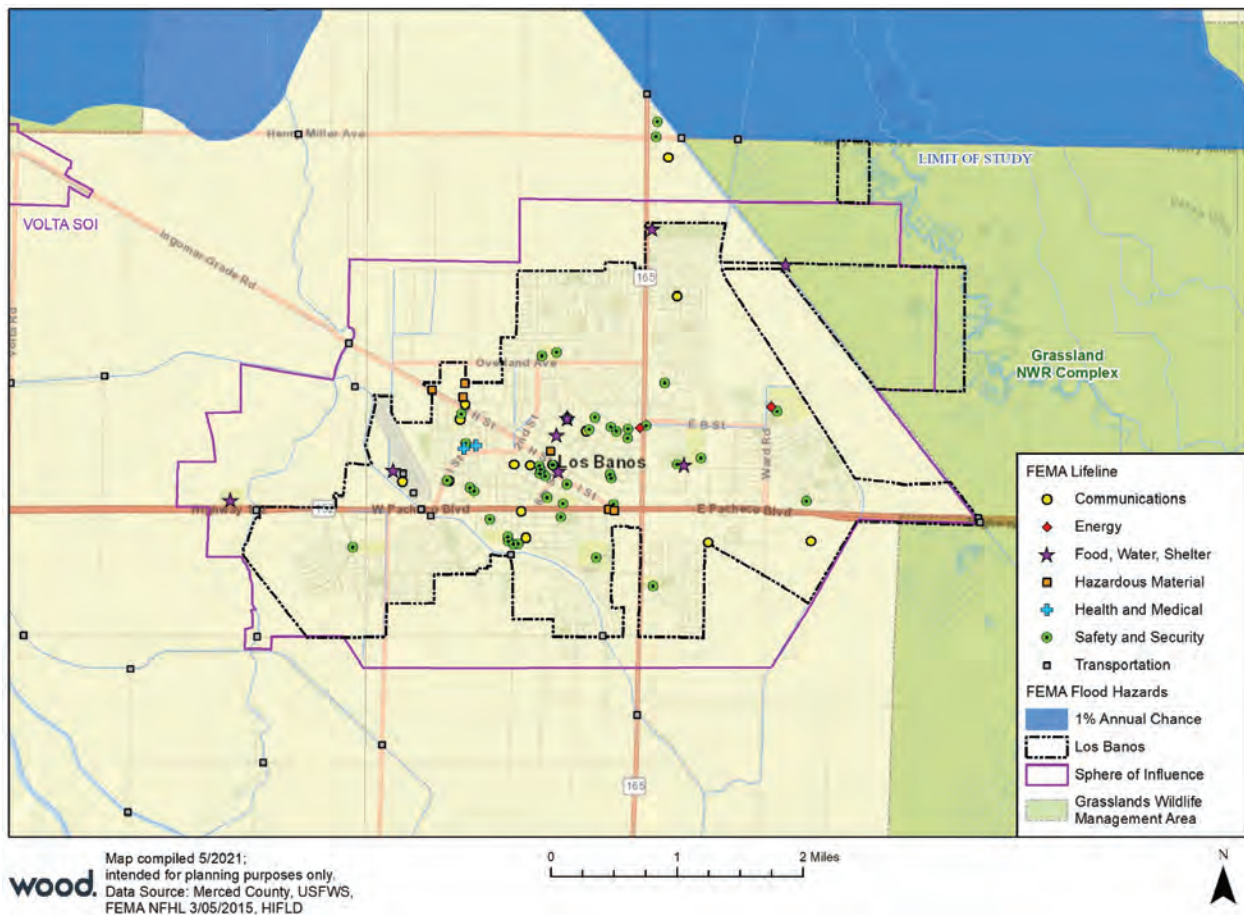
Figure 2-2 City of Los Banos 200-Year Flood USACE Comprehensive Study



Based on the analysis conducted, the City of Los Banos has no improved parcels located within the 100-year floodplain or 200-year floodplain. No parcels were found to be located within the 500-year floodplain.

Critical Facilities at Risk

Critical facilities are those community components that are most needed to withstand the impacts of disaster as previously described. There are no critical facilities located within the City of Los Banos which are also in the floodplain, although there are some within the general vicinity of Los Banos which are exposed to flood hazards as shown in Figure 2-3. The impact to the wider community could be great if these facilities are damaged or destroyed during a flood event.

Figure 2-3 Critical Facilities at Risk of 1% Annual Flood Hazard

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Los Banos joined the National Flood Insurance Program (NFIP) on February 3, 1998. NFIP Insurance data indicates that as of July 2021, there were 16 flood insurance policies in force in the City with \$5,180,000 of coverage. All of the policies are single family residential and located in the B, C, and X zone.

There has been no historical claims for flood losses in Los Banos. According to the FEMA Community Information System accessed July 23, 2021, the City has no Repetitive Loss properties or Severe Repetitive Loss properties.

2.3.3 Wildfires

Weather components, such as temperature, relative humidity, wind, and lightning, also affect the potential for wildfire. High temperatures and low relative humidity dry out the fuels that feed the wildfire creating a situation where fuel will more readily ignite and burn more intensely. Both urban and wildland fire conditions exist in Merced County and its cities which increases the chances for damage to property, loss of life and/or injury. In most of Merced County, the California Department of Forestry and Fire Protection (Cal Fire) ranks fuel loading as low. Fuels are mainly crops and grasses. In the southwest corner, there are some brush, pine, and grass fuels, which are ranked as moderate fuel hazards, primarily in the area west of Interstate 5.

There have not been any state or federal disaster declarations in the City of Los Banos or Merced County related to wildfire in the past. The LPT noted that although there are many fire starts, the fuels are “flashy” and fires are usually quickly put out. Table 2-4 below summarizes the counts, values, and property types of improved parcels exposed to various wildfire hazards, as well as an estimated exposed population. Figure 2-5 shows the wildfire threat areas in Los Banos.

Table 2-4 Properties Exposed to Wildfire Threat Areas

Property Type	Improved Parcel Count	Building Count Very High	Building Count High	Building Count Moderate	Building Count Low	Total Building Count	Improved Value	Estimated Content Value	Total Value	Population
Agricultural	2	0	0	1	2	3	\$110,505	\$110,505	\$221,010	
Commercial	11	0	0	1	16	17	\$28,779,969	\$28,779,969	\$57,559,938	
Exempt	13	0	0	3	10	13	\$699,902	\$699,902	\$1,399,804	
Mixed Use	1	0	0	0	1	1	\$19,283	\$19,283	\$38,566	4
Residential	1,138	0	2	193	947	1,142	\$298,688,139	\$149,344,070	\$448,032,209	4,111
Total	1,165	0	2	198	976	1,176	\$328,297,798	\$178,953,729	\$507,251,527	4,115

Source: CAL FIRE, Merced County Assessor, Wood GIS analysis

Figure 2-4 Wildfire Threat Areas in City of Los Banos

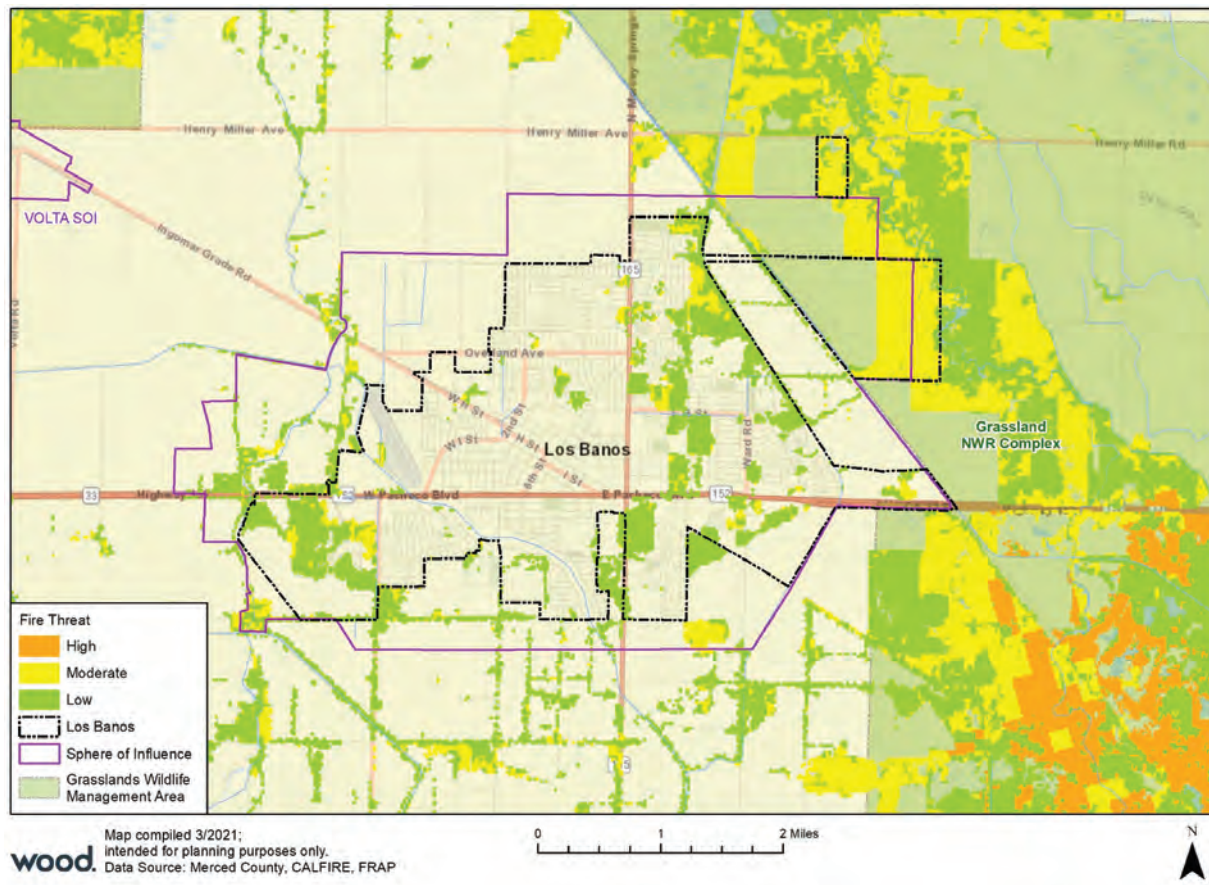


Table 2-5 shows the results of the critical facility analysis by fire threat area.

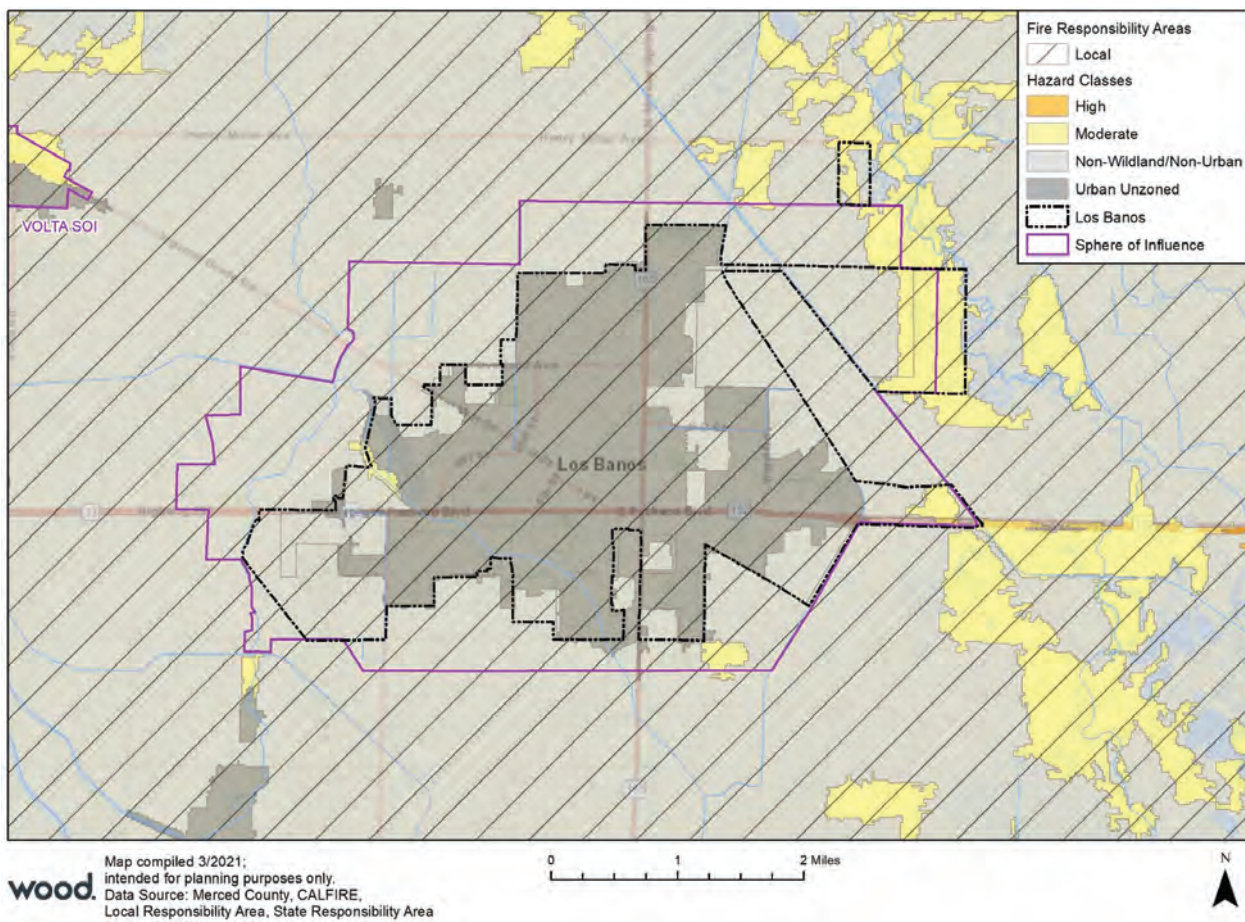
Table 2-5 Critical Facilities Exposed to Wildfire Threat Areas

FEMA Lifeline	Count
Low Wildfire Threat	
Food, Water, Shelter	1
Safety and Security	2
Total	3

Source: Merced County, HIFLD, CAL FIRE, FRAP, Wood GIS Analysis

Figure 2-6 shows the fire responsibility areas in the City of Los Banos. Based on the analysis there is 1 commercial building located with the moderate hazard area, with a total value of \$1,478,268. Two critical facilities, one categorized as a Transportation Lifeline and the other a Food, Water, and Shelter Lifeline, are located within the local responsibility moderate fire hazard area. Refer to Section 4 of the Base Plan for methodology and results of the countywide analysis.

Figure 2-5 City of Los Banos Fire Responsibility Areas



Future Development

The results of the SOI and wildfire analysis are shown Table 2-6 and Table 2-7.

Table 2-6 Sphere of Influence Areas Exposed Within Fire Severity Areas

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Population
SRA Moderate						
Residential	3	3	\$487,205	\$243,603	\$730,808	10
Total	3	3	\$487,205	\$243,603	\$730,808	10

Source: CAL FIRE, Merced County Assessor, Wood GIS analysis

Table 2-7 Sphere of Influence Areas Exposed Within Fire Threat Areas

Property Type	Improved Parcel Count	Building Count High	Building Count Moderate	Building Count Low	Total Building Count	Improved Value	Estimated Content Value	Total Value	Population
Agricultural	21	0	8	29	37	\$4,341,319	\$4,341,319	\$8,682,638	
Commercial	4	0	1	4	5	\$306,394	\$306,394	\$612,788	
Exempt	4	0	1	3	4	\$0	\$0	\$0	
Industrial	2	0	1	1	2	\$1,575,000	\$2,362,500	\$3,937,500	
Residential	34	1	8	37	46	\$4,092,501	\$2,046,251	\$6,138,752	153
Vacant Land	1	0	0	1	1	\$16,236	\$16,236	\$32,472	
Total	66	1	19	75	95	\$10,331,450	\$9,072,700	\$19,404,150	153

Source: CAL FIRE, Merced County Assessor, Wood GIS analysis

3 CAPABILITY ASSESSMENT

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation outreach and partnerships, and other mitigation efforts. To develop this capability assessment, the jurisdictional planning representatives reviewed a matrix of common mitigation activities to inventory which of these policies or programs and shared any updates or changes through the Los Banos Data Collection Guide. The team then supplemented this inventory by reviewing additional existing policies, regulations, plans, and programs to determine if they contribute to reducing hazard-related losses.

