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**INDIAN WELLS VALLEY WATER DISTRICT
2023 WATER SHORTAGE CONTINGENCY PLAN**

December 2023

Adopted by Ordinance No. 108 on January 8, 2024

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SECTION 1
INTRODUCTION



SECTION 1 INTRODUCTION

Water Code

10632(a) Every urban water supplier shall prepare and adopt a water shortage contingency plan as part of its urban water management plan...

1.1 Purpose of the WSCP

The primary purpose of the Water Shortage Contingency Plan (WSCP) is to comply with the requirements of the California Water Code (CWC) sections, which are described in additional detail in **Section 1.2** below. Importantly, the District has a civic and legal responsibility to provide for the water-related health and safety needs of the community. During a water shortage or a catastrophic interruption of water supplies, the District will take the actions described herein to minimize the interruption in water service to its customers to the extent possible, until normal service can be resumed. The WSCP includes an analysis of the contingency plan and sets forth actions, prohibitions, and penalties to be implemented during the various levels of a water shortage or a catastrophic interruption of water supplies to help ensure that the District can provide continuous service to its customers during a severe or extended water shortage in which the District has access to less than 50% of its normal water supply.

1.2 Background

Indian Wells Valley Water District (the District) prepared its initial Water Shortage Contingency Plan in 1992 (1992 WSCP) and adopted same by Resolution No. 92-08 on April 27, 1992. The 1992 WSCP was prepared in response to the adoption of California Assembly Bill 11X (AB 11X) relating to drought contingency in California. AB 11X added Section 10656 to the CWC and amended CWC Sections 10620, 10631, and 10652.

The District later prepared a revised WSCP, the 2017 Water Shortage Contingency Plan (2017 WSCP), and adopted same by Ordinance No. 101 on July 10, 2017. The 2017 WSCP was prepared in response to the addition of CWC Sections 365 through 367. Sections 365 through 367 were



added to the CWC by Senate Bill 814 on August 29, 2016 and relate to excessive residential water use during drought.

Since adoption of the 2017 WSCP, several revisions and additions to the CWC have taken effect. In 2015, Senate Bill 664 added Section 10632.5 to the CWC. CWC Section 10632.5 requires that a WSCP, beginning January 1, 2020, include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities. Section 10632.5 additionally requires that an urban water supplier update the seismic risk assessment and mitigation plan when updating its urban water management plan. In 2018, Senate Bill 606 (SB 606) modified CWC Section 10632 and added Sections 10632.2 and 10632.3, which pertain to the contents of a WSCP, the usage of a WSCP during a drought or other shortage conditions, and the requirement that a WSCP be included as part of an urban water supplier's urban water management plan. In 2019, Assembly Bill 1414 amended CWC Section 10632.1, requiring an urban water supplier to conduct an annual water supply and demand assessment and to submit an annual water shortage assessment report to the Department of Water Resources (DWR). The WSCP must include the procedures for conducting the annual water supply and demand assessment. The District adopted its 2020 WSCP by Ordinance No. 105 on August 9, 2021.

This current WSCP supersedes the 2017 and 2020 WSCPs and has been adopted pursuant to Ordinance No. 108, a copy of which is included in **Appendix 1** herein. This WSCP has been made available to the public prior to adoption, and the final, adopted version will be made available to the public, and provided to the City of Ridgecrest, County of Kern, County of San Bernardino, DWR within 30 days after adoption.

This WSCP has been prepared to coordinate the elements and analysis required pursuant to the CWC sections described above and is intended to create a standard and uniform response to a water shortage or a catastrophic interruption of water supplies. Copies of the relevant CWC sections are included in **Appendix 2** herein.



1.3 Definitions

- **"Allotment"** means the quantity of water allocated (including increased allotments) to a District customer under mandatory rationing during a Water Supply Shortage, a Catastrophic Interruption of Water Supplies, a Drought State of Emergency, or a Local Water Supply Shortage.
- **"California Water Code"** or **"CWC"** means the California Water Code adopted by the State of California and available at <http://leginfo.legislature.ca.gov/faces/codes.xhtml>.
- **"Catastrophic Interruption of Water Supplies"** means a significant interruption of water supplies resulting from a disaster, such as earthquake, fire, or flood, or from any other sudden, unexpected event.
- **"Commercial Customer"** means a business or individual who provides a service or sells products for profit.
- **"Decorative Water Feature"** means a man-made fountain, pond, waterfall, or other water-using feature that is provided solely for aesthetic or beautification purposes.
- **"District"** means the Indian Wells Valley Water District.
- **"Drought State of Emergency"** means either:
 - a. A period for which the Governor has issued a proclamation of a state of emergency under the California Emergency Services Act (Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code) based on statewide drought conditions to an urban retail water supplier that has moved to a level of action in response to a local water supply shortage condition under the District's contingency plan pursuant to CWC Section 10632(a) that requires mandatory water use reductions; or
 - b. A period for which the Governor has issued a proclamation of a state of emergency under the California Emergency Services Act (Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code) based on local drought conditions.