During the plan update process, this inventory was reviewed by the jurisdictional planning representatives and Wood consultant team staff to update information where applicable and note ways in which these capabilities have improved or expanded. Additionally, in summarizing current capabilities and identifying gaps, the jurisdictional planning representatives also considered their ability to expand or improve upon existing policies and programs as potential new mitigation strategies. The City of Los Banos' capabilities are summarized below.

3.1 Regulatory Capability

The regulatory and planning capabilities table lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities. The table below indicates those that are in place in the City of Los Banos.

Table 3-1 City of Los Banos – Regulatory and Planning Capabilities

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General Plan	Yes	Approved July 15, 2009, currently working on update to be completed by 2021
Zoning ordinance	Yes	Chapter 3 – Municipal Code
Subdivision ordinance	Yes	Chapter 2 – Municipal Code
Growth management ordinance		
Floodplain ordinance	Yes	Title 9, Section 4 – Municipal Code
Other special purpose ordinance (stormwater, steep slope, wildfire)	Yes	Storm Water Pollution Plan
Building code	Yes	The 2019 California Code of Regulations, Title 24 Part 1 (California Administrative Code)
Fire department ISO rating	Yes	Rating 3
Erosion or sediment control program	Yes	Landscape Improvement Standards
Stormwater management program	Yes	MS4 Permit
Site plan review requirements	Yes	Title 9, Section 4 – Municipal Code
Capital improvements plan	Yes	2022-2026
Economic development plan	Yes	Economic Development Strategic Plan, December 2012

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
Local emergency operations plan	Yes	2015
Other special plans	Yes	Storm Water Pollution Plan
Flood insurance study or other engineering study for streams	N/A	
Elevation certificates (for floodplain development)	N/A	
Other		

City of Los Banos General Plan, 2009 – The City of Los Banos approved its General Plan revision in July 2009, with an anticipated horizon year of 2030. This General Plan defines the City’s goals, objectives and policies that guide the physical growth, use and development of land under the jurisdictional authority of the City.

The purpose of the Public Health and Safety Element is to reduce or eliminate long term risk to people and property from natural or human caused hazards. This element focuses on establishing policies and programs to protect the community from risks associated with seismic, geologic, flood, and fire hazards. The Public Health and Safety Element is now expanded to include community health and community safety related issues that are more commonly associated with the built environment as affecting the health and safety of residents living within the City. As noted above, the city is currently in the process of updating the General Plan through the year 2040.

The City of Los Banos Public Health and Safety Element does not reference incorporation of the 2014 MJHMP. Also, integration of the 2014 MJHMP was not noted in any of the other City planning mechanisms. However, the City can now incorporate the 2021 Merced County MJHMP by reference as part of their General Plan update process.

City of Los Banos Emergency Plan, 2015 – The Emergency Plan addresses the planned response to emergency situations associated with natural disasters, technological incidents, human caused events and national security emergencies in or affecting the City of Los Banos. The plan establishes the emergency management organization required to mitigate any significant emergency or disaster affecting the City; identifies the policies, responsibilities, and procedures required to protect the health and safety of communities, public and private property, and the environmental effects of natural, human caused and technological emergencies and disasters; and establishes the operational concepts and policies for disaster response and recovery.

City Fire Management Plan – The City of Los Banos Fire Department is a full-service department providing fire protection, fire suppression, inspections, public education, fire responders for medical aids, and all types of technical rescue operations. The department operates four (4) front line engines, one reserve engine, one OES engine, one ladder truck, two rescue units, water tender, and other service vehicles. The goals of the Los Banos Fire Department and Volunteer Fire Department are:

- To continue to provide cost effective fire protection and emergency services to the citizens of Los Banos;
- To improve operational efficiency and accountability, to continue moving in a positive direction providing the best possible service to the community;
- To continue to foster the Volunteer Fire Department providing training, comradery and pride in their department; and
- To support the goals, objectives and mission of the City of Los Banos.

The primary mission of the Los Banos Fire Department and Volunteer Fire Department is to protect life and property for the citizens of the City of Los Banos from the effect of fires, medical emergencies, vehicle accidents, exposure to hazardous materials, earthquakes, floods, disasters and dangerous conditions. The life safety and property protection mission is accomplished through a wide range of programs which include fire protection, fire prevention, planning, fire prevention education, fire inspections, code enforcement, fire suppression, and training. The Los Banos Fire Department also provides mutual aid for fire/rescue and EMS services to other local agencies in Merced County, and participates in the statewide Master Mutual Aid plan.

Emergency Services Ordinance, Title 4, Chapter 2 – The declared purposes of this chapter are to provide for the preparation and carrying out of plans for the protection of persons and property within the City in the event of an emergency; the direction of the emergency organization; and the coordination of the emergency functions of the City with all other public agencies, corporations, organizations and affected private persons. The council's powers include the development of emergency and mutual aid plans and agreements and the ordinances and resolutions as necessary to implement the Multi-Hazard Functional Plan and any other such plans and agreements.

California Fire Code – Title 4, Chapter 3 – For the purpose of prescribing regulations governing conditions hazardous to life and property from fire, hazardous materials or explosion, that certain Code known as the 2013 California Fire Code (Part 9 of Title 24 of the California Code of Regulations), as published by the International Code Council, together with all appendices and subsequent additions and editions thereto, one copy of which is on file in the office of the City Clerk for public record and inspection, is hereby adopted by reference and made a part of this chapter as though set forth in this chapter in full, subject, however, to the amendments, additions, and deletions set forth in this chapter, and said Code shall be known as the Fire Prevention Code of the City of Los Banos. (§ 1, Ord. 1066, eff. February 1, 2008, as amended by § 1, Ord. 1099, eff. August 20, 2011, and § 1, Ord. 1117, eff. March 19, 2014)

Floodplain Management Ordinance Chapter 9-Sec.4-9.12 – It is the purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- Protect human life and health;
- Minimize expenditure of public money for costly flood control projects;
- Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- Minimize prolonged business interruptions;
- Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in areas of special flood hazard;
- Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future blighted areas caused by flood damage;
- Ensure that potential buyers are notified that property is in an area of special flood hazard; and,
- Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

3.2 Administrative and Technical Capability

The table below identifies city personnel with responsibilities for activities related to mitigation and loss prevention in the City of Los Banos. Many positions are full time and/or filled by the same person. A summary of technical resources follows.

Table 3-2 City of Los Banos – Personnel Capabilities

Personnel Resources	Yes/No	Department/Position	Comments
Planner/engineer with knowledge of land development/land management practices	Yes	Planning and Economic Development Director	
Engineer/professional trained in construction practices related to buildings and/or infrastructure	Yes	City Building Department Building Official	
Planner/engineer/scientist with an understanding of natural hazards	Yes	City Engineer, Public Works	
Personnel skilled in GIS	Yes	Planning and Economic Director	
Full time building official	Yes	Building Department	
Floodplain manager	Yes	Public Works Department – Public Works Director	
Emergency manager	Yes	City Administrator; City Fire Chief	
Grant writer	Yes	Administration	
Other personnel	Yes	Many other agencies and departments within the City support personnel capabilities to carry out hazard mitigation activities	
GIS Data Resources			
(Hazard areas, critical facilities, land use, building footprints, etc.)			
Other			

The City of Los Banos operates under a City Council/City Manager form of government. The City Council (4 members) makes laws and sets policies which are enforced and implemented by the City Manager, with the assistance of subordinate officers, department heads, and the City Clerk, City Treasurer and City Attorney. Municipal elections are held every two years in November of even-numbered years with City Council terms overlapping. The Mayor and two Council Members are elected at one election, and the other two Council Members, City Clerk and City Treasurer are elected at the next election. The City of Los Banos provides water, sewer, and storm drainage, as well as police, fire, and general government services.

The City of Los Banos has one school district which serves the students of the City and surrounding area. The Los Banos Unified School District has eight elementary schools (K-6), five charter schools, three parochial schools, one junior high school, a continuation high school, an adult school, two high school campuses, and a media center. Los Banos has a Community College, and is minutes away from UC Merced.

3.3 Fiscal Capability

The following table identifies financial tools or resources that the City could potentially use to help fund mitigation activities. There are currently no specific funding sources for hazard mitigation.

Table 3-3 City of Los Banos – Available Financial Tools and Resources

Financial Resources	Accessible/ Eligible to Use	Has This Been Used for Mitigation in the Past?	Comments
Community Development Block Grants	Yes		
Capital improvements project funding	Yes		
Authority to levy taxes for specific purposes	Yes		Must be approved by voters
Fees for water, sewer, gas, or electric services, new development	Yes		Services provided through cities districts and levied through property assessments adopted development impact fees for Fire / Police / water / waste water.
Incur debt through general obligation bonds	Yes		
Incur debt through special tax bonds	Yes		Requires approval through two-thirds voters
Incur debt through private activities	Yes		Do not have any in place
Federal Grant Programs (Hazard Mitigation Grant Program)	Yes		Various Departments

3.4 Outreach and Partnerships

The Merced County Office of Emergency Services provides education and outreach on Disaster Preparedness for all of the jurisdictions within the County. This education program is in coordination and partnerships with county and the cities' departments with education programs including the Sheriff's Office, Police Departments, Fire Departments, Agricultural Commissioner, and the Department of Public Health.

During the 2021 planning process the following outreach efforts were identified:

- Ongoing newsletter
- Fire Prevention School Programs
- Presence and use of social media

Education and outreach efforts, as well as emergency response planning, will need to address the needs of low-income residents and the large Spanish-speaking population. In past emergencies, volunteers have organized spontaneously to help those with mobility issues.

3.4.1 Planning Commission

The Planning Commission performs the duties described in the present or any future zoning ordinances and subdivision regulations of the City's Municipal Code. This includes any similar ordinance, statute, rule or regulation of the State, County or this City pertaining to the districting, zoning or dividing the city into districts or zones and regulating the construction of improvements, the use, division or minor subdivision of property within the City. The City Council provides the Planning Commission with its directions and

assigns tasks. The Planning Commission is charged with the responsibility of studying the needs of the City in which they advise and recommend to the City Council concerning the establishment, modifications and change of zones or districts, and designations of the uses to which property contained therein may be prohibited, restricted, and regulated and other duties as may be delegated by the City Council.

3.4.2 The Economic Development Advisory Committee

The Los Banos Economic Development Advisory Commission (EDAC) was formed to assist the City of Los Banos in an advisory capacity. Cities throughout the State of California have Economic Development Advisory Commissions that meet monthly and provide ideas and support for economic projects within each jurisdiction's redevelopment area.

3.4.3 Traffic Safety Committee

The City of Los Banos has established a Traffic Safety Committee as outlined in Los Banos Municipal Code Section 4-5.05. It was established in 1992. Members include representatives from the Public Works Department, Community & Economic Development Department, Police Department, Fire Department, and Planning Commission. This Committee has the duty of initiating or reviewing all proposals or requests for establishment, modification, elimination, or removal of all traffic control signs, signals, markings, speed zones, prohibited or restricted parking zones, or other such related matters, which fall under the lawful discretionary control of the City.

3.5 Other Mitigation Efforts

In addition to the project identified in the City's Mitigation Action plan, the City of Los Banos' Fire Department conducts annual fire and life safety inspections for all businesses and SB 1205 occupancies (Apartments, Hotels, Assemblies and Schools). The Los Banos Fire Department also provides mutual aid for fire/rescue and EMS services to other local agencies in Merced County and participates in the statewide Master Mutual Aid plan.

3.6 Opportunities for Enhancement

Based on the capabilities assessment, the City of Los Banos has several existing mechanisms in place that already help to mitigate hazards. There are also opportunities for the city to expand or improve on their policies, programs and fiscal capabilities and further protect the community. Future improvements may include providing training for staff members related to hazards or hazard mitigation grant funding in partnership with the County and Cal OES. Additional training opportunities will help to inform City staff members on how best to integrate hazard information and mitigation projects into their departments. Continuing to train City staff on mitigation and the hazards that pose a risk to the City of Los Banos will lead to more informed staff members who can better communicate this information to the public. The City is also enhancing their residential inspection program that identifies unreinforced masonry (URM) buildings in the downtown area. These annual inspections help the City identify and mitigate seismic risk associated with this construction method of construction.

4 MITIGATION STRATEGY

4.1 Goals and Objectives

The City of Los Banos adopts the hazard mitigation goals and objectives developed by the Planning Team and described in Section 5 Mitigation Strategy of the Basin Plan.

4.2 Continued Compliance with the National Flood Insurance Program

The city has been an NFIP participating community since 1998. In addition to the mitigation actions identified herein the City will continue to comply with the NFIP. Floodplain management is under the purview of the Director of the Public Works Department. This includes ongoing activities such as enforcing local floodplain development regulations, including issuing permits for appropriate development in Special Flood Hazard Areas and ensuring that this development mitigated in accordance with the regulations. This will also include periodic reviews of the floodplain ordinance to ensure that it is clear and up to date and reflects new or revised flood hazard mapping.

4.3 Progress on 2014 Actions

During the 2021 planning process the City of Los Banos Planning Team reviewed all the mitigation actions from the 2014 plan. Of their ten (10) mitigation actions from 2014, eight (8) of the actions are continuing and are implemented annually, demonstrating ongoing progress and building the community's resiliency to disasters. Two (2) actions were deleted that were more county-focused. Seven (7) new actions were added in 2021.

4.4 Mitigation Actions

The Planning Team for the City identified and prioritized the following mitigation actions based on risk assessments, goals, and objectives. Background information as well as information on how the action will be implemented and administered, such as ideas for implementation, responsible office, partners, potential funding, estimated cost, and timeline also are described.