- **"Excessive Water Use"** means usage in excess of Tier 2 of the District's rate structure; i.e. usage in Tiers 3 and 4, which are defined below.
- **"Hundred Cubic Feet" or "HCF"**, means 748 gallons.
- **"Local Water Supply Shortage"** under CWC Section 367(a)(2) means a period in which the District has moved to a level of action in response to a local water supply shortage condition under the District's contingency plan pursuant to CWC Section 10632(a)(1) that requires mandatory water use reductions.
- **"Multi-Family Residential Customer"** means a multi-unit housing complex in which each unit is not metered individually but is instead metered collectively with one or more other units.
- **"Single-Family Residential Customer"** means a single-family residence or a customer in a multi-unit housing complex in which each unit is metered individually.
- **"Swimming Pool"** means any structure intended for swimming or recreational bathing that contains water over 18 inches deep. "Swimming Pool" includes in-ground and aboveground structures and includes, but is not limited to, hot tubs, spas, portable spas, and nonportable wading pools.
- **"Tier 2"** is the customer usage criterion that is described in the District's Water Sales & Service Policy Manual, adopted February 27, 2023 by Ordinance No. 106 and amended on March 13, 2023 by Ordinance No. 107 (refer to **Appendix 3** herein).
- **"Urban Retail Water Supplier"** means a water supplier, either publicly or privately owned, that provides water either directly or indirectly to more than 3,000 end users or that supplies more than 3,000 acre-feet of water annually for municipal purposes. The District is an Urban Retail Water Supplier.
- **"Water Shortage Response Team"** consists of, at a minimum, the General Manager, Operations Manager, Chief Engineer, and Chief Financial Officer, but may also include as necessary the Water Supply Supervisor, Field Services Supervisor, or other representatives of various District departments, as determined and appointed by the General Manager.



- **"Water Supply Shortage"** means a period in which the District has moved to a level of action in response to a water supply shortage under the District's contingency plan pursuant to CWC Section 10632(a)(1).

SECTION 2

WATER SUPPLY RELIABILITY ANALYSIS



**SECTION 2
WATER SUPPLY RELIABILITY ANALYSIS**

Water Code

10632(a) Every urban water supplier shall prepare and adopt a water shortage contingency plan as part of its urban water management plan that consists of the following elements:

(1) The analysis of water supply reliability conducted pursuant to Section 10635.

10635 Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

The District's sole source of potable water supply water supply consists of groundwater pumped from the Indian Wells Valley Groundwater Basin (IWVGB). Although California had experienced severe drought conditions extending from 2012 through 2017, the IWVWD did not experience any actual supply deficiencies due to its reliance on local groundwater sources.

The IWVGB is one of 21 basins in the state that the DWR determined is in "critical overdraft," meaning that the Basin suffers from chronic overuse of water supplies beyond the natural recharge of the Basin. The region has created a Groundwater Sustainability Agency (the Indian Wells Valley Groundwater Authority or IWVGA) to take policy steps that address the long-term sustainability of the IWVGB. IWVGA is a joint-powers authority consisting of the City of Ridgecrest, County of Kern, County of Inyo, County of San Bernardino, and the Indian Wells Valley Water District. IWVGA is in the process of implementing a Groundwater Sustainability Plan (GSP) to reverse the effects of overdraft while maintaining the water needs of area residents and business, which include the Indian Wells Valley Water District. The GSP was submitted to the DWR on January 31, 2020 and was approved by DWR January 13, 2022. As part of the plan, the IWVGA is implementing a series of projects and procedures to slow the groundwater overdraft and bring the basin back into long-term sustainability.



The GSP includes alternatives for implementation of a recycled water program, alternatives for purchasing and importing water to the IWVGB, and a program to facilitate fallowing of active farmland, among other projects and programs.

IWVWD does not have an immediate concern with short-term water supply reliability, and because the District's water supply is groundwater, the District is not subject to short-term water shortages resulting from temporary dry weather conditions. As described in the District's 2020 Urban Water Management Plan (2020 UWMP), the District and other groundwater users in the Indian Wells Valley have been implementing ongoing groundwater management practices to extend the useful life of the groundwater resource to meet current and future demands.

The District's goal is to provide its customers with adequate and reliable supplies of high-quality water, which meet present and future needs in an environmentally and economically responsible manner. The District's projected water supply reliability under normal conditions, during a single dry water year, and during a drought lasting up to five consecutive years, is shown in **Tables 2-1** through **2-3** below.

TABLE 2-1 PROJECTED NORMAL YEAR SUPPLY AND DEMAND COMPARISON					
	2025	2030	2035	2040	2045
Supply totals (acre-feet per year (AF/yr))	23,000	23,000	23,000	23,000	23,000
Demand totals (AF/yr)	6,930	7,130	7,690	7,830	8,050
Difference (supply minus demand, in AF/yr)	16,070	15,870	15,310	15,170	14,950
Difference as % of Supply	70%	69%	67%	66%	65%
Difference as % of Demand	232%	226%	199%	194%	186%

TABLE 2-2 PROJECTED SINGLE DRY YEAR SUPPLY AND DEMAND COMPARISON					
	2025	2030	2035	2040	2045
Supply totals (AF/yr)	23,000	23,000	23,000	23,000	23,000
Demand totals (AF/yr)	6,930	7,130	7,690	7,830	8,050
Difference (supply minus demand, in AF/yr)	16,070	15,870	15,310	15,170	14,950
Difference as % of Supply	70%	69%	67%	66%	65%
Difference as % of Demand	232%	226%	199%	194%	186%



TABLE 2-3 PROJECTED MULTIPLE ⁽¹⁾ DRY YEARS SUPPLY AND DEMAND COMPARISON					
	2025	2030	2035	2040	2045
Supply totals (AF/yr)	23,000	23,000	23,000	23,000	23,000
Demand totals (AF/yr)	6,930	7,130	7,690	7,830	8,050
Difference (supply minus demand, in AF/yr)	16,070	15,870	15,310	15,170	14,950
Difference as % of Supply	70%	69%	67%	66%	65%
Difference as % of Demand	232%	226%	199%	194%	186%

⁽¹⁾ Based on a drought lasting five consecutive years and ending in the year specified in each column.

The estimated groundwater supply of 23,000 acre-feet per year (AF/yr) is based on the maximum quantity of water that the District is capable of producing if all existing wells operate continuously for 24 hours per day (20,856 AF/yr rounded down). The District has not experienced an actual supply deficiency during dry years. The District is located in an arid high desert region; therefore, supply and demand remain relatively unchanged in the District's service area during dry years, and the District does not expect a decrease in supply based on drought conditions (including a drought lasting up to five years) or climate change.

Since the District relies exclusively on groundwater as its source of supply, and is therefore not subject to short-term shortages caused by periodic drought, the analysis herein focuses on equipment failure and disaster. **Table 2-4** below shows the nominal production capability for each of the District's production wells.

TABLE 2-4 SUPPLY SOURCE PRODUCTION CAPABILITY	
Well No.	Nominal Production Capacity (gallons per minute(gpm))
9A	1,000
10	1,100
11	1,200
13	1,200
17	1,200
18	1,200
30	1,400
31	1,200
33	1,200
34	2,000
35	1,200
Total	13,900



The District's current pumping plant capacity is capable of providing for the current maximum day demand of 4400 gallons per minute (gpm), with a reserve capacity of 9500 gpm.

The District has an emergency water system interconnection with the China Lake Naval Air Weapons Station (China Lake NAWS) which permits either entity to deliver water to the other as needed to meet water supply requirements during emergencies. If, during a period of peak demand, multiple pumping plants were out of service, the District may rely upon water supplied from the emergency interconnection with the China Lake NAWS to make up the pumping shortfall (there is some emergency supply in storage). The District also has an emergency interconnection with Searles Valley Minerals (SVM); however, the District cannot accept water from the SVM interconnection because SVM water is not chlorinated until further downstream.

Additionally, the District recently approved a modified version of its Water Supply Improvement Project, which is designed to increase the District's water production capacity and maintain a 20% redundancy factor above the estimated maximum day demand to accommodate scheduled and unscheduled maintenance and repairs. As part of the project, Well 35 has been constructed and was placed into service August of 2021, which increased the District's production capacity by an estimated 1,200 gpm. The District plans to increase Well 35's capacity to 2,200 in the future.

The District's *Emergency Response Plan for the Indian Wells Valley Water District*, dated October 2019 (referred to as the Emergency Response Plan) outlines the actions to be taken in the event of a major catastrophe. The Emergency Response Plan is reviewed regularly and updated as needed. The District's Emergency Response Plan is incorporated herein by reference and is kept on file at the District's office.

The District does not anticipate any inconsistency in supply due to legal, environmental, water quality, or climate factors. Factors that can cause water supply shortages or supply interruptions for the District are earthquakes, equipment failure, chemical spills, and energy outages at treatment and pumping facilities. The actions the District will take in the event of a water supply shortage or supply interruption are described in **Section 4** herein.

SECTION 3

ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES



**SECTION 3
ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES**

Water Code

10632(a) Every urban water supplier shall prepare and adopt a water shortage contingency plan as part of its urban water management plan that consists of the following elements:

(2) The procedures used in conducting an annual water supply and demand assessment that include, at a minimum, both of the following:

(A) The written decision-making process that an urban water supplier will use each year to determine its water supply reliability.

(B) The key data inputs and assessment methodology used to evaluate the urban water supplier's water supply reliability for the current year and one dry year, including all of the following:

(i) Current year unconstrained demand, considering weather, growth, and other influencing factors, such as policies to manage current supplies to meet demand objectives in future years, as applicable.

(ii) Current year available supply, considering hydrological and regulatory conditions in the current year and one dry year. The annual supply and demand assessment may consider more than one dry year solely at the discretion of the urban water supplier.

(iii) Existing infrastructure capabilities and plausible constraints.

(iv) A defined set of locally applicable evaluation criteria that are consistently relied upon for each annual water supply and demand assessment.

(v) A description and quantification of each source of water supply.

10632.1 An urban water supplier shall conduct an annual water supply and demand assessment pursuant to subdivision (a) of Section 10632 and, on or before July 1 of each year, submit an annual water shortage assessment report to the department with information for anticipated shortage, triggered shortage response actions, compliance and enforcement actions, and communication actions consistent with the supplier's water shortage contingency plan. An urban water supplier that relies on imported water from the State Water Project or the Bureau of Reclamation shall submit its annual water supply and demand assessment within 14 days of receiving its final allocations, or by July 1 of each year, whichever is later.

In accordance with CWC Section 10632.1, the District is required to prepare and submit an annual water supply and demand assessment (referred to herein as the Annual Assessment) to the DWR each year by July 1, beginning in 2022. The Annual Assessment will be conducted based on the procedures described in this section of the WSCP.



3.1 Decision-Making Process

The process and anticipated timeline that the District will follow in conducting its Annual Assessment is below.

January

Convene Water Shortage Response Team (WSRT), as defined in Section 1.3 herein. WSRT will assess supplies and demands based on monitoring data and current conditions.

February

WSRT will develop preliminary report and present to Board of Directors.