Table 4-1 City of Los Banos Mitigation Action Plan

ID	Goal(s)	Hazard(s) Mitigated	Description/Background/Benefits	Lead Agency and Partners	Cost Estimate	Potential Funding	Priority	Timeline	Status/Implementation Notes
1	1,2,3	Multi-Hazard: Earthquake, Flood and Levee Failure, Severe Weather, Wildfire	Participate in Countywide Public Education Program. A natural hazards education and awareness program in Merced County would be a valuable tool for sharing information with residents. Implementation ideas include sharing information online and conducting workshops. The county will partner with special districts, the cities and other entities to provide awareness and education on hazards and steps to mitigate.	OES / CEO's Office	\$100,000	Federal Grants	High	Annually	Continue — in progress
2	1,2,3	Multi-Hazard: Earthquake, Flood and Levee Failure, Severe Weather, Wildfire	Integrate Local Hazard Mitigation Plan into Safety Element of General Plan. Recognizing the potential duplication of effort over evaluation of the same issues, efforts to update the Health and Safety Element will be conducted in coordination with the multi-hazard mitigation plan and to also ensure AB2140 Compliance. Integration and coordination of both plans provides General Plan policy direction for development activity. Potential loss reductions in the \$1000s as any new development within the county will be considered within the context of the county's Health and Safety Element.	Community Development Agency	\$5,000	General Fund	Medium	1 to 3 years	Continue — in progress
3	1,2,3	Earthquake	Non-structural Earthquake Mitigation Outreach. Existing	Public Works	\$100,000	Federal Grants	Medium	1 to 3 years	Continue — in progress

ID	Goal(s)	Hazard(s) Mitigated	Description/Background/Benefits	Lead Agency and Partners	Cost Estimate	Potential Funding	Priority	Timeline	Status/Implementation Notes
			structures can be retrofitted to better withstand damage from seismic events. Outreach will include educating home and business owners about structural and non-structural retrofit techniques and how to seismically strengthen their homes and businesses. Specific techniques include secure furnishings, storage cabinets and utilities to prevent injuries and damages, such as anchoring, installing lathes, using flexible connections on gas and water lines, and bracing propane tanks and water heaters.						
4	1,3	Earthquake	Participate in countywide Inventory for Unreinforced Masonry Buildings - Use GIS a to map and track URM's Countywide. An accurate inventory of URM Buildings with appropriate tracking will lessen time during the recovery after an EQ.	Public Works	\$15,000 – 20,000	Federal Grants	Medium	1 year	Continue – in progress
5	1,3	Multi-Hazard: Earthquake, Flood and Levee Failure, Severe Weather, Wildfire	Periodically review building codes for updates and enhancements and ensure necessary capabilities for enforcement.	Building Department	Staff time	Dept. Budget	Medium	1 year with all CBC updates	Continue – in progress
6	1,2,3	Severe Weather	Participate in Severe Weather Preparedness Campaign. This project would add to and enhance the existing, campaigns that share information on Severe Weather	Fire Department	\$100,000	Federal Grants	High	Annually	Continue – in progress

ID	Goal(s)	Hazard(s) Mitigated	Description/Background/Benefits	Lead Agency and Partners	Cost Estimate	Potential Funding	Priority	Timeline	Status/Implementation Notes
			Hazards: Fog, Freeze, Location of Warming Centers, Heat Related Illness, All Hazards Preparedness information, etc.; The county will work with special districts, the cities and other entities.						
7	1,2,3	Drought	Promote Water Conservation Program. Drought is a serious issue that is faced in California. Water awareness of all citizens within the County is critical to the future of our water supply. Reminders, education and awareness will help keep the conservation importance in the forefront.	Public Works	\$100,000	Federal Grants	High	Annually	Continue – in progress
8	1, 2	Wildfire	Implement and Monitor Weed Abatement Program to Reduce Wildfire Fuels	Fire Department	\$15,000	General Fund	High	Annually	New in 2021
9	3	Flood and Levee Failure, Earthquake, Wildfire	Prepare Emergency Plan for Critical Infrastructure	Public Works	\$25,000	General Fund	High	3 to 5 years	New in 2021
10	3	Earthquake	Perform Building-Specific Seismic Vulnerability Assessment of City Owned Critical Facilities	Building Department/ Public Works/ Economic Development	\$50,000	General Fund	High	3 to 5 years	New in 2021
11	2, 3	Flood	Continue to Update Storm Water System Master Plan to Identify Potential Flood Mitigation Projects	Public Works	\$100,000	Federal Funds	Medium	3 to 5 years	New in 2021
12	1	Flood, Earthquake, Wildfire	Prepare a Shelter, and Emergency Provision Plan to Ensure Adequate Space and Supplies	Fire Department	\$100,000	Federal Funds	Medium	3 to 5 years	New in 2021

ID	Goal(s)	Hazard(s) Mitigated	Description/Background/Benefits	Lead Agency and Partners	Cost Estimate	Potential Funding	Priority	Timeline	Status/Implementation Notes
13	1	Severe Weather	Prepare Weather Preparedness Program (Extreme Heat and Cold)	Fire Department	\$25,000	General Fund	Medium	1 year	New in 2021
14	3	Drought	Promote Water Conservation Program with continued updates to Urban Water Management Plan	Public Works	\$50,000	General Fund	High	3 to 5 years	New in 2021
15	1, 2	Earthquake Flood and Levee Failure, Wildfire	Rental Home Inspections to ensure fire and life safety.	Fire Department/ Community Economic Development	\$100,000	General Fund	High	3 to 5 years	New in 2021

5 IMPLEMENTATION AND MAINTENANCE

Moving forward, the city will use the mitigation action table in the previous section to track progress on implementation of each project. Implementation of the plan overall is discussed in Section 6 in the Base Plan.

5.1 Incorporation into Existing Planning Mechanisms

The information contained within this plan, including results from the Vulnerability Assessment, and the Mitigation Strategy will be used by the City to help inform updates and the development of local plans, programs and policies. The Engineering Division may utilize the hazard information when implementing the City's Community Investment Program and the Planning and Economic Department s may utilize the hazard information when reviewing a site plan or other type of development applications. The City's Public Works Department would integrate key flood and stormwater projects outlined in the MJHMP in the most recent Capital Improvement Program. The City is also currently undergoing a General Plan update; during this planning process they City's Planning and Economic Development Department will incorporate the 2021 MJHMP into the Safety Element of their General Plan, as recommended by Assembly Bill (AB) 2140.

As noted in Section 6 of the Base Plan, the HMPT representatives from Los Banos will report on efforts to integrate the hazard mitigation plan into local plans, programs and policies and will report on these efforts at the annual HMPT plan review meeting.

5.2 Monitoring, Evaluation and Updating the Plan

The City will follow the procedures to monitor, review, and update this plan in accordance with Merced County as outlined in Section 6 of the Base Plan. The city will continue to involve the public in mitigation, as described in Section 6.2.1 of the Base Plan. The Los Banos Fire Department, Fire Chief will be responsible for representing the city in the County HMPT, and for coordination with City staff and departments during plan updates. The City realizes it is important to review the plan regularly and update it every five years in accordance with the Disaster Mitigation Act Requirements as well as other State of California requirements.



1 CITY OF MERCED

1.1 Community Profile

1.1.1 Mitigation Planning History and 2021 Process

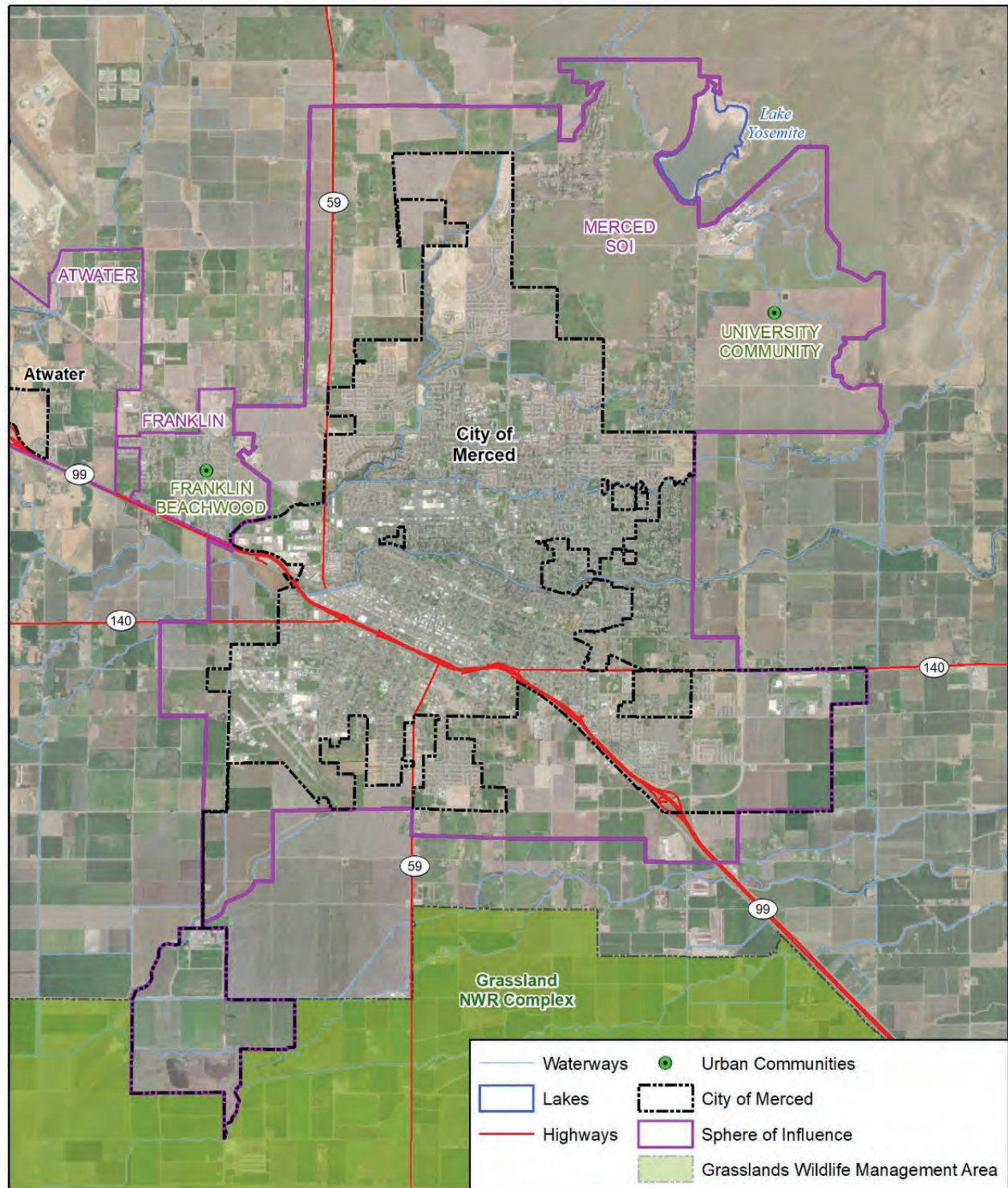
This annex was created during the development of the 2021 Merced County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update. This Jurisdictional Annex builds upon the City of Merced's Local Hazard Mitigation Plan (LHMP), which was prepared as a stand-alone plan in 2015, separate from the 2014 Merced County MJHMP. A review of jurisdictional priorities found no significant changes in priorities since the previous plan.

The City's Local Planning Team (LPT) held the responsibility for implementation and maintenance of the plan. Members are listed in Appendix A. More details on the planning process follow and how the jurisdictions and stakeholders participated can be found in Section 3 Planning Process of the Base Plan, along with how the public was involved during the 2021 update.

1.1.2 Geography and Climate

The City of Merced is located in Merced County and in the heart of San Joaquin Valley approximately 100 miles south of Sacramento and 55 miles north of Fresno and Bakersfield. Merced is the county seat and also one of the larger cities in the County of Merced and is known as the "Gateway to Yosemite" because the City has served as a stopping place for visitors on their way to Yosemite National Park, which is approximately two hours away or approximately 80 miles to the east. The City is located in the eastern portion of the County at the intersection of Highway 99 and State Highway 140. According to the United States Census Bureau, Merced has a total area of 25 square miles – almost all of which consists of land with an elevation of 171 feet above sea level. The City is home to the University of California, Merced (UC-Merced) with educational opportunities, commercial centers and agribusiness, a revitalized downtown with annual events and a live-stage theater, and a community and diversified industry with a history of food, farming and manufacturing.

The northern part of the City is characterized by rolling terrain and the southern part is relatively flat. The northern, western, and eastern portions of the City contain creeks and canals, including Bear Creek, Black Rascal Creek, Fahrens Creek, and Cottonwood Creek. Lake Yosemite and UC-Merced are located approximately two miles to the north and east of downtown. Climate in the City of Merced cycles through a cool rainy winter season and a dry summer season. Summers are hot and dry, and winters are cool and wet, with most of the year's rain falling from late October through early April.

Figure 1-1 City of Merced Planning Area Map

Map compiled 9/2021;
intended for planning purposes only.
Data Source: Merced County, USFWS

0 1 2 Miles



Source: City of Merced 2012 (Amended 2015)

1.1.3 History

The City of Merced's history dates back to the 1870's when the City developed along the banks of Bear Creek and growth was driven by the Central Pacific Railroad. In 1871, Charles H. Huffman was locating town sites along the new railroad, and like other San Joaquin Valley communities, the major railroad transportation corridor helped lay out the City's grid along the alignment of the new railroad line. As a result, the older parts of Merced between Bear Creek and the Central Pacific Railroad line are along a southeast/northwest trending angle (City of Merced 2015).

The City initially grew in 1872 with the sale of lots and within a few months several buildings were constructed with the El Capitan Hotels serving as the primary entry point into the City. The City served as an entry point to the gold mining industry until Yosemite Valley became recognized and Merced became recognized as an important gateway to the national park. Around this same time the Merced County seat of government was relocated from Snelling to Merced and a new county courthouse was developed in the downtown.

The City of Merced's commercial and industrial districts were established by 1875 with hotels, stables, small stores, warehouses, and industrial buildings behind the railroad tracks. Merced also had three distinctive residential districts within a few years, a street light system, and a water system, and in 1889 the City incorporated and by 1890 the City reached a population of 2,009 (City of Merced 2015).

Transportation continued to have a major impact on the City of Merced when the San Francisco and San Joaquin Valley Railroad established a right-of-way through the City. After the turn of the century, growth and development slowed and residential development was limited to large 10 to 20 acre lots with large homes to the east of the City. The Yosemite Valley Railroad was constructed between 1905 and 1907 and located off the end of Main Street in the present day Westgate Shopping Center, which brought new jobs to the City, a demand for goods and services, and a surge of commercial and residential development that took place prior to World War I. Around the 1920's Merced's residential districts expanded to the west near the Yosemite Valley railroad tracks and by the 1930's the population increased to 7,066. The opening of the Yosemite Highway (Highway 140) in 1926, the City further expanded with the increase in vehicle traffic and automotive-related businesses.

Merced continued to grow through the 1940s with the nearby airports and Merced Air Field (Castle Air Force Base). After World War II, the City expanded again and began developing their first zoning ordinance and redevelopment projects. By 1960, the City grew to 20,000 people and the Merced Junior College was established, the Merced Mall opened, and new single-family residential expanded. Soon after, the City adopted their first general plan in 1968, which foresaw the need for the University of California campus in the Valley. The 1960's also brought the construction of Highway 99, which divided downtown Merced into three distinct subareas: north Merced, central Merced, and south Merced, south of Highway 99. The City's population reached 37,000 by 1980 and an urban growth boundary was established that directed growth to the north and south to avoid prime agricultural lands and areas subject to high flood levels to the City's east and west.

Again, the City grew through the 1980s and 1990s with residential construction and the population reached 55,608 (City of Merced 2015). It was not until the recession in 1990 that slowed the growth of the preceding decade. Around the same time, the City completed growth studies and directed growth to occur primarily north of northeast around Lake Yosemite. In 1995, the Lake Yosemite area was selected as the site for the present day UC-Merced campus and approximately 10 years later the campus opened in 2005. The City grew again after the second economic recession and by 2010 annexed another 3,800 acres of new residential, commercial, and industrial land, opened another hospital, and grew to a population of approximately 80,865.

The City of Merced had steady economic growth in the following decade following the 2008 Recession, but in the initial years the City's downtown suffered as it lost retail and real estate value. This was a result of both the recession and the closure of the Castle Air Force Base in 1995 (Collins 2020). The City recovered with continuing development and primarily from the expansion of the UC-Merced campus – the fastest growing public research university in the Country. The expansion of the university and the redevelopment in the City was largely accomplished through a public-private redevelopment effort to double the UC-Merced campus by 2020 (known as Merced 2020).

The expansion of the UC-Merced campus resulted in a positive impact on the City, and this is visible with the development of a Downtown Center across from the City Hall that has moved hundreds of jobs into the City. The City has also focused on revitalization of the downtown through key redevelopment projects at historic downtown landmarks: the Tioga Apartments, the Manzier Theatre, and the EL Capitan Hotel (Klein 2018). According to the City, the building industry did not slow down during the ongoing (2020-2021) pandemic but continued to complete development projects through 2020 and into 2021. There were 1,974,217 square feet of construction added in 2020, and 600,000 square feet more than 2019 (City of Merced 2021). The total number of building permits was 3,727, and in 2020, the City processed the most single-family dwelling permits (723) and multi-family building permits (20) completed in the last decade. There were also 389 multi-family units added last year (City of Merced 2021). This growth has resulted in jobs, additional income, and new housing and businesses in the City.

1.1.4 Economy

The City of Merced's vision is to increase employment opportunities for its citizens, promote a diverse and balanced economy, preserve the City's economic base, support high-quality industrial areas and research and development parks, and provide access to commercial services to create a distinguished downtown. Merced's growth and increase in industry and retail businesses has added substantial retail and office space, new industrial buildings, new business parks, the UC-Merced campus, and a new hospital. The economic recession impacted the City and around this time, unemployment rates rose and many businesses and industries left the City, and house prices at the end of 2009 fell to 1998 levels. While the economy has traditionally relied on agribusiness and the presence of Castle Air Force Base, over the past twenty years, the economy has diversified with the presence of UC-Merced and new educational and hospital jobs, printing services, warehousing, and packaging industries.

Estimates of select economic characteristics for the City of Merced are shown in Table 1-1.

Table 1-1 City of Merced Economic Characteristics, 2015-2019

Characteristic	City of Merced
Families below Poverty Level (%)	18.5%
All People below Poverty Level (%)	29.3%
Median Family Income	\$45,232
Median Household Income	\$45,232
Per Capita Income	\$20,488
Population in Labor Force	59.6%
Population Employed*	90.1%
Unemployment**	9.7%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

*Excludes armed forces. **Does not reflect unemployment numbers due to COVID-19 Pandemic

The most common industries within a five-mile radius of Merced are agribusiness, followed by educational services and health care. Other industries include printing, distribution, boat manufacturing, food processing, and packaging materials. Merced is the home of two major grocery distribution centers (i.e., SaveMart and McLane Pacific), Malibu Boats, Safeway food processing, and various printing companies. The City is also home to various non-manufacturing employers, including the County of Merced, Merced City School District, AT&T Call Center, Merced Union High School District, Merced College, UC-Merced, City of Merced, and numerous large retailers, such as Walmart, Costco, Home Depot, Lowes, Target, Sears, and JC Penney. The tables below show the labor force breakdown by occupations and industry based on estimates from the 2015-2019 five-year American Community Survey.

Table 1-2 City of Merced Employment by Industry, 2015-2019

Occupation	# Employed	% Employed
Educational services, and health care and social assistance	8,161	23%
Retail trade	4,103	12%
Manufacturing	2,972	8%
Agriculture, forestry, fishing and hunting, and mining	4,028	11.3%
Construction	2,145	6%
Arts, entertainment, and recreation, and accommodation and food services	5,171	15%
Transportation and warehousing, and utilities	1,558	4%
Finance and insurance, and real estate and rental and leasing	1,070	3%
Public administration	2,318	7%
Other services, except public administration	839	2%
Professional, scientific, and management, and administrative and waste management services	2,029	6%
Wholesale trade	775	2%
Information	355	1%
Total	35,524	100%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

*Excludes armed forces

Table 1-3 City of Merced Employment by Occupation, 2015-2019

Occupation	# Employed	% Employed
Management, business, science, and arts occupations	7,904	22%
Service occupations	7,690	22%
Sales and office occupations	8,698	25%
Natural resources, construction, and maintenance occupations	6,070	17%
Production, transportation, and material moving occupations	5,162	14%
Total	35,524	100%

Source: U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

*Excludes armed forces

1.1.5 Population

In May 2020, the State Department of Finance released preliminary population data for the state demographic report, the estimates did not include potential effects of the COVID-19 pandemic. According to the report the City of Merced has a population of 90,071 persons as of January 1, 2021, and gained

2,710 residents from the previous year, leaving the population slightly higher. Select demographic and social characteristics for the City of Merced from the 2015-2019 American Community Survey and the California Department of Finance, are shown in Table 1-4.

Table 1-4 City of Merced Demographic and Social Characteristics, 2015-2019

Characteristic	City of Atwater
Gender/Age	
Male	49.5%
Female	50.5%
Median age (years)	30.1
Under 5 years	6.9%
Under 18 years	27.9%
65 years and over	9.1%
Race/Ethnicity	
White	23%
Asian	14.4%
Black or African American	5.0%
American Indian/Alaska Native	1.4%
Hispanic or Latino (of any race)	57.8%
Native Hawaiian and Other Pacific Islander	0.0%
Some other race	0.0%
Two or more races	2.6%
Education*	
% High school graduate or higher	73.6%
% with Bachelor's Degree or Higher	14.6%
Social Vulnerability	
% with Disability	13.8%
% Language other than English spoken at home	53.0%
% Speak English less than "Very Well"	17.5%
% of households with a computer with internet use	93.2%
% of households with no vehicle available	6.9%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

* Population 25 years and over

The following table with information from the American Community Survey 5-year estimates (2015-2019) is related to housing occupancy in the City of Merced.

Table 1-5 City of Merced Housing Occupancy and Units, 2015-2019

Housing Characteristic	Estimate	Percentage
Housing Occupancy		
Total Housing Units	26,025	100%
Units Occupied	25,005	96.1%
Vacant	1,020	3.9%

Housing Characteristic	Estimate	Percentage
Housing Units		
1-unit detached	17,384	66.8%
1-unit attached	694	2.7%
2 units	807	3.1%
3 or 4 units	2,617	10.1%
5-9 units	1,876	7.2%
10-19 units	578	2.2%
20 or more units	1,448	5.6%
Mobile Home	621	2.4%
Boat, RV, van etc.	0	0%
Housing Tenure		
Owner Occupied	11,192	44.8%
Renter Occupied	13,813	55.2%

Source: CA Department of Finance U.S. Census Bureau American Community Survey 2015-2019 5-Year Estimates, www.census.gov/

1.1.6 Development Trends

Merced has long been recognized for its small-town feeling, surrounded by agricultural and open space land, parks and historic structures, tree-lined streets, and the creek side bikeways. In order to maintain a sustainable community, it must find a way to attract a variety of industries, local and region serving commercial development, and provide housing opportunities that will appeal to all demographic categories ranging from university students and faculty to retirees and young families. In order to achieve these objectives, the General Plan focuses on a number of basic themes that are reflected in goals and policies. Parts of the City of Merced have grown since the Merced Vision 2030 General Plan, which relied on various assumptions and anticipated future conditions within Merced's growth area, also known as the City's Specific Urban Development Plan (SUDP)/Sphere of Influence (SOI). The previous growth considerations focused on the expansion of the vicinity around Lake Yosemite along with a future University community, limiting growth in the unincorporated areas surrounding the City, and setting aside commercial areas to support future employment.

Following the adoption of the Merced Vision 2030 General Plan in 2012, a population projection was prepared by the Merced County Association of Governments (MCAG). MCAG projections cover the entire 20-year General Plan period. The projections for Merced, among other cities in Merced County were augmented by growth rates used in the Environmental Impact Report for the UC Merced 2020 Long Range Development Plan (LRDP) to account for the anticipated population increase generated by UC Merced, located at Lake Yosemite north of Merced. Based on MCAG's projections, the City of Merced was expected to grow to 103,000 by 2030. In comparison, the General Plan took into account the new UC-Merced campus and revised MCAG growth projections, which subsequently reduced the population projections for 2030 but added the projections for the City, UC-Merced campus, University Community, and the County to account for additional land that may be useful throughout the life of the plan and to accommodate up to 40 years of potential development. Under this scenario, the City of Merced was expected to grow to 137,400 by 2030 and 152,100 by 2035.

Table 1.6 below summarizes the population projections for the City of Merced, UC-Merced campus and University Community, and combination of the City and the UC-Merced development. It is important to note these projections are based on population forecasts completed in 2010 and may now be an

underestimate of potential growth projections for the City of Merced and UC-Merced/University community.

Table 1-6 City of Merced Population Projections, 2010-2035

Year	City of Merced	UC Merced/ University Community	Merced + UC Merced/Univ. Community	County of Merced	Percentage of County (Merced & UC)
2010	81,500	1,900	83,400	260,000	32.1%
2015	91,500	4,700	96,200	287,000	33.5%
2020	107,600	9,400	117,000	331,000	35.3%
2025	121,800	15,600	137,400	372,000	36.9%
2030	137,400	22,500	159,900	417,500	38.3%
2035	152,100	31,300	183,400	465,500	39.4%

Sources: City of Merced 2012; MCAG 2010

The General Plan plans for new jobs in commercial retail, commercial services, light industrial, manufacturing, public services, and other employment uses. It also plans for growth through buildout estimates or the expansion of the urban limit line (i.e., SUDP/SOI). According to the City's Draft EIR for the Merced Vision 2030 General Plan, approximately 33,463 acres of land will be available in the SUDP/SOI for proposed land uses. This includes 2,414 acres for agriculture, 9,947 acres for single-family residential, 1,027 acres for multi-family residential, 1,052 acres for office uses, 4,099 acres for industrial uses, 747 acres for business park use, 1,965 acres for commercial, 1,107 acres for open space, 1,740 acres for schools, and 1,014 acres for other lands. Build out estimates and designated land uses are not official growth projections and do not represent City policy and actual population, square footage, or number of dwelling units could be lower or higher than these estimates based on a number of factors. Build out may vary overall or within individual land use designations due to:

- The need to preserve the agricultural base, grazing lands, and other types of open space;
- Infrastructure availability, including the provision of transportation facilities, public services, and facilities;
- The need to limit development due to flood risk, fire risk, geologic and soils constraints, presence of habitat and biological resources, and presence of other important natural resources; and
- Other factors, as described in the General Plan, community plans, specific plans, and City codes and ordinances.

The major goals of the previous general plan update were to expand the SUDP/SOI to accommodate growth and the rural residential centers east of the City and the UC-Merced campus, preserve prime agricultural land around the City, continue the predominantly north-south growth pattern, plan for the area around UC-Merced, and locate higher densities along the transit corridors.

There are numerous recent development projects that have been approved or that are in progress in the City according to the City of Merced Tentative Subdivision Activity List (May 2021), including several road and infrastructure capital improvement projects, such as the R Street Crossings at Fahrens Creek, Mission Avenue Interchange, Parsons Avenue Reconstruction, Wastewater Treatment Plant upgrades, and the Fahrens Creek Bridge upgrade. The most recent tentative development projects approved include various subdivision activity projects within the City that range from 2 to 520-acre tentative subdivision projects for residential developments (e.g., Crossing at River Oaks, Moraga, Mission Ranch, Stoneridge South, etc.). These projects are proposed mostly along the north and south end of the City, with the two larger projects, the Crossing and River Oaks and Moraga located to the east of the City (City of Merced 2018). The projects that were approved and some of those that are now under construction since the 2015 LHMP include 20 to 44 acre subdivisions consisting of 100 to 240 lot developments. The most recent projects

underway as of 2020 are located along the north end of the City (i.e., Palisades, Mansionette Commercial Development) and the south end of the City (i.e., Mission Ranch Phase 2). The City is also considering one 70-acre annexation project, which involves an off-campus student housing and retail project associated with UC-Merced campus.

Any increases in development and population increases exposure to hazards including severe weather-related hazards and pandemics/epidemics, as well as earthquakes. Increases in growth also puts more demands on water resources and can increase vulnerability to drought.

The areas located in the Sphere of Influence (SOI) shown in Figure 1-1 are areas each City plans to grow into and potentially slated for future development. Understanding the potential hazard exposure in these area can help to mitigate the impacts of events before development occurs in those areas. During this plan update process parcel analysis was conducted using the SOI and overlaid with available hazard risk layers to determine where future development may be at risk of natural hazard events. The results of the analysis have been integrated into the applicable hazard sections: dam, flood and wildfire. Table 1-6 is the summary of the SOI total exposure for the City of Merced.

Table 1-6 Sphere of Influence Total Exposure Summary

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value
Agricultural	190	256	\$20,956,556	\$20,956,556	\$41,913,112
Commercial	64	97	\$16,870,315	\$16,870,315	\$33,740,630
Exempt	36	50	\$18,162,288	\$18,162,288	\$36,324,576
Industrial	32	62	\$22,790,175	\$34,185,263	\$56,975,438
Mixed Use	10	11	\$280,289	\$140,145	\$420,434
Residential	2,180	2,403	\$475,376,520	\$237,688,260	\$713,064,780
Vacant	16	17	\$66,594	\$66,594	\$133,188
Total	2,528	2,896	\$554,502,737	\$328,069,420	\$882,572,157

Source: Wood Analysis 2021

2 HAZARD IDENTIFICATION AND SUMMARY

The City of Merced Planning Team identified the hazards that affect the City and summarized their frequency of occurrence, spatial extent, potential magnitude, and significance specific to their community (see Table 2-1). There are no hazards that are unique to Merced. The overall hazard significance takes into account the geographic area, probability and magnitude as a way to identify priority hazards for mitigation purposes. This is discussed further in the Vulnerability Assessment Section.

Table 2-1 City of Merced —Hazard Profiles

Hazard	Geographic Area	Probability of Future Occurrence	Magnitude/Severity	Overall Significance
Dam Incidents	Extensive	Occasional	Catastrophic	High
Earthquake	Extensive	Occasional	Critical	Medium
Flood and Levee Failure	Significant	Likely	Critical	High

Severe Weather: Extreme Temperatures/Extreme Heat	Extensive	Highly Likely	Critical	Medium
Wildfire	Limited	Highly Likely	Negligible	Medium
Geographic Area Limited: Less than 10% of planning area Significant: 10-50% of planning area Extensive: 50-100% of planning area Probability of Future Occurrences Highly Likely: Near 100% chance of occurrence in next year or happens every year. Likely: Between 10 and 100% chance of occurrence in next year or has a recurrence interval of 10 years or less. Occasional: Between 1 and 10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years. Unlikely: Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.		Magnitude/Severity (Extent) Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid Significance Low: minimal potential impact Medium: moderate potential impact High: widespread potential impact		

2.1 Vulnerability Assessment

The intent of this section is to assess Merced's vulnerability that is separate from that of the planning area as a whole, which has already been assessed in Section 4 Hazard Identification and Risk Assessment in the Base Plan. This vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of medium or high significance that may vary from other parts of the planning area.

The information to support the hazard identification and risk assessment was based on a combination of the previous LHMP for the City and County and jurisdiction-specific information collected during the 2021 update. A LHMP Update Guide and associated worksheets was distributed to each participating municipality or special district to complete during update process in 2021. Information collected was analyzed and summarized in order to identify and rank all the hazards that could impact anywhere within the County, as well as to rank the hazards and identify the related vulnerabilities unique to each jurisdiction.

Each participating jurisdiction was in support of the main hazard summary identified in the Base Plan (see Table 4-2). However, the hazard summary rankings for each jurisdictional annex may vary due to specific hazard risk and vulnerabilities unique to that jurisdiction. The information in this annex helps differentiate the jurisdiction's risk and vulnerabilities from that of the overall County.

Note: The hazard "Significance" reflects overall ranking for each hazard and is based on the City of Merced's Planning Team member input from the Data Collection Guide and the risk assessment developed during the planning process (see Section 4 of the Base Plan), which included a more detailed qualitative and quantitative analysis with best available data.

The hazard summaries in Table 2-1 above reflect the hazards that could potentially affect City. The discussion of vulnerability for each of the following hazards is located in Section 2.3 Estimating Potential Losses. Based on this analysis, the priority hazards (Medium and High Significance) for the City of Merced are identified below.

- Dam Incidents
- Earthquake
- Flood and Levee Failure
- Severe Weather: Extreme Temperatures/Extreme, Heat
- Wildfire

Severe weather (extreme temperatures/extreme heat) is not addressed in this vulnerability assessment as the exposure is similar to the overall County exposure, and the potential for losses are difficult to quantify specific to the City of Merced.

Other Hazards

Hazards assigned a significance rating of Low and which do not differ significantly from the County ranking (e.g., Low vs. High) are not addressed further in this plan and are not assessed individually for specific vulnerabilities in this section. In the City of Merced, those hazards include: drought, hazardous material incidents, severe weather (dense fog, heavy rain, high wind/tornado), subsidence, cyber attacks, agricultural pests and disease, and pandemics. A brief discussion on hazardous material incidents is profiled because this human-caused hazard was addressed in the City's previous LHMP.

Additionally, the City's committee members decided to rate landslides as Not Applicable (N/A) to the planning area due to a lack of exposure, vulnerability, and no probability of occurrence.