March

WSRT will prepare an updated Annual Assessment report based on current supply and demand data. If a shortage is anticipated, District staff will use the WSCP to determine shortage level and appropriate actions, including triggered shortage response actions, compliance and enforcement actions, and communication actions.

April

WSRT will present Annual Assessment report and accompanying ordinance or resolution to Board of Directors for consideration and approval. If revisions to the Annual Assessment report or accompanying ordinance or resolution are needed after Board review, District staff will make the necessary revisions and present the final versions to the Board for review and approval prior to submission to DWR.

June

District will submit final Annual Assessment Report to DWR. The report is due on or before July 1 each year, with the first report due on or before July 1, 2022.

3.2 Data and Methodologies

This section includes a description of the key data inputs and methodology used to evaluate the District's water system reliability in preparation of the Annual Assessment.



Key Data Inputs:

- Prior year water demand
- Estimated water demand for the following year
- Capacity and current condition of all existing wells
- Capacity and current condition of all existing storage tanks
- Status of current and proposed water system facilities projects

District staff will evaluate all available data to determine any supply or facilities constraints or deficiencies. If shortages are anticipated, the District will use this WSCP to determine the anticipated shortage level and appropriate actions.

3.3. Communication Protocols

<u>Water Code</u>	
10632(a)	Every urban water supplier shall prepare and adopt a water shortage contingency plan as part of its urban water management plan that consists of each of the following elements:
(5)	Communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments, regarding, at a minimum, all of the following:
	(A) Any current or predicted shortages as determined by the annual water supply and demand assessment described pursuant to Section 10632.1.
	(B) Any shortage response actions triggered or anticipated to be triggered by the annual water supply and demand assessment described pursuant to Section 10632.1.
	(C) Any other relevant communications.

The District maintains a website, www.iwvwd.com, with public notices, announcements, mandatory and voluntary water conservation measures, conservation tips, adopted ordinances, and other information. The District will prominently display on its website notice of any current or predicted water shortages or any shortage response actions triggered or anticipated to be triggered by the annual water supply and demand assessment or by the District's routine monitoring activities. The District will also communicate a current or anticipated Water Supply Shortage, Drought State of Emergency, or Local Water Supply Shortage, defined in **Section 1.3** herein, by mail, various social media outlets, and email.

SECTION 4

**WATER SHORTAGE LEVELS AND
SHORTAGE RESPONSE ACTIONS**



SECTION 4 WATER SHORTAGE LEVELS AND SHORTAGE RESPONSE ACTIONS

Water Code

- 10632(a)** Every urban water supplier shall prepare and adopt a water shortage contingency plan as part of its urban water management plan that consists of each of the following elements:
- (3) (A) Six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, and 50 percent shortages and greater than 50 percent shortage. Urban water suppliers shall define these shortage levels based on the suppliers' water supply conditions, including percentage reductions in water supply, changes in groundwater supply levels, changes in surface elevation or level of subsidence, or other changes in hydrological or other conditions indicative of the water supply available for use. Shortage levels shall also apply to catastrophic interruption of water supplies, including, but not limited to, a regional power outage, an earthquake, and other potential emergency events.
 - (B) An urban water supplier with an existing water shortage contingency plan that uses different water shortage levels may comply with the requirement in subparagraph (A) by developing and including a cross-reference relating its existing categories to the six standard water shortage levels.
 - (4) Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following:
 - (A) Locally appropriate supply augmentation actions.
 - (B) Locally appropriate demand reduction actions to adequately respond to shortages.
 - (C) Locally appropriate operational changes.
 - (D) Additional, mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions and appropriate to the local conditions.
 - (E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action.

4.1 Water Shortage Levels

CWC Section 10632(a)(3)(A) sets forth six standard water shortage levels that correspond to progressive ranges of shortage, up to and including a shortage of greater than 50 percent. The District's shortage response actions are summarized in **Table 4-1** below, which is based on DWR Submittal Table 8-1, a table that is required by DWR for submission with 2020 WSCPs. The District's shortage response actions are described in additional detail in Sections **4.2 through 4.5**.



TABLE 4-1 WATER SHORTAGE CONTINGENCY PLAN LEVELS (FROM DWR SUBMITTAL TABLE 8-1)		
Shortage Level	Percent Shortage Range	Shortage Response Actions (Narrative description)
1	Up to 10%	The District routinely provides water conservation information to customers. Because the District has adequate capacity to provide regular service to customers at this shortage level, no additional actions will be taken by the District in response to a shortage level of 10% or less.
2	Up to 20%	The District will notify customers via customer portal and will provide conservation information to customers, explaining importance of water use reductions. The District will provide technical information to customers regarding methods of improving water use efficiency. The District will conduct a media campaign to remind customers of the need to save water.
3	Up to 30%	The District will notify customers via customer portal and will provide conservation information to customers, explaining importance of water use reductions. The District will provide technical information to customers regarding methods of improving water use efficiency. The District will conduct a media campaign to remind customers of the need to save water.
4	Up to 40%	Water use in excess of Tier 1, as defined in District Ordinance No. 107, will be considered Excessive Water Use and will be assessed a fine of \$100 for the initial HCF of usage in Tier 2 and an additional \$10 for each HCF over the initial Tier 2 HCF. Fines will be increased (see section 4.2.2) for each consecutive billing cycle in which a customer exceeds Tier 1 water use. In severe situations, water rationing may be implemented.
5	Up to 50%	Water use in excess of Tier 1, as defined in District Ordinance No. 107, will be considered Excessive Water Use and will be assessed a fine of \$100 for the initial HCF of usage in Tier 2 and an additional \$15 for each HCF over the initial Tier 2 HCF. Fines will be increased for each consecutive billing cycle in which a customer exceeds Tier 1 water use. In severe situations, water rationing may be implemented.
6	>50%	Water use in excess of Tier 1, as defined in District Ordinance No. 107, will be considered Excessive Water Use and will be assessed a fine of \$100 for the initial HCF of usage in Tier 2 and an additional \$20 for each HCF over the initial Tier 2 HCF. Fines will be increased for each consecutive billing cycle in which a customer exceeds Tier 1 water use. In severe situations, water rationing may be implemented.