2.2 Assets at Risk

This section considers Merced's assets at risk, including values at risk, critical facilities and infrastructure, historic assets, economic assets and growth and development trends.

2.2.1 Values at Risk

The following data on property exposure is derived from the Merced County 2020 Parcel and Assessor data. This data should only be used as a guideline to overall values in the City as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is likely low and does not reflect current market value of properties. It is also important to note that in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss and is not included in the values below. Table 2-2 shows the exposure of properties (e.g., the values at risk) broken down by property type for the City of Merced.

Table 2-2 City of Merced Property Exposure by Type

Property Type	Parcel Count	Improved Value	Content Value Estimate	Total Value
Agricultural	23	\$1,112,724	\$1,112,724	\$2,225,448
Commercial	911	\$1,045,871,699	\$1,045,871,699	\$2,091,743,398
Exempt	632	\$48,779,381	\$48,779,381	\$97,558,762
Industrial	120	\$167,440,322	\$251,160,483	\$418,600,805
Mixed Use	16	\$259,279	\$259,279	\$518,558
Residential	20,611	\$3,488,757,480	\$1,744,378,740	\$5,233,136,220
Vacant Land	49	\$1,410,697	\$1,410,697	\$2,821,394
Total	22,362	\$4,753,631,582	\$3,092,973,003	\$7,846,604,585

Source: Merced County Assessor, Wood analysis

2.2.2 Critical Facilities and Infrastructure

For the purposes of this plan, a critical facility is defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA sorts critical facilities into seven lifeline categories as shown in Figure 4-1 in the Base Plan. The 2021 plan update process also involved the development of a web-based mapping application by the County in collaboration with Wood. This project webpage served multiple purposes: a planning process backgrounder for the HMPT and public with public survey links; a GIS map based –interactive storyboard (i.e., Experience Builder Application) to communicate the highlights of the risk assessment. The GIS application included interactive hazard maps; a web-based method for collecting, validating, updating and maintaining critical facilities for the plan; and a platform to make the Plan a “living document” moving forward. The City of Merced helped validate the critical facility GIS data collected to ensure accuracy and to align the data with the seven FEMA Lifelines framework classifications. More information on the web-based mapping application is detailed in Section 3.4.1 of the Base Plan.

Table 2-3 shows a summary of the critical facilities analysis for the City of Merced grouped by FEMA lifeline category. critical facilities and other community assets as important to protect in the event of a disaster. Within the City of Merced the following are considered key critical facilities and community assets:

- City of Merced Records – City Hall/Emergency Operations Center (678 W. 18th Street)
- Merced Fire Stations (Stations #51, #53, #54, #55, #81, #85)
- Merced Police Department – Central Station (611 West 22nd Street)
- Merced Police Department – South Station (470 West 11th Street)
- City of Merced Public Works Yard (1776 Grogan Avenue)
- Merced Wastewater Treatment Facility (1961 Gove Road)
- McKee Water Tower (3362 McKee Road)
- Merced Medical Center Repeater
- Mercy Medical Center (3333 Mercy Avenue)
- St. Joseph’s Medical Center (3377 G Street)
- Valley Children’s Medical Center (1190 Olivewood Drive)
- Hyland Healthcare and Rehabilitation Center (3170 M Street)
- NICU Children’s Hospital (333 Mercy Avenue)
- Amie Marchini Senior Care (1450 E. 27th Street)
- Senior Community Center (755 W. 15th Street)
- Merced Coroner Facility (455 E 13th Street)
- Merced College (3600 M Street)
- Merced Regional Airport (324 W. 24th Street)
- Merced-Yosemite Regional Airport (20 MacReady Drive)
- Communications Tower
- Covalascent Facility (3170 M Street)
- Hobie House – Community Shelter
- Applegate Zoon (1045 W. 25th Street)
- Water supply lines and wells
- Pumping stations, and trunk lines
- Major electrical transmission lines and substations
- Major communication lines and microwave transmission facilities

- Federal Prison and major railways

Critical infrastructure also include major roadways which may serve as principal evacuation routes. There are also several additional designated shelters in Merced for use in an emergency event including the Salvation Army Merced Corps Community Center, Merced United Way, Valley Crisis Center, recreation centers/parks, high school gyms and school cafeterias.

2.2.3 Historic, Cultural and Natural Resources

The following historical resources are located in the City of Merced

- Bank of Italy, Merced – National Register (listed 10/12/2004)
- Buhach Grammar School – National Register (listed 4/7/1983)
- Cook Maj. George Beecher House – National Register (listed 9/15/1983)
- Kaehler Rector House – National Register (listed 1/4/1982)
- Leggett House – National Register (listed 10/25/1979)
- Leggett Thomas H. House – National Register (listed 7/8/1982)
- Merced County Courthouse – National Register (listed 10/29/1975)
- Merced County High School – National Register (listed 5/31/1984)
- Merced Theatre – National Register (listed 5/1/2009)
- Tioga Hotel – National Register (listed 10/3/1980)
- U.S. Post Office – National Register (listed 2/10/1983)

Natural resources are important to include in benefit-cost analyses for future projects and may be used to leverage additional funding for projects that also contribute to community goals for protecting sensitive natural resources. Awareness of natural assets can lead to opportunities for meeting multiple objectives. For instance, protecting wetlands areas protects sensitive habitat as well as attenuates and stores floodwaters.

The City of Merced manages a well-developed network of parks and recreation facilities. From the incorporation of the City until the 1960's, the City's park system grew at a moderate rate. During the 1970's the City's park system expanded and there were 47 acres of developed park land as compared to 133 acres in 1980 (City of Merced 2004). During the 1980's and early 1990's, park development slowed but the City acquired additional park lands in the late 1990's. By 2004, there were 310 acres of developed park land in the City and today the City owns approximately 330 acres of park and open space facilities (City of Merced 2016). These natural and recreational resources are summarized in the City's 2004 Park and Open Space Master Plan.

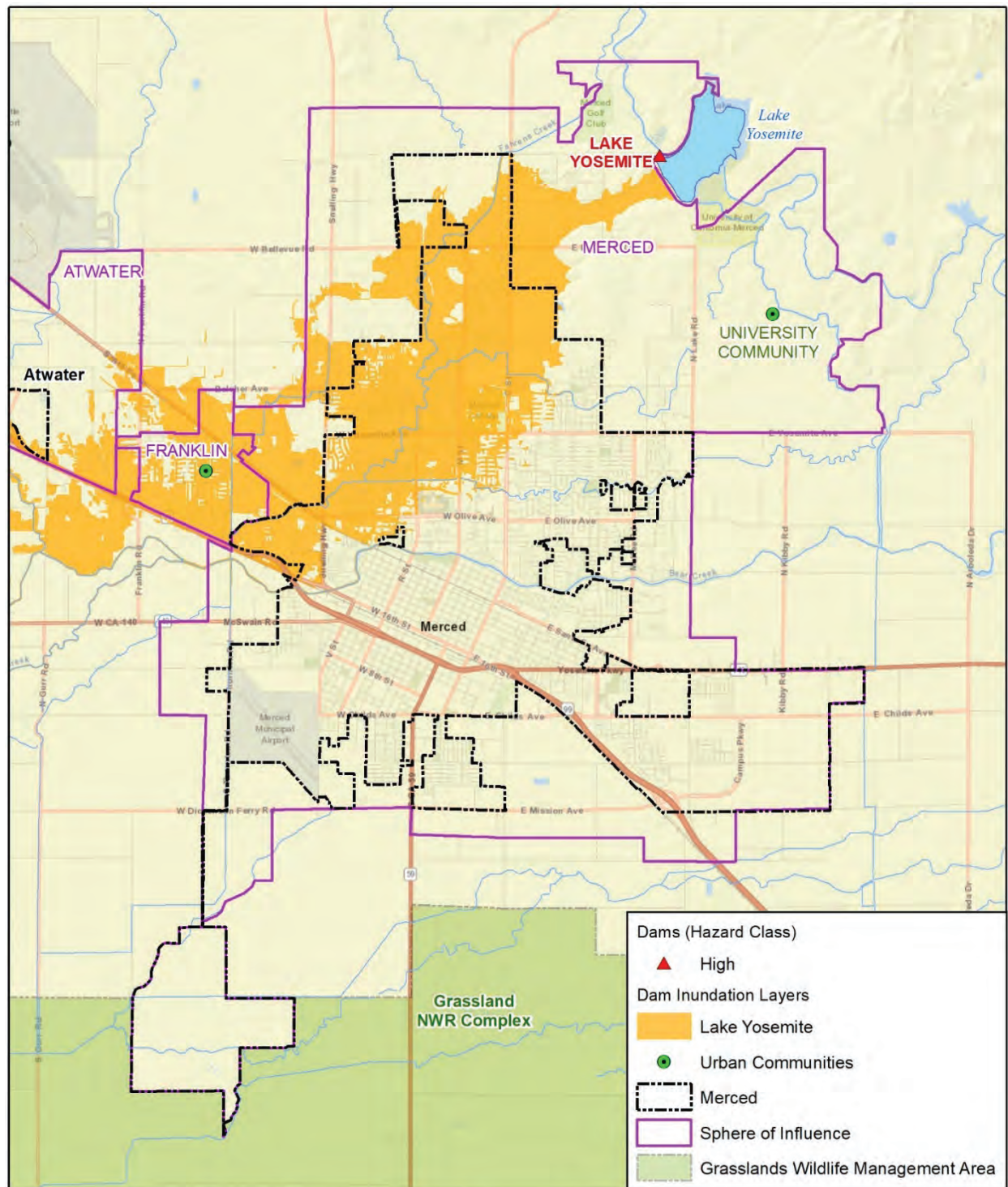
The City also contains several important habitats, which could support sensitive plant and animal species. Several creeks, including Fahrens, Cottonwood, Black Rascal, Bear, and Miles along with the Hartley Slough, provide habitat for native plants and animals (City of Merced 2016). These natural drainage courses have been preserved and protected in the City to create large tracts of open space and many of the City parks are oriented around regional surface water drainage features. The northern portions of the City contain seasonal wetlands and vernal pools in scattered locations, which provide potential habitat for several species of wildlife which are listed as threatened and endangered. The Merced Irrigation District (MID) irrigation canal system has also become an important open space feature in the area as has Lake Yosemite. The Merced National Wildlife Refuge is located outside the city limits to the southwest, and the extensive agricultural fields that surround the City also provide habitat for many wildlife species (City of Merced 2016).

2.3 Estimating Potential Losses

2.3.1 Dam Incidents

Protection from flood hazards created by dam failures is critical to the safety and well-being of Merced residents. Dam incidents can result from various natural or human caused events, such as earthquakes, erosion, improper siting, improper maintenance, rapidly rising flood waters and structural or design flaws. The ability to provide warning for potential victims of flooding from dam failure is influenced by the type of dam constructed, the frequency of inspections for structural integrity, the flood wave arrival time, the ability to notify persons downstream and their ability to evacuate. Aside from loss of life, damage to property and displacement of people, hydroelectric facilities on dams that fail would suffer damage. This could have an impact on life support systems in communities outside the immediate hazard areas. A failure of one of the dams operated by the Merced Irrigation District (MID) that generate electricity could affect supply to the CAADC site, within which the Castle Medical Center is located. Should more of the City choose MID as its electricity supplier and distributor, those customers would likewise be affected.

A dam vulnerability assessment was completed during the 2021 update, following the methodology described in Section 4 of the Base Plan. Dam inundation areas from Yosemite dam with the City of Merced are shown in Figure 2-2 and Table 2-3 summarizes the values at risk within the inundation area. The Yosemite dam is rated as high significance. Yosemite dam is also rated as Extremely High by the California Department of Water Resources, Division of Safety of Dams. Extremely High rated dams are expected to cause considerable loss of human life or result in an inundation area with a population of 1,000 or more. Areas of future development, located within the City's Sphere of Influence are most vulnerable to dam inundation events. One critical facility, categorized as a Transportation Lifeline, is located within a dam inundation area.

**Figure 2-2 City of Merced Potential Dam Inundation Areas**

wood. Map compiled 3/2021;
intended for planning purposes only.
Data Source: Merced County, USFWS,
Department of Water Resources, Division of Safety of Dams (DSOD),
Flood Emergency Response Information Exchange (FERIX)

0 1 2 Miles



Table 2-3 Yosemite Dam Inundation

Property Type	Improved Parcel County	Building Count	Population
Agricultural	5	5	0
Commercial	24	30	0
Exempt	110	134	0
Industrial	22	38	0
Mixed Use	1	1	3
Residential	4,603	5,839	18,781
Vacant Land	3	3	0
Total	4,768	6,080	18,784

Source: California DSOS, National Inventory of Dams, Merced County Assessor's Office

Future Development

The results of the SOI and dam analysis are shown in and Table 2-4.

Table 2-4 Sphere of Influence Areas Exposed to Yosemite Dam Inundation

Property Type	Improved Parcel Count	Building Count	Population
Agricultural	14	16	0
Commercial	7	8	0
Exempt	2	4	0
Industrial	4	8	0
Residential	100	110	365
Vacant	1	1	0
Total	128	147	365

Source: CAL FIRE, Merced County Assessor, Wood GIS analysis

2.3.2 Earthquake

The City of Merced and surrounding areas historical earthquake activity is below California's state average. No known faults are located in the Merced area. The nearest known fault is the Kings Canyon Lineament, approximately 5 miles south of Atwater, however geological evidence would show this fault is not active. There is no record of any seismic activity originating within the City; however, the County of Merced has been shaken by earthquakes originating elsewhere. There is documented evidence of six earthquakes that shook the area, those of 1872, 1906, 1952, 1966, 1984, and 1989. Major damage occurred in Los Banos to the southwest associated with the 1906 event, with minor damage recorded throughout the County from other occurrences.

No damaging earthquakes greater than M 6.0 have been recorded in the City of Merced or Merced County in over 200 years, though several have been very close. The most recent large earthquake near Merced County, and the City of Merced, was 16 miles east north-east of King City at a magnitude of 5.3 on October 20, 2012. Several aftershocks followed the main earthquake, including a M3.1 aftershock. This earthquake was preceded by two earthquakes located approximately 100 miles from Merced County, the 1982 New Idria earthquake (M5.4) and the 1983 Coalinga quake (M6.5). There was low level ground shaking and low local magnitude reported. The City of Merced Planning Team also report a M3.4 earthquake on March 31, 2016 with an epicenter 21 miles southwest of Los Banos. No damage was noted

associated with this recent earthquake event, but the team agreed there is a likelihood of a similar earthquake occurring again in the future.

Based on the earthquake shaking potential mapped for Merced County and the City of Merced, due to the proximity to the San Andreas Fault, and the history of shaking with no surface rupture, means the probability of damaging seismic ground shaking in the City of Merced is considered as occasional. Other hazards associated with earthquake activity, such as lateral spreading, surface cracking or differential setting, are considered unlikely to occur, although no studies have been conducted to determine the likelihood of these hazards.

2.3.3 Extreme Heat

Extreme heat is identified as a priority hazard; this hazard was also identified as a priority for the City of Merced in their previous plan. The City of Merced collaboratively works with all agencies throughout the County to address extreme heat by following the State of California Contingency Plan for Excessive Heat Emergencies and the Merced Operational Area Excessive Heat Guideline. The City also opens cooling zones and centers to provide shelter for vulnerable populations in the City and to help mitigate the hazard and continues to open additional facilities.

2.3.4 Flood and Levee Failure

The primary types of flood events in Merced County that may impact the City of Merced are riverine and urban. Flooding could also occur as a result of levee failure. Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area, upstream, or from winter snowmelt.

The floodplain of the Merced River is well defined from the eastern county boundary to approximately 10 miles above the mouth of the river. Downstream of this point, the floodplain is undifferentiated from the valley floor and major floods can spread out over large areas. During the 1950 flood event, approximately 19,600 acres of land along the Merced River were inundated, including the towns of Snelling and Merced Falls. A large portion of Merced County continues to be subject to inundation during flood events, as approximately 380,010 acres, including a large portion of the City of Merced, have been determined to be in the FEMA floodplain. The physical risks associated with potential flooding and the regulatory requirements for floodplain management are important considerations when decisions are being made regarding future land use throughout the City of Merced given the City is traversed by four creeks from east to west, including Bear Creek, Fahrens Creek, Cottonwood Creek, and Black Rascal Creek. The flood hazards for three of these four creeks are further summarized below based on information from the City's previous LHMP.

Bear Creek

Historically, flood flows in excess of the Bear Creek channel capacity spill over the left bank of Bear Creek approximately 6 miles east of the City Merced (City of Merced 2015). Due to topography and embankments, overflow from Bear Creek does not return to the channel. The natural slope is southwest from Bear Creek, but some of the overflow moves westward and northwestward into Merced along the Atchison, Topeka, and Santa Fe Railway embankment. There are flood relief structures along the embankment that allow part of the overflow to proceed southwestward, but much of the floodwater flows into Merced, where it ponds and eventually overtops the Atchison, Topeka, and Santa Fe Railway embankment between R and V Streets. The floodwater then flows as shallow flooding southwestward through downtown Merced, ponds behind the Southern Pacific Railroad embankment, eventually overtops the railroad embankment, and finally continues as shallow flooding through southwest Merced.

Overflow from Bear Creek will also occur upstream of the West 16th Street bridges at several locations near the Daisy Park residential area. This floodwater will flow west through the Daisy Park area as shallow flooding, then over the Snelling Highway and into the Industrial Park area, where it will pond behind the U.S. Highway 99 embankment and the Black Rascal Creek levee. During the major flood events in 1969, 1997, 1998, and 2006, Bear Creek overflowed at the southwest end of the City of Merced in the vicinity of Thornton Avenue and State Highway 140.

Black Rascal Creek

Black Rascal Creek flood flows are diverted into Bear Creek approximately 3 miles east of Merced. Minor flooding from local runoff has occurred along Black Rascal Creek between G Street and Parsons Avenue.

Fahrens Creek

Fahrens Creek, which joins Black Rascal Creek near West Olive Avenue and State Highway 59 (Snelling Highway), flows through the northwestern part of Merced. Limited channel capacity, coupled with constricted bridge openings at State Highway 59, produces widespread ponding upstream from the bridges and road embankment.

A very large portion of the City of Merced is within the 100-year floodplain designated by the Federal Emergency Management Agency (FEMA), particularly the southern portion of the City. Of the 14,954 acres within the City, 65.2% is within the floodplain: 60.7% (9,072 acres) is within the 100-year floodplain and 4.5% (668 acres) is within the 500-year floodplain. Based on the history of flooding in the County of Merced, the City of Merced and surrounding areas are considered to likely have the hazard potential for future flooding.

A flood vulnerability assessment was completed during the 2021 update, following the methodology described in Section 4 of the Base Plan. Flood hazards for the City of Merced are shown in Figure 2-3 and Table 2-5 summarizes the values at risk in the City's 100-year floodplain, respectively. These tables also detail loss estimates for each flood.

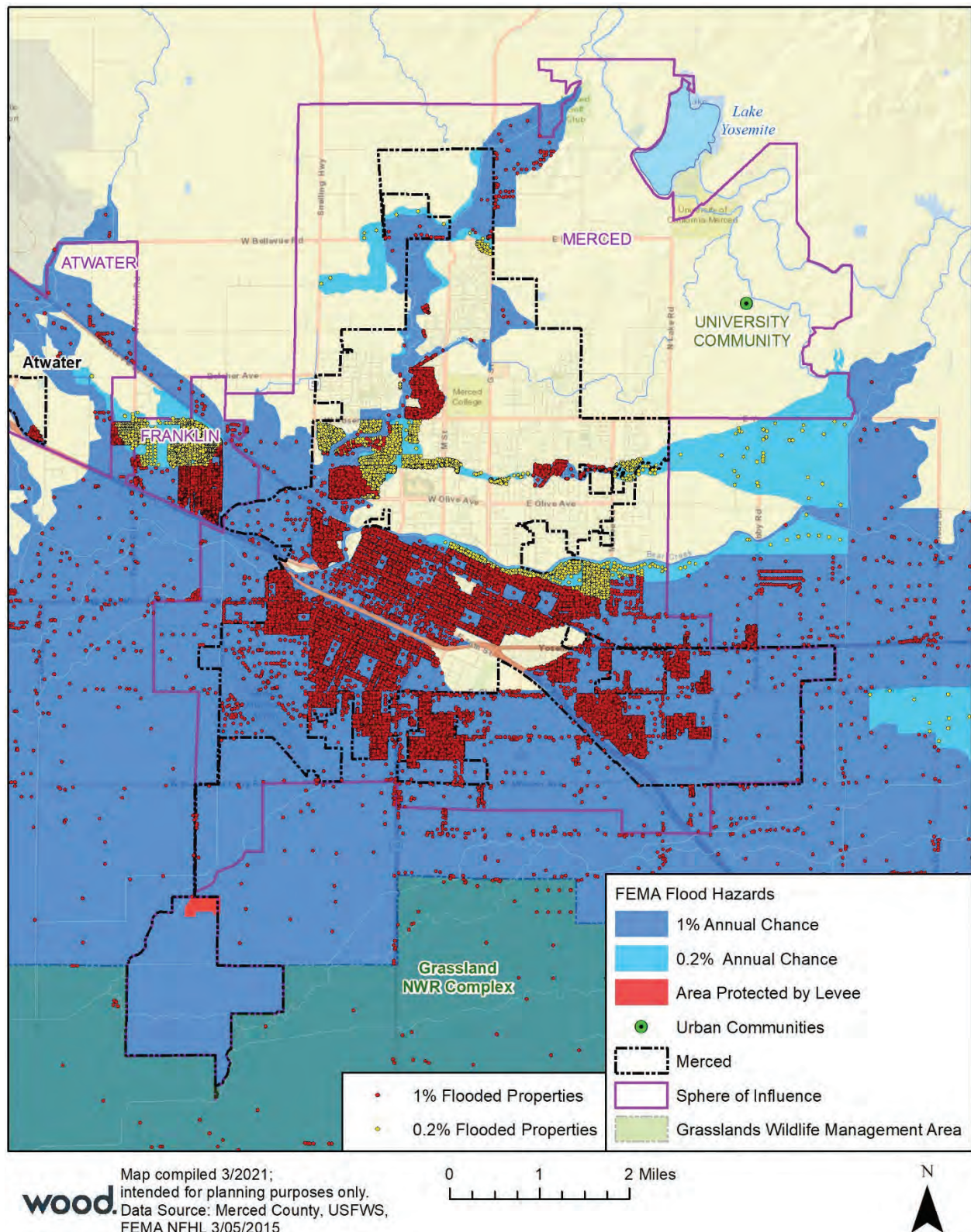
Figure 2-3 City of Merced 100-year Floodplain

Table 2-5 City of Merced FEMA 1% Annual Chance Flood Hazard, by Property Type

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Estimated Loss	Population
Agricultural	17	19	\$704,235	\$704,235	\$1,408,470	\$352,118	0
Commercial	527	1,873	\$339,551,353	\$339,551,353	\$679,102,706	169,775,677	0
Exempt	433	960	\$9,185,588	\$9,185,588	\$18,371,176	\$4,592,794	0
Industrial	118	218	\$167,406,079	\$251,109,119	\$418,515,198	\$104,628,799	0
Mixed Use	9	9	\$185,869	\$185,869	\$371,738	\$92,935	29
Residential	9,161	12,140	\$1,218,507,813	\$609,253,907	\$1,827,761,720	\$456,940,430	38,848
Vacant	30	38	\$1,030,699	\$1,030,699	\$2,061,398	\$515,350	0
Total	10,295	15,257	\$1,736,571,636	\$1,211,020,769	\$2,947,592,405	\$736,898,101	38,877

Source: Merced County Assessor's Office; National Flood Hazard Layer reflecting FEMA FIRM Effective 12/2/2008; FEMA; Wood analysis

Based on this analysis, the City of Merced has 10,295 improved parcels located within the 100-year floodplain for a total value of over \$736 million. Of the 22,362 parcels within the City of Merced, this means that almost half (46%) of the total parcels in the City have a potential risk to flooding. Population at risk was calculated for the 100-year based on the number of residential properties at risk and the average number of persons per household (3.32). There is an estimated 38,877 persons at risk to flooding in the City of Merced. Table 2-6 summarizes the values at risk in the City's 500-year floodplain.

Table 2-6 City of Merced FEMA 0.2% Annual Chance Flood Hazard, by Property Type

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Estimated Loss	Population
Commercial	30	31	\$62,378,180	\$62,378,180	\$124,756,360	\$31,189,090	
Exempt	33	69	\$0	\$0	\$0	\$0	
Mixed Use	2	3	\$41,361	\$41,361	\$82,722	\$20,681	10
Residential	1,594	2,412	\$337,480,454	\$337,480,454	\$674,960,908	\$168,740,227	7,718
Total	1,659	2,515	\$399,899,995	\$399,899,995	\$799,799,990	\$199,949,998	7,728

1,659 parcels were found to be located in within the 500-year floodplain, which represents 7% of the total parcels in the City.

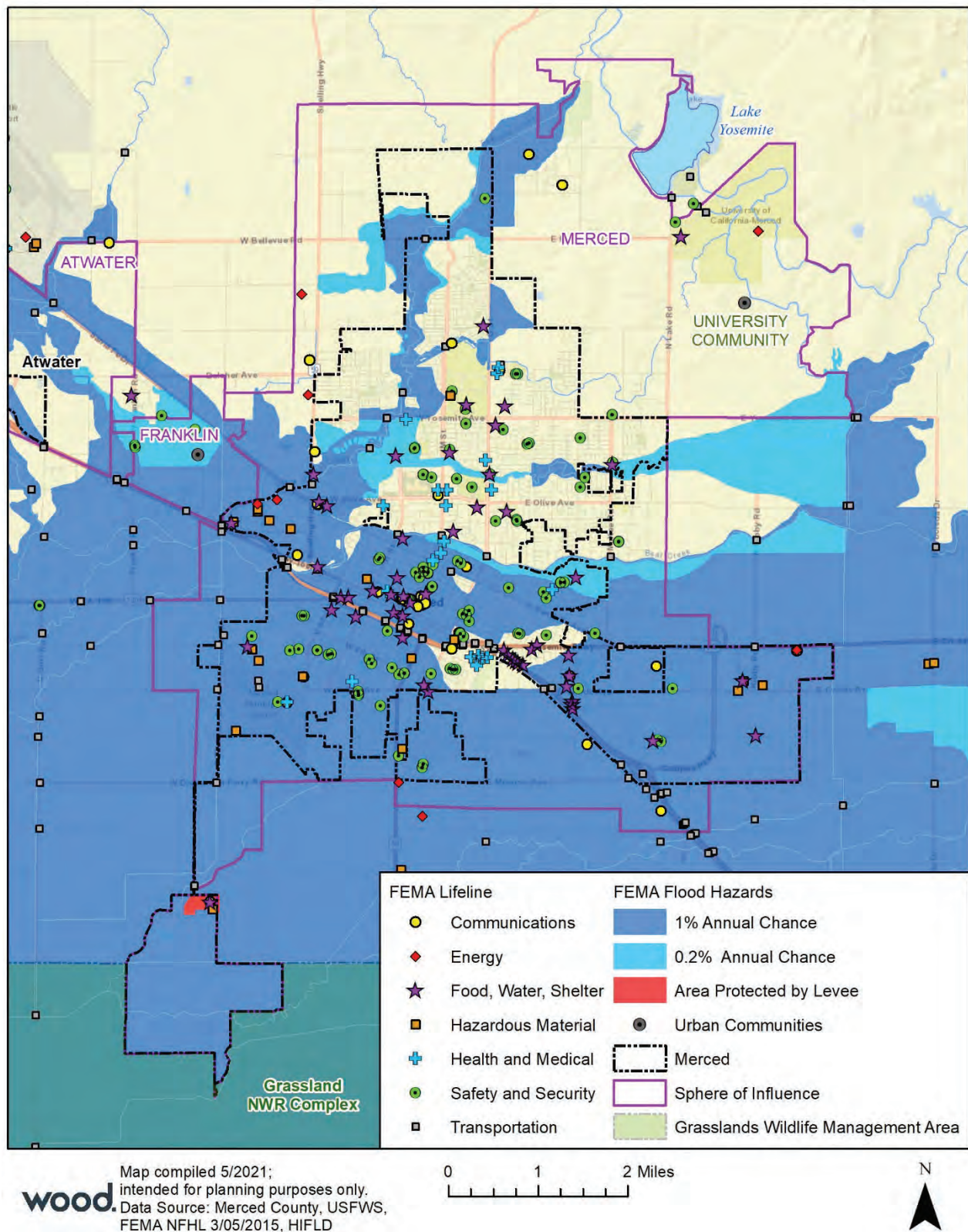
Critical Facilities at Risk

Critical facilities are those community components that are most needed to withstand the impacts of disaster as previously described. Specific information on critical facilities can be found in Section 3.4.1 of the Base Plan. Information on key critical facilities and community assets in the City of Merced is also included in the GIS Experience Builder Application developed by the County and Wood to communicate the highlights of the risk assessment and validate the critical facility GIS data collected during the MJHMP update process. Table 2-7 lists the critical facilities in the City's 100-year floodplains and Figure 2-4 shows the location of the critical facilities. The impact to the community could be great if these facilities are damaged or destroyed during a flood event.

Table 2-7 Critical Facilities at risk of 1% Annual Chance Flood Hazard, by FEMA Lifeline

FEMA Lifeline	Count
Communications	26
Energy	3
Food, Water, Shelter	30
Safety and Security	51
Transportation	25
Total	156

Source: HIFLD, FEMA NFHL

Figure 2-4 Critical Facilities at Risk of 1% Annual Flood Hazard

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Merced joined the National Flood Insurance Program (NFIP) on November 1, 1979. NFIP Insurance data indicates that as of July 2021, there were 3,401 flood insurance policies in force in the City with \$786,021,200 of coverage. Of the policies in place, there have been 152 claims for flood losses totaling \$2,230,265 in total loss payments.

According to the FEMA Community Information System accessed August 11, 2021, the City has 12 Repetitive Loss properties that resulted in flood losses totaling \$401,664 associated with building content losses. Of these losses, \$392,643 of the payments were associated with building contents in Zones AE, A1-30, AO, AH, and A. There were no Severe Repetitive Loss properties.

Future Development

The results of the SOI and flood analysis are shown in Table 2-8 and Table 2-9.

Table 2-8 Sphere of Influence Areas Exposed to 1% Annual Chance Flood Hazard

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Estimated Loss	Population
Agricultural	114	156	\$10,783,537	\$10,783,537	\$21,567,074	\$5,391,769	0
Commercial	53	76	\$12,078,814	\$12,078,814	\$24,157,628	\$6,039,407	0
Exempt	19	25	\$5,465,593	\$5,465,593	\$10,931,186	\$2,732,797	0
Industrial	27	46	\$20,347,558	\$30,521,337	\$50,868,895	\$12,717,224	0
Mixed Use	4	5	\$16,064	\$8,032	\$24,096	\$6,024	17
Residential	679	800	\$105,267,278	\$52,633,639	\$157,900,917	\$39,475,229	2,656
Vacant Land	12	13	\$54,242	\$54,242	\$108,484	\$27,121	0
Total	908	1,121	\$154,013,086	\$111,545,194	\$265,558,280	\$66,389,570	2,673

Source: Wood Analysis 2021

Table 2-9 Sphere of Influence Areas Exposed to 0.5% Annual Chance Flood Hazard

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Estimated Loss	Population
Agricultural	9	10	\$2,130,727	\$2,130,727	\$4,261,454	\$1,065,364	0
Exempt	1	1	\$2,848,363	\$2,848,363	\$5,696,726	\$1,424,182	0
Residential	70	75	\$24,684,881	\$12,342,411	\$37,027,322	\$9,256,830	3
Total	80	87	\$29,745,815	\$17,362,453	\$47,108,268	\$11,777,067	252

Source: Wood Analysis 2021

2.3.5 Hazardous Material Incidents

Hazardous material incidents were ranked by the City as a priority hazard in both their previous plan and the current plan. These human-caused hazards are currently minimized through past studies completed to understand commodity flows, as documented in the City of Merced Hazardous Materials Commodity Flow Study. The City's Fire Department have also been trained to handle hazardous material incidents and currently have both a hazardous material technician and specialists on staff to respond to these incidents.