4.2 Shortage Response Actions

The District has developed a rationing plan (refer to **Table 4-2**) to implement during a Water Supply Shortage which coincides with the actions to be taken during a Drought State of Emergency or a Local Water Supply Shortage.

The District's rationing plan includes voluntary and mandatory rationing, which will be implemented based on factors, including but not limited to, the cause, severity, and anticipated duration of the Water Supply Shortage. Voluntary rationing occurs when a Level 2 or 3 (up to 30% shortage) exists or a Drought State of Emergency, that contains mandatory water usage restrictions, has been declared by the Governor. Mandatory rationing will be implemented when a Level 4 shortage condition (>30% shortage) exists or a Local Water Supply Shortage has been declared by the District.

A Water Supply Shortage may be triggered by a shortage in aquifer supply, equipment failure, catastrophe (such as earthquake or power outage), or other event that results in a Water Supply Shortage. Once a Water Supply Shortage is triggered, depending on the shortage condition, either voluntary or mandatory rationing will be implemented as described in **Table 4-2** below.

TABLE 4-2 WATER SHORTAGE LEVELS AND REDUCTION GOALS			
Shortage Level	Shortage Condition	Customer Reduction Goal	Type of Rationing Program
1	≤10%	--	Voluntary*
2	≤20%	25%	Voluntary*
3	≤30%	25%	Voluntary*
4	≤40%	30%	Mandatory
5	≤50%	35%	Mandatory
6	>50%	40%	Mandatory

* In the event the State of California issues mandatory water conservation requirements, whether or not such requirements are accompanied by a Governor-declared Drought State of Emergency, the District will adopt an ordinance setting forth mandatory measures to comply with such mandatory water conservation requirements.



4.2.1 Voluntary Rationing Program

In the event of a Level 2 or 3 shortage condition, the District will implement the voluntary measures outlined in **Items (1) through (4)** below. These voluntary measures, will also be implemented in the event of a Level 4, 5, or 6 water shortage condition, a Local Water Supply Shortage, or a Drought State of Emergency, that include mandatory water usage restrictions. Note that during any shortage condition level, the requirements of District Ordinance No. 103 and the penalties applicable to violations thereof remain in effect. District Ordinance No. 103 is described in **Section 6.3** herein, and a copy of said ordinance is included in **Appendix 4**.

- 1) The District will notify customers of the water shortage by customer portal, mail, the District's website, various social media outlets, and email. Conservation information will be mailed to every customer, which will explain the importance of significant water use reductions.
- 2) Technical information will be provided to the District's customers regarding methods for improving water use efficiency.
- 3) The District will conduct a media campaign to remind consumers of the need to save water.

4.2.2 Mandatory Rationing Program

In the event of a Level 4, Level 5, or Level 6 shortage condition or a Local Water Supply Shortage, water use in excess of Tier 1 water use is considered Excessive Water Use and is subject to the penalties described below. The District's tiered usage Allotment, listed in **Table 4-3** below, is based on the District's tiered rate structure, which is set forth in the *Indian Wells Valley Water District Water Sales & Service Policy Manual* (Ordinance No. 106, as amended by Ordinance No. 107), a copy of which is included in **Appendix 3** herein. The rate structure is organized into usage tiers based on quantity, meter size, and connection type.

The quantities of water designated in **Table 4-3** and Ordinance No. 107 are given in units of hundred cubic feet (HCF), which is the standard measurement for all District water



deliveries and is indicated on the District's water bills and water meters. One HCF is equivalent to 748 gallons of water.

TABLE 4-3 USE ALLOTMENT PER TIER IN HUNDRED CUBIC FEET (HCF) PER ORDINANCE NO. 107 - WATER SALES AND SERVICE POLICY MANUAL				
Tier	3/4" Meter	1" Meter	1-1/2" Meter	2" Meter
Tier 1	0 - 20	0 - 33	0 - 65	0 - 104
Tier 2	20.01 and over	33.01 and over	65.01 and over	104.01 and over
Tier	3" Meter	4" Meter	6" Meter	8" Meter
Tier 1	0 - 208	0 - 325	0 - 650	0 - 1,040
Tier 2	208.01 and over	325.01 and over	650.01 and over	1,040.01 and over

During a Level 4, 5, or 6 shortage condition or a Local Water Supply Shortage, the following will apply, in addition to the actions applicable during a Level 2 or 3 shortage condition:

- 1) Water use in excess of Tier 1 of the District's rate structure in a single billing cycle shall be considered Excessive Water Use.
- 2) A customer exceeding Tier 1 usage in a single billing cycle shall be assessed a fine of \$100 for the initial HCF of usage in Tier 2. An additional fine of \$10, \$15, or \$20 depending on water shortage level, for each HCF of usage over the initial Tier 2 HCF of usage shall be assessed in addition to the base rate.
- 3) For each consecutive billing cycle that a customer's usage exceeds Tier 1 usage, the previous fine shall be increased by \$100 for the initial HCF of usage in Tier 2. The additional \$10, \$15, or \$20 fine for each HCF of usage over the initial Tier 2 HCF of usage shall similarly increase \$10, \$15 or \$20 in addition to the base rate. For example, a second consecutive billing cycle will result in an Excessive Water Use fine of \$200 for the initial HCF of Tier 2 usage. For each additional HCF of Tier 2 usage, a penalty of \$20 shall be assessed in addition to the base rate of a level 4 violation. A third consecutive billing cycle will result in an Excessive Water Use fine of \$300 for the initial HCF of Tier 2 usage. For each additional HCF of Tier 2 usage, a penalty of \$30 shall be assessed in addition to the base rate.



The fines shall increase in increments of \$100 and \$10, \$15, or \$20 depending on water shortage level, respectively, up to a maximum of \$500 for the initial HCF of Tier 2 usage and \$50, \$75, or \$100 for each additional HCF over the initial HCF of Tier 2 usage in addition to the base rate.

- 4) Any fine resulting from violation of this WSCP will be added to the customer's water bill and is due and payable with that water bill.
- 5) Non-payment of a fine shall be addressed with due process in mind.

4.3 Drought State of Emergency

During a period for which the Governor has issued a proclamation of a Drought State of Emergency, water use in excess of Tier 1 water use is considered Excessive Water Use and the following will apply:

- 1) Water use in excess of Tier 1 of the District's rate structure in a single billing cycle shall be considered Excessive Water Use.
- 2) Water use in excess of Tier 1 of the District's rate structure in a single billing cycle will be assessed a fine of 1% of the total Tier 2 use during that billing cycle until the Drought State of Emergency is declared over by proclamation of the Governor or like action.
- 3) Any fine resulting from violation of this WSCP will be added to the customer's water bill and is due and payable with that water bill.
- 4) Non-payment of a fine shall be addressed with due process in mind.

4.4 Emergency Response Actions During a Catastrophic Interruption of Water Supplies

The water shortage contingency analysis includes the possibility of a catastrophic interruption of water supplies impacting the District's ability to deliver water. Events that can cause catastrophic outages include earthquakes, chemical spills, and power outages at treatment plants and pumping facilities. The *Emergency Response Plan for the Indian Wells Valley Water District*, dated October



2019, referred to as the Emergency Response Plan, describes the actions to be taken in the event of a catastrophic interruption of water supplies. The Emergency Response Plan is reviewed regularly and updated as needed. The District's Emergency Response Plan is incorporated herein by reference and is kept on file at the District's office.

The Emergency Response Plan is coordinated with other emergency services, including police, fire, medical services, other utilities, as well as county, state, and federal agencies. The Emergency Response Plan includes procedures for reportable emergency incidents, notifications, boil water orders, unsafe water alerts, and emergency chlorination.

The following steps comprise the District's procedure for emergency situation response and evaluation of a catastrophic interruption of water supplies.

STEP 1: The priority response to any degree of disaster, prior to plant evaluation, is to shut and lock off the inlet and outlet valves of the Bowman #2 service-level storage tank on West Bowman Road. This tank is one of the three service-level storage tanks in the A-Zone, which can supply water to the District's main distribution grid. The isolation of this tank will have minimal effect on the hydraulics of the system and can be left off, pending evaluation of the distribution mains.

STEP 2: Evaluate the integrity of the District's remaining service-level storage tanks and the quantities of water still contained therein.

STEP 3: Coordinate the personnel available for use in the emergency and establish District communication. Next, establish communication with other local governmental and law enforcement agencies.

STEP 4: Evaluate the damage done to the rest of the District's facilities, including wells and distribution mains.

****** Damaged mains will be assumed contaminated, and therefore will not be put back into service until the District determines that they comply with all applicable federal and state laws and regulations. ******



If system evaluation shows a loss of capacity, then depending on the amount of capacity lost, it might be necessary to valve off additional service-level storage tanks to protect the system from loss of stored water. District staff maintains the ability to take any necessary action to maintain the integrity of all District facilities.

The general priorities for valving off additional service-level storage are:

- 1. R/C Heights Tank 3,000,000 gallons
- 2. Springer Tank 2,000,000 gallons
- 3. C-Zone Tanks 2,00,000 gallons
- 4. Gateway Tanks 1,550,000 gallons

And in a drastic situation:

- 5. Salisbury Tank 400,000 gallons
- 6. Kendall Tank 2,000,000 gallons
- 7. College Tanks 1,100,000 gallons

As soon as the evaluation is complete, the District will communicate necessary information to other emergency services and to the public. If plant integrity is found to be good, any storage tanks that have been valved off can be put back online as determined by the District. The District's storage facilities are listed in **Table 4-4**.

TABLE 4-4 EXISTING STORAGE FACILITIES					
No.	Total Volume (gallons)	Number of Storage Tanks	Name	Zone	Location
1	7,000,000	2	Bowman	A	West Bowman Road
2	2,000,000	1	Kendall	A	Kendall Street
3	3,000,000	1	R/C Heights	B	Kendall & Brady
4	2,000,000	1	Springer	B	Springer Street
5	1,550,000	2	Gateway	B	Gateway & Jarvis
6	2,000,000	2	C-Zone	C	Sunland, South of Jarvis
7	400,000	1	Salisbury	D	Belle Vista & Richmond
8	1,100,000	2	College	E	East of Cerro Coso College



The District maintains spare motors and pumping equipment for use at any of its pumping plants and has typically been able to return pumping plants to service within two weeks after minor damage. Further, the District has adequate backup power (generators) to provide emergency water service (indoor domestic use only) to its customers in the event of a catastrophic interruption of water supplies. Refer to the water Allotments described in **Section 4.5** below.