Further, the City established on Memorandum of Understanding (MOU) with the County to establish, support, and train the Merced County Hazardous Material Response Team.

2.3.6 Wildfires

Weather components, such as temperature, relative humidity, wind, and lightning, also affect the potential for wildfire. High temperatures and low relative humidity dry out the fuels that feed the wildfire creating a situation where fuel will more readily ignite and burn more intensely. Both urban and wildland fires conditions exist in Merced County and its cities which increases the chances for damage to property, loss of life and/or injury. In most of Merced County, the California Department of Forestry and Fire Protection (Cal FIRE) ranks fuel loading as low. Fuels are mainly crops and grasses. In the southwest corner of the County, there are some brush, pine, and grass fuels, which are ranked as moderate fuel hazards, primarily in the area west of Interstate 5. Figure 2-5 shows the fire threat areas in the City of Merced and Table 2-10 summarizes the values at risk and detail loss estimates.

Table 2-3 Properties Exposed to Wildfire Threat Areas in the City of Merced

Property Type	Improved Parcel Count	Building Count High	Building Count Moderate	Building Count Low	Total Building Count	Improved Value	Estimated Content Value	Total Value
Agricultural	3	0	1	3	4	\$179,357	\$179,357	\$358,714
Commercial	2	0	0	6	6	\$5,765,341	\$5,765,341	\$11,530,682
Exempt	28	1	13	19	33	\$0	\$0	\$0
Industrial	3	0	0	4	4	\$18,412,738	\$27,619,107	\$46,031,845
Mixed Use	1	0	0	1	1	\$14,280	\$14,280	\$28,560
Residential	561	0	243	330	573	\$132,105,988	\$66,052,994	\$198,158,982
Vacant Land	1	0	1	1	\$26,508	\$26,508	\$53,016	1
Total	599	1	257	364	622	\$156,504,212	\$99,657,587	\$256,161,799

Source: CAL FIRE, Merced County Assessor, Wood GIS analysis

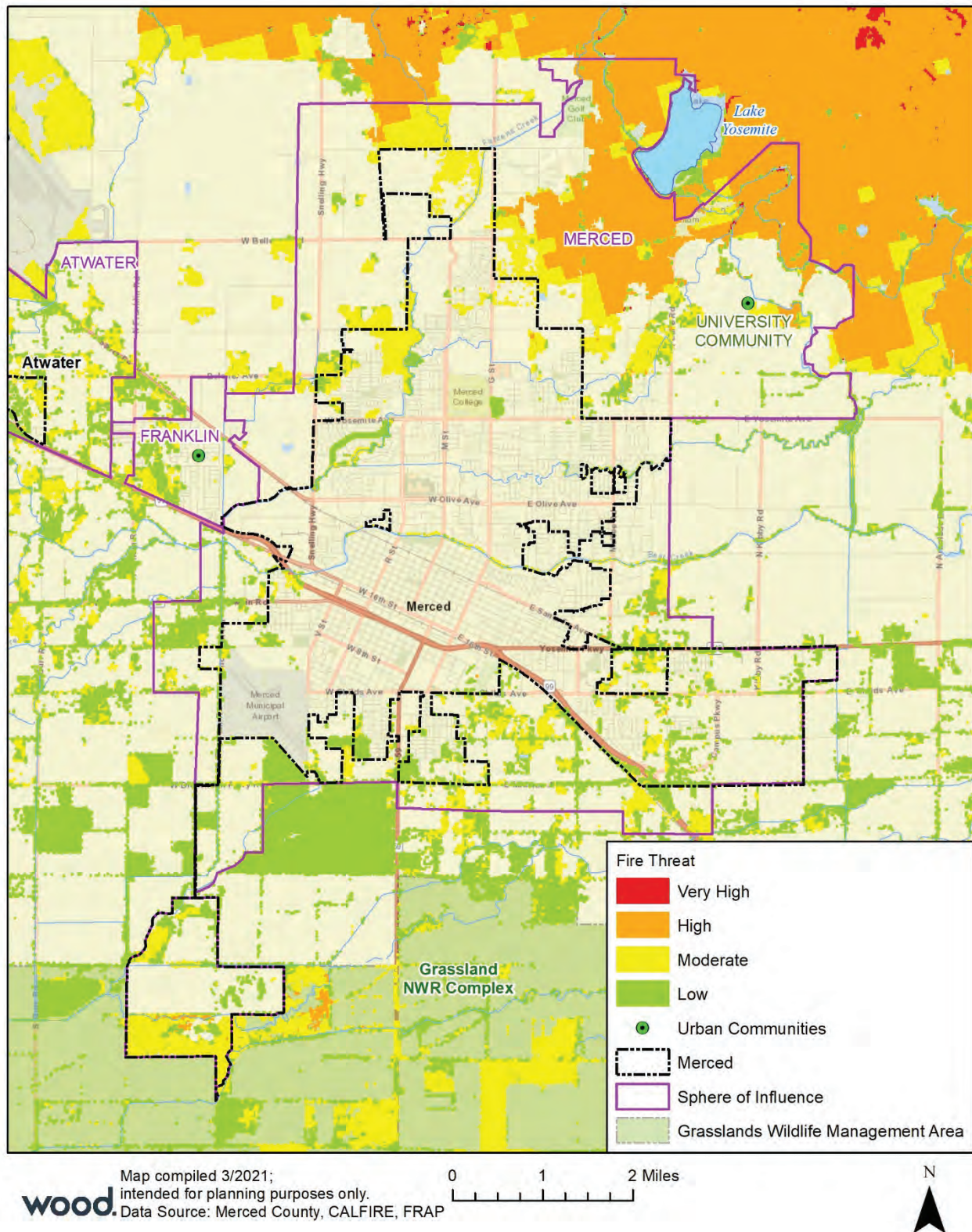
Figure 2-5 Wildfire Threat Areas in City of Merced

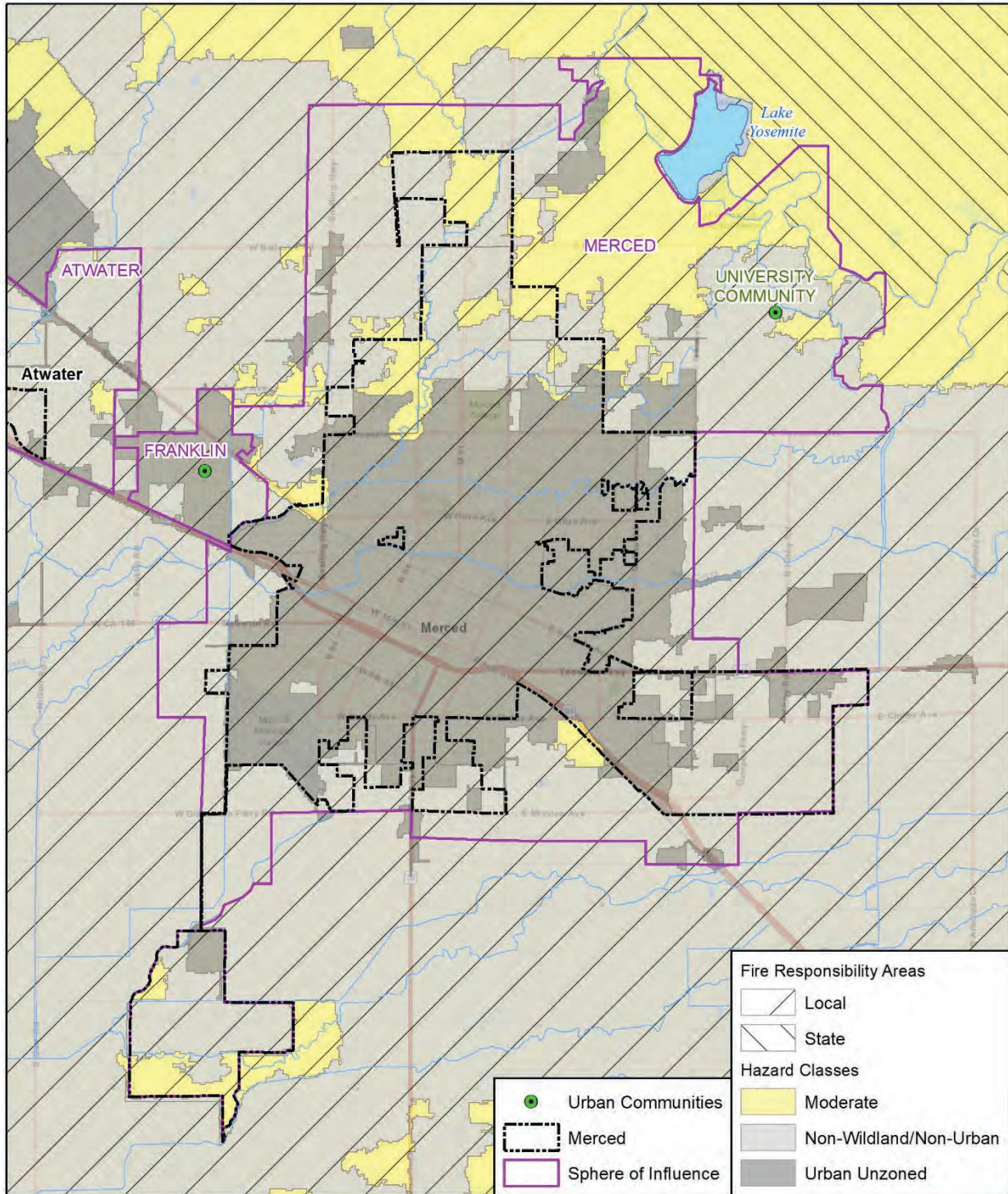
Table 2-11 shows the results of the critical facility analysis by fire threat area.

Table 2-4 Critical Facilities Exposed to Wildfire Threat Areas

FEMA Lifeline	Count
Moderate Wildfire Threat	
Food, Water, Shelter	1
Safety and Security	1
Transportation	1
Low Wildfire Threat	
Food, Water, Shelter	1
Hazardous Materials	2
Safety and Security	1
Transportation	4
Total	11

Source: Merced County, HIFLD, CAL FIRE, FRAP, Wood GIS Analysis

Figure 2-6 shows the fire responsibility areas in the City of Merced. Based on the analysis there are 970 residential buildings located with the moderate hazard area, with a total value of \$314,703,588. Six critical facilities, categorized as Food, Water, and Shelter and Transportation Lifelines are located within the local responsibility moderate fire hazard area. Refer to Section 4 of the Base Plan for methodology and results of the countywide analysis.

Figure 2-6 City of Merced Fire Responsibility Areas

Map compiled 3/2021;
intended for planning purposes only.
Data Source: Merced County, CALFIRE,
Local Responsibility Area, State Responsibility Area

0 1 2 Miles



Future Development

The results of the SOI and wildfire analysis are shown Table 2-12 and Table 2-13.

Table 2-5 Sphere of Influence Areas Exposed Within Fire Severity Areas

Property Type	Improved Parcel Count	Building Count	Improved Value	Estimated Content Value	Total Value	Population
SRA Moderate						
Agricultural	12	14	\$1,276,826	\$1,276,826	\$2,553,652	0
Commercial	9	10	\$3,892,834	\$3,892,834	\$7,785,668	0
Exempt	3	4	\$0	\$0	\$0	0
Industrial	3	6	\$1,333,846	\$2,000,769	\$3,334,615	0
Residential	158	167	\$51,380,141	\$25,690,071	\$77,070,212	554
Vacant Land	4	4	\$12,352	\$12,352	\$24,704	0
Total	189	205	\$57,895,999	\$32,872,852	\$90,768,851	554

Source: CAL FIRE, Merced County Assessor, Wood GIS analysis

Table 2-6 Sphere of Influence Areas Exposed Within Fire Threat Areas

Property Type	Improved Parcel Count	Building Count High	Building Count Moderate	Building Count Low	Total Building Count	Improved Value	Estimated Content Value	Total Value	Population
Agricultural	70	5	16	71	92	\$8,158,058	\$8,158,058	\$16,316,116	
Commercial	9	0	0	9	9	\$5,621,324	\$5,621,324	\$11,242,648	
Exempt	6	2	0	5	7	\$2,737,730	\$2,737,730	\$5,475,460	
Industrial	1	0	0	2	2	\$153,070	\$229,605	\$382,675	
Mixed Use	2	0	2	1	3	\$54,673	\$54,673	\$109,346	10
Residential	227	31	68	147	246	\$47,501,282	\$23,750,641	\$71,251,923	817
Vacant	6	2	1	3	6	\$24,757	\$24,757	\$49,514	
Total	162	1	67	127	195	\$30,390,581	\$23,025,641	\$53,416,222	359

Source: CAL FIRE, Merced County Assessor, Wood GIS analysis

3 CAPABILITY ASSESSMENT

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation outreach and partnerships, and other mitigation efforts. To develop this capability assessment, the jurisdictional planning representatives reviewed a matrix of common mitigation activities to inventory which of these policies or programs and shared any updates or changes through the Merced Data Collection Guide. The team then supplemented this inventory by reviewing additional existing policies, regulations, plans, and programs to determine if they contribute to reducing hazard-related losses.

During the plan update process, this inventory was reviewed by the jurisdictional planning representatives and Wood consultant team staff to update information where applicable and note ways in which these capabilities have improved or expanded. For the City of Merced, the team and planning representatives

also noted key capabilities accounted for in the City's existing LHMP. Additionally, in summarizing current capabilities and identifying gaps, the jurisdictional planning representatives also considered their ability to expand or improve upon existing policies and programs as potential new mitigation strategies. The City of Merced's capabilities are summarized below.

3.1 Regulatory Capability

The regulatory and planning capabilities table lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities. The table below indicates those that are in place in the City of Merced.

Table 3-1 City of Merced —Regulatory and Planning Capabilities

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
General Plan	Yes	Merced Vision 2030 General Plan, Adopted January 3, 2012
Zoning ordinance	Yes	Title 20 of the Merced Municipal Code
Subdivision ordinance	Yes	Title 18 of the Merced Municipal Code
Growth management ordinance	No	
Floodplain ordinance	Yes	Title 17 of the Merced Municipal Code Flood Damage Prevention Ordinance (Ordinance No. 1250)
Other special purpose ordinance (stormwater, steep slope, wildfire)	No	
Building code	Yes	2019 California Code of Regulations, Title 24, Part 1 (California Administrative Code) Title 17 Buildings and Construction
Fire department ISO rating	Yes	Rating: 2
Erosion or sediment control program	Yes	1983 Merced Critical Area Flooding and Drainage Plan
Stormwater management program	Yes	Phase II Small MS4 General Permit (Permit No. CA000004, Water Quality Order No. 2013-0001 DWQ) Program Effectiveness Assessment and Improvement Plan for the City of Merced, City of Atwater, and Merced County Title 15 of the Merced Municipal Code, Division III – Storm Water System, Chapter 15.50 – Storm Water Management and Discharge Control Storm Drain Master Plan
Site plan review requirements	Yes	Title 20 of the Merced Municipal Code Chapter 20.32.030 – Site Plan Review
Capital improvements plan	Yes	City of Merced 2018-2023 Five-Year Capital Improvement Program (CIP)
Economic development plan	Yes	Economic Development Department 2012 Economic Development Action Plan
Local emergency operations plan	Yes	City of Merced Emergency Operations Plan 2003 City of Merced Emergency Response/Disaster Plan
Other special plans	No	
Flood insurance study or other engineering study for streams	Yes	Flood Insurance Study (December 2, 2008)
Elevation certificates (for floodplain development)	Yes	Flood Elevation Certificates

Regulatory Tool (ordinances, codes, plans)	Yes/No	Comments
Other	No	

Merced Vision 2030 General Plan, 2012 - The City of Merced adopted its first General Plan in 1950. The most recent update occurred in 2012 and resulted in the adoption of the Merced Vision 2030 General Plan in January 2012, with an anticipated horizon year of 2030. This General Plan defines the City's goals, objectives and policies that guide the physical growth, use and development of land under the jurisdictional authority of the City.

The purpose of the Safety Element is to reduce or eliminate long term risk to people and property from natural or human caused hazards. This element focuses on establishing policies and programs to protect the community from risks associated with seismically-induced ground shaking, ground failure, dam failure/seiche, flooding, and wildfire. The element also covers human-caused hazards such as airport safety, crime and policing, and hazardous materials and waste.

The City of Merced 2030 General Plan Safety Element (Chapter 11) includes Policy S-1.1 – Develop and Maintain Emergency Preparedness Procedures for the City, which includes an implementing action to adopt and update the City of Merced LHMP, as needed. As previously noted, the City developed a single-jurisdictional and stand-alone LHMP in 2015. The goals and policies in the City's 2030 General Plan Safety Element support and are consistent with the mitigation strategy actions in the 2015 LHMP. The 2015 City of Merced LHMP was also incorporated by reference into the Safety Element following plan amendments in 2015 (March 16, 2015 Resolution #2015-09).

City of Merced Emergency Response/Disaster Plan, 2011 (Emergency Operations Plan) - The City's Emergency Operations Plan (EOP) addresses the planned response to emergency situations associated with natural disasters, technological incidents, human caused events and national security emergencies in or affecting the City of Merced. The EOP, also referred to as the Emergency Response/Disaster Plan, was updated in 2011 to address mitigation, planning, response, and recovery activities from various emergency situations. The EOP is compliant with the requirements of the Standardized Emergency Management System (SEMS), the Incident Command System (ICS), and the National Incident Management System (NIMS). It is regularly updated by the City to prepare the community for responding to an emergency situation in a highly organized and efficient manner. The EOP was revised and updated in 2017 to meet local, state and federal needs.

Merced Fire Department – The City of Merced Fire Department (MFD) provides fire protection and emergency medical response services within the City limits. The City of Merced was established in 1873 and provides fire, rescue, and emergency management services for the citizens and visitors of Merced. The MFD operates out of five fire stations that on average respond to 11,230 calls per calendar year. As of 2020, the MFD employs 63 public safety members and three support personnel. The MFD has five engines, one truck, one battalion chief, six captains, six engineers, and six firefighters to provide a minimum daily staffing of 19 personnel to cover daily staffing needs within the City.

California Fire Code Chapter 17.32 – The City of Merced adopts by reference as its fire code, the International Fire Code, 2018 Edition and the California Fire Code, 2019 Edition, and including among Appendices, Appendix Chapter 4 (Special Detailed Requirements Based on Use and Occupancy); Appendix Chapter B (Fire Flow Requirements for Buildings); Appendix Chapter C (Fire Hydrant Locations and Distribution); Appendix Chapter CC (Fire Hydrant Locations and Distribution); Appendix D (Fire Apparatus Access Roads); Appendix F (Hazard Ranking); Appendix H (Hazardous Materials Management Plans and Hazardous Materials Inventory Statements); Appendix I (Fire Protection system-Noncompliance Conditions); and Appendix J (Emergency Responder Radio Coverage), based on the 2009 International Fire

Code as published by the International Code Council (ICC) and as adopted and amended by the California Building Standards Commission in the California Building Standards Code Title 24 of the California Code of Regulations.

Flood Damage Prevention Chapter 17.48.020 (Ordinance No. 2321) – It is the purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- To protect human life and health;
- To minimize expenditure of public money for costly flood control projects;
- To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- To minimize prolonged business interruptions;
- To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- To help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas;
- To ensure that potential buyers are notified that property is in an area of special flood hazard; and
- To ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

3.2 Administrative and Technical Capability

The table below identifies City personnel with responsibilities for activities related to mitigation and loss prevention in the City of Merced. Many positions are full time and/or filled by the same person. A summary of technical resources follows.

Table 3-2 City of Merced – Personnel Capabilities

Personnel Resources	Yes/No	Department/Position	Comments
Planner/engineer with knowledge of land development/land management practices	Yes	City Planning Department/Planning Manager	
Engineer/professional trained in construction practices related to buildings and/or infrastructure	Yes	City Engineering Department/City Engineer	
Planner/engineer/scientist with an understanding of natural hazards	No		
Personnel skilled in GIS	Yes	GIS Coordinator	
Full time building official	Yes	Inspection Services/Chief Building Official	
Floodplain manager	Yes	City Engineer	
Emergency manager	No		
Grant writer	No		
Other personnel	NA		
GIS Data Resources (Hazard areas, critical facilities, land use, building footprints, etc.)	Yes	GIS Coordinator	
Warning Systems/Services (Reverse 9-11, cable override, outdoor warning signals)	Yes	Merced County Emergency Alert System	Everbridge
Other	NA		

The City operates under a City Council/City Manager form of government. The City Council makes laws and sets policies, which are enforced and implemented by the City Manager, with the assistance of subordinate officers, department heads, and the City Clerk, City Treasurer and City Attorney. Municipal elections are held every two years in November of even-numbered years with City Council terms overlapping. The Mayor and two Council Members are elected at one election, and the other two Council Members, City Clerk and City Treasurer are elected at the next election.

The City of Merced provides water, sewer, and garbage services through their monthly utility services. They also provide storm drainage, police, fire, and general government services.

The Merced City School District serves school-aged children in grades kindergarten through eighth grade (K-8). There are 14 elementary schools (K-6), four middle schools (7-8), and one school that serves pre-school students (pre-school program). High school education is provided by the Merced Union High School District which has eight comprehensive high schools and one continuation school. The City also offers opportunities for post-secondary education with satellite campuses for Merced College, UC Merced and other graduate schools.

3.3 Fiscal Capability

The following table identifies financial tools or resources that the City could potentially use to help fund mitigation activities. There are currently no specific funding sources for hazard mitigation.

Table 3-3 City of Merced —Available Financial Tools and Resources

Financial Resources	Accessible/ Eligible to Use	Has This Been Used for Mitigation in the Past?	Comments
Community Development Block Grants	Yes	No	
Capital improvements project funding	Yes	No	The City Council needs to approve and establish a CIP.
Authority to levy taxes for specific purposes	Yes	No	The City Council needs to approve authority to levy taxes; this must also be voted on by the community.
Fees for water, sewer, gas, or electric services, new development	Yes	No	
Incur debt through general obligation bonds	Yes	No	
Incur debt through special tax bonds	Yes	No	
Incur debt through private activities	Yes	No	
Federal Grant Programs (Hazard Mitigation Grant Program)	Yes	No	

3.4 Outreach and Partnerships

The Merced County Office of Emergency Services provides education and outreach on Disaster Preparedness for all of the jurisdictions within the County. This education program is in coordination and

partnerships with county and the cities' departments with education programs including the Sheriff's Office, Police Departments, Fire Departments, Agricultural Commissioner, and the Department of Public Health.

During the 2021 planning process the following outreach efforts were identified:

- Ongoing newsletter
- Fire Prevention School Programs
- Presence and use of social media

Education and outreach efforts, as well as emergency response planning, will need to address the needs of low-income residents and the large Spanish-speaking population. In past emergencies, volunteers have organized spontaneously to help those with mobility issues.

3.4.1 Planning Commission

The Planning Commission reviews development proposals for compliance with the General Plan and makes recommendations to the City Council on long range plans and maps for the City and plans for public improvements, plans and development plans for proposed for property within the City, and zoning and rezoning of property within the City. The Commission develops and maintains a long range comprehensive General Plan of the Merced planning area.

3.4.2 City Fire Department

The City Fire Department has a public education program in place that annually visits all 2nd grade classrooms to present the Exit Drills in the Home (EDITH).

3.5 Other Mitigation Efforts

In addition to the project identified in the City's Mitigation Action plan the City of Merced's Fire Department conducts annual fire and life safety inspections for all businesses and SB 1205 mandates reporting compliance of state mandated inspections for Hotels, Motels, Apartments, Schools, Jails and various residential care facilities. As a result, the City of Merced Fire Department conducts annual fire and life safety inspections for all businesses mandated by California Health and Safety Code. Fire and life safety inspections are annually completed for mercantile, assemblies, factories, hazardous, and storage facilities. In addition, city-wide weed abatement is heavily enforced.

3.6 Opportunities for Enhancement

Based on the capabilities assessment, the City of Merced has several existing mechanisms in place that already help to mitigate hazards. There are also opportunities for the City to expand or improve on their policies, programs and fiscal capabilities and further protect the community. Future improvements may include providing training for staff members related to hazards or hazard mitigation grant funding in partnership with the County and Cal OES. Additional training opportunities will help to inform City staff members on how best to integrate hazard information and mitigation projects into their departments. Continuing to train City staff on mitigation and the hazards that pose a risk to the City of Merced will lead to more informed staff members who can better communicate this information to the public. Given the City's flood risk and number of flood insurance policies, joining the Community Rating System could be another capability enhancement that could benefit residents by lowering flood insurance premiums.

4 MITIGATION STRATEGY

4.1 Goals and Objectives

The City of Merced adopts the hazard mitigation goals and objectives developed by the Planning Team and described in Section 5 Mitigation Strategy of the Basin Plan.

4.2 Continued Compliance with the National Flood Insurance Program

The City has been an NFIP participating community since 1974. In addition to the mitigation actions identified herein the City will continue to comply with the NFIP. Floodplain management is under the purview of the Inspection Services Department and the Chief Building Official. This includes ongoing activities such as enforcing local floodplain development regulations, including issuing permits for appropriate development in Special Flood Hazard Areas and ensuring that this development mitigated in accordance with the regulations. This will also include periodic reviews of the floodplain ordinance to ensure that it is clear and up to date and reflects new or revised flood hazard mapping.

4.3 Progress on 2014 Actions

During the 2021 planning process the City of Merced Planning Team reviewed all the mitigation actions from their 2015 plan. Of their nine mitigation actions from 2015, three (3) of the actions are continuing and are implemented annually, demonstrating ongoing progress and building the community's resiliency to disasters. Six (56) were noted as being continuing not started.

4.4 Mitigation Actions

The Planning Team for the City identified and prioritized the following mitigation actions based on risk assessments, goals, and objectives. Background information as well as information on how the action will be implemented and administered, such as ideas for implementation, responsible office, partners, potential funding, estimated cost, and timeline also are described.

Table 4-1 City of Merced Mitigation Action Plan

ID	Goal(s) and Lifelines	Hazard(s) Mitigated	Description/Background/ Benefits	Lead Agency and Partners	Cost Estimate and Potential Funding	Priority	Timeline	Status/Implementation Notes
1	3, 4, 5, Energy	Flood and Levee Failure, Earthquake, Wildfire	Prepare an Energy Assurance Plan	Public Works	\$100,000 Federal Grants	High	3 years	Continue Not Started
2	1, 2, 3, 5 Safety and Security	Flood and Levee Failure	Develop and enhance storm-water drainage improvements to reduce frequent flooding	Development Services	\$5,000 General Fund	High	3 years	Continue In-Progress
3	1, 2, 3, 6 Safety and Security	Dam Incidents, Flood and Levee Failure, Earthquake, Wildfire	Create a Disaster Preparedness Program	Fire Department	\$100,000 Federal Grants	High	3 years	Continue Not Started
4	1, 2, 3, 5, Safety and Security	Flood and Levee Failure	Support Merced County efforts to construct the Haystack Alternative of Black Rascal Creek	Development Services	\$50,000 – 100,000 Federal Grants	Medium	1 year	Continue Not Started
5	1, 2, 3, 5, Safety and Security	Flood and Levee Failure	Update the City's Storm-water Drainage Master Plan	Development Services	Staff time Dept. Budget	Medium	1 year	Continue In-Progress

ID	Goal(s) and Lifelines	Hazard(s) Mitigated	Description/Background/ Benefits	Lead Agency and Partners	Cost Estimate and Potential Funding	Priority	Timeline	Status/Implementation Notes
6	1, 2, 6, 7; Safety and Security; Food, Water, and Shelter	Dam Incidents, Flood and Levee Failure,, Earthquake, Wildfire	Prepare a Shelter and Emergency-Provision Plan	Fire Department	\$100,000 Federal Grants	Medium	1 year	Continue Not Started
7	1, 2, 3, 6; Food Water, and Shelter	Wildfire	Prepare a Natural Area Fire Prevention Plan	Fire Department	\$100,000 Federal Grants	Low	3 to 5 years	Continue Not Started
8	1, 2, 3, 6, 7; Safety and Security	Earthquake	Perform building-specific, structural seismic vulnerability assessment of City-owned critical facilities	Public Works	\$100,000 - \$200,000 FEMA HMA Grants	Low	3 years	Continue Not Started
9	1, 2, 3, 6, 7; Safety and Security	Earthquake	Create a program to retrofit or upgrade unreinforced masonry buildings in Downtown Merced, or other buildings in the Plan area.	Development Services	\$100,000 - \$1,000,000 FEMA HMA Grants	Low	3 to 5 years	Continue Not Started

ID	Goal(s) and Lifelines	Hazard(s) Mitigated	Description/Background/ Benefits	Lead Agency and Partners	Cost Estimate and Potential Funding	Priority	Timeline	Status/Implementation Notes
10	1, 2, 3, 5, Safety and Security	Flooding	Consideration for enrolling in the NFIP Community Rating System program	Engineering Department	\$75,000 Staff time Dept. Budget	Medium	3 to 5 years	New in 2021
11	1, 2, 3, 6; Food Water, and Shelter	Severe Weather: Extreme Temperatures/Extreme Heat	Identify and open additional cooling zones and centers within the City of Merced to provide additional capacity of vulnerable populations	Police Department	\$25,000 Staff time Dept. Budget	Medium	3 to 5 years	New in 2021
12	1, 2, 3, 6; Food Water, and Shelter	Wildfire	Enhance the City Weed Abatement Program to include mandatory debris clean-up and vegetation clearing on properties to mitigate wildfire risk. This action includes utilizing surveys and GIS tools to identify seasonal wildfire hazards in the community, providing notice to property owners, and clearing the properties to reduce wildfire potential, loss of property and injury, and improve air quality.	Fire Department	\$75,000 Staff time General Fund	High	1 year	New in 2021

5 IMPLEMENTATION AND MAINTENANCE

Moving forward, the City will use the mitigation action table in the previous section to track progress on implementation of each project. Implementation of the plan overall is discussed in Section 6 in the Base Plan.

5.1 Incorporation into Existing Planning Mechanisms

The information contained within this plan, including results from the Vulnerability Assessment, and the Mitigation Strategy will be used by the City to help inform updates and the development of local plans, programs and policies. The Engineering or Planning Departments may utilize the hazard information when implementing the City's Community Investment Program and the Planning Department may utilize the hazard information when reviewing a site plan or other type of development applications. The City will also incorporate the 2021 MJHMP into the Safety Element of their General Plan, as recommended by Assembly Bill (AB) 2140.

As noted in Section 6 of the Base Plan, the HMPT representatives from Merced will report on efforts to integrate the hazard mitigation plan into local plans, programs and policies and will report on these efforts at the annual HMPT plan review meeting.

5.2 Monitoring, Evaluation and Updating the Plan

The City will follow the procedures to monitor, review, and update this plan in accordance with Merced County as outlined in Section 6 of the Base Plan. The City will continue to involve the public in mitigation, as described in Section 6.2.1 of the Base Plan. The Fire Department, Fire Chief or assigned designee will be responsible for representing the City of Merced in the County HMPT, and for coordination with City staff and departments during plan updates. The City realizes it is important to review the plan regularly and update it every five years in accordance with the Disaster Mitigation Act Requirements as well as other State of California requirements.