The District has interconnection agreements with the China Lake Naval Air Weapons Station (China Lake NAWS) and Searles Valley Minerals (SVM). The District's interconnection with China Lake NAWS includes facilities that can transfer approximately 1,300 gpm from China Lake NAWS to the District and approximately 2,000 gpm from the District to China Lake NAWS under emergency conditions. The District's interconnection with SVM consists of a single tie-in located in the northern half of the District's service area, and allows SVM to take up to approximately 750 gpm from the District under emergency conditions. Since SVM does not perform well-head disinfection, the District cannot currently accept water from SVM.

4.5 Water Allotments During a Catastrophic Interruption of Water Supplies

In the event of a catastrophic interruption of water supplies, the District will establish mandatory monthly Allotments for each connection. The water Allotment for a residential customer is based on the minimum quantity that is required for health and safety needs (e.g. drinking, personal hygiene). The District has established said minimum quantity as 68 gallons per capita per day (gpcd), which is based on five (5) flushes per day of a 5.5 gallons-per-flush toilet, five (5) minutes in a 4.0 gallons-per-minute shower, 12.5 gpcd for clothes washing, 4 gpcd for kitchen use, and 4 gpcd for other use; as shown in Table 23 of the 2015 Urban Water Management Plan. The water Allotment for commercial, industrial, and landscape connections will be based on average use during a three-year base period that will supplement the voluntary measures outlined in



Section 4.2.1. Said base period will be selected by the District's Water Shortage Response Team, which is defined in **Section 1.3** herein.

a. Allotments by Customer Type

1) Single-Family Residential Connections

Each single-family residential connection will receive an Allotment, calculated as described below.

The Allotment for Single-Family Residential Connections is determined by the following equation:

$$\boxed{68 \text{ Gallons per Capita per Day (gpcd)}} \times \boxed{3.1 \text{ Persons per Household}} \times \boxed{\text{Number of Days in the Billing Month}}$$

Each single-family residential connection will receive no more than 103 HCF per year (68 gpcd minimum water requirement x 3.1 persons per household x 365 days = 76,942 gallons ÷ 748 = 103 HCF) per dwelling unit plus 20% of the Allotment. The 103 HCF per year equates to 0.2822 HCF per day. This daily figure will be used to calculate the monthly Allotments based on the number of days in the relevant month(s).

2) Multi-Family Residential Connections

Each multi-family residential connection will receive an Allotment, calculated as described below.

The Allotment for Multi-Family Residential Connections is determined by the following equation:

$$\boxed{68 \text{ Gallons per Capita per Day (gpcd)}} \times \boxed{2.3 \text{ Persons per Household}} \times \boxed{\text{Number of Days in the Billing Month}}$$

Each multi-family residential connection will receive no more than 76 HCF per year (68 gpcd minimum water requirement x 2.3 persons per dwelling unit x 365



days = 57,086 gallons ÷ 748 = 76 HCF) per dwelling unit plus 20% of the Allotment. The 76 HCF per year equates to 0.2082 HCF per day. This daily figure will be used to calculate the monthly Allotments based on the number of days in the relevant month(s).

- 3) The Allotment for each commercial and industrial connection will be no more than 60% of average usage for said account for the same billing month over the selected three-year base period.
- 4) Each account that has been identified as a landscape connection will receive an Allotment consisting of 20% of the average water use of said account for the same billing month over the selected three-year base period, unless the specific account has been determined by District staff to meet the District's landscape guidelines for xeriscape design, irrigation, and maintenance, in which case it will receive 70% of the average water usage for said account for the billing month over the selected three-year base period.
- 5) No meters will be installed for new accounts during a Water Supply Shortage or a Drought State of Emergency.

b. Increased Customer Allotments

Increased Allotments may be approved for the following:

- 1) **Substantial Medical Requirements:** Increased Allotments to a residential customer may be established and approved when the residential customer has established to the satisfaction of the District that the Allotment would be dangerous to the health of the residential customer or a full-time resident of the residential customer's household. Certification from a licensed physician, public health nurse, or a social worker may be required by the District.
- 2) **Residential Connections with Four or More Residents in a Single-Family Household or Three or More Residents per Unit in a Multi-Family Residence:** These connections may, at the discretion of the District, receive additional



Allotments based upon the same calculations used for Allotments. A census may be conducted to determine the actual number of residents per dwelling unit. Increased Allotments will be approved for permanent residents only. Permanent residents are defined as people who live in the specific residence a minimum of five days per week, nine months per year.

- 3) Commercial Customers for which Water Supply Reductions Will Result in Unemployment or Decreased Production: A District water auditor must first confirm that the Commercial Customer has implemented all applicable water efficiency improvements.
- 4) Non-commercial customers can appeal for additional or increased Allotments for a horse, cow, or other large non-domestic animal, and for each efficiently irrigated mature fruit tree.
- 5) Government agencies may have separate Allotments.

c. Appeals Procedure for Customer Allotments

Customers may appeal their Allotment in accordance with the procedure described below.

- 1) Any person who wishes to appeal their customer classification or Allotment must do so in writing, using forms and procedures to be provided by the District.
- 2) Appeals will be handled and decided by the Water Shortage Response Team. Site visits will be scheduled as determined by the Water Shortage Response Team.
- 3) One of the conditions of approval will be that all applicable plumbing fixtures or irrigation systems be replaced or modified to provide maximum water conservation.
- 4) The Water Shortage Response Team may enlist the services of a qualified consultant to assist in making the final decision of any appeal.
- 5) The Water Shortage Response Team will approve or deny all appeals.



- 6) If the applicant disagrees with the decision of the Water Shortage Response Team, the applicant may further appeal the decision which will then be heard by the District's Board of Directors, who will make the final determination.

- 7) The decision on all appeals will be reported monthly to the District's Board of Directors as a part of the District's Water Supply Report.



4.6 Shortage Response Action Effectiveness

TABLE 4-5 DEMAND REDUCTION ACTIONS (FROM DWR SUBMITTAL TABLE 8-2)				
Shortage Level	Demand Reduction Actions <i>Drop down list</i> <i>These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.</i>	How much is this going to reduce the shortage gap? <i>Include units used (volume type or percentage)</i>	Additional Explanation or Reference <i>(optional)</i>	Penalty, Charge, or Other Enforcement? <i>For Retail Suppliers Only</i> <i>Drop Down List</i>
2	Expand Public Information Campaign		See Notes	No
2	Increase Frequency of Meter Reading		See Notes	No
2	Offer Water Use Surveys		See Notes	No
2	Provide Rebates on Plumbing Fixtures and Devices		See Notes	No
2	Landscape - Restrict or prohibit runoff from landscape irrigation		See Notes	No
2	Landscape - Limit landscape irrigation to specific times		See Notes	No
2	Landscape - Limit landscape irrigation to specific days		See Notes	No
2	CII - Lodging establishment must offer opt out of linen service		See Notes	No
2	CII - Restaurants may only serve water upon request		See Notes	No
2	Water Features - Restrict water use for decorative water features, such as fountains		See Notes	No
2	Pools and Spas - Require covers for pools and spas		See Notes	No
2	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner		See Notes	No
2	Other - Prohibit use of potable water for washing hard surfaces		See Notes	No
2	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water		See Notes	No
4, 5, 6	Implement or Modify Drought Rate Structure or Surcharge	Minimal	See Notes	Yes
4, 5, 6	Moratorium or Net Zero Demand Increase on New Connections	Minimal	See Notes	No

NOTES: Actions implemented for each Shortage Level will also be implemented for all higher shortage levels. Most of the actions listed for Level 2 are already in place by ordinance. Because of existing conservation measures already in place, including many of those listed above, substantial water use reduction is not expected during Level 2. Actions implemented for Levels 4-6 are expected to result in an unknown reduction in any shortage gap, but any reduction is expected to be minimal.



TABLE 4-6 SUPPLY AUGMENTATION AND OTHER ACTIONS (FROM DWR SUBMITTAL TABLE 8-3)			
Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier <i>Drop down list</i> <i>These are the only categories that will be accepted by the WUEdata online submittal tool</i>	How much is this going to reduce the shortage gap? <i>Include units used (volume type or percentage)</i>	Additional Explanation or Reference <i>(optional)</i>
4	Stored Emergency Supply		Existing storage in reservoirs
4	Transfers	1,300 gpm	Emergency interconnection with China Lake NAWS
NOTES: Supply augmentation methods will be implemented as deemed necessary by the District's Board of Directors and are not limited to any particular shortage level.			

SECTION 5

SEISMIC RISK ASSESSMENT AND MITIGATION PLAN



**SECTION 5
SEISMIC RISK ASSESSMENT AND MITIGATION PLAN**

Water Code

- 10632.5**
- (a) In addition to the requirements of paragraph (3) of subdivision (a) of Section 10632, beginning January 1, 2020, the plan shall include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities.
 - (b) An urban water supplier shall update the seismic risk assessment and mitigation plan when updating its urban water management plan as required by Section 10621.
 - (c) An urban water supplier may comply with this section by submitting, pursuant to Section 10644, a copy of the most recent adopted local hazard mitigation plan or multihazard mitigation plan under the federal Disaster Mitigation Act of 2000 (Public Law 106-390) if the local hazard mitigation plan or multihazard mitigation plan addresses seismic risk.

To comply with CWC Section 10632.5, this WSCP includes a copy of the most recent hazard mitigation plan adopted for Kern County, *County of Kern Multi-Jurisdiction 2020 Hazard Mitigation Plan*, which was adopted by Kern County on February 11, 2021 and approved by the Federal Emergency Management Agency (FEMA) on April 9, 2021. The plan includes a seismic risk assessment for the county, and a copy of said plan is included in **Appendix 5** herein.

Measures that the District will take in the event of a seismic event will depend upon the resultant water shortage level or whether a catastrophic water supply interruption results from the seismic event, and are described in **Section 4** herein.

SECTION 6
PROHIBITIONS, PENALTIES, AND APPEALS



SECTION 6 PROHIBITIONS, PENALTIES, AND APPEALS

Water Code

10632(a)(6) For an urban retail water supplier, customer compliance, enforcement, appeal, and exemption procedures for triggered shortage response actions as determined pursuant to Section 10632.2.

The District currently has multiple ordinances in effect that prohibit or restrict specific water use practices. Ordinance No. 98 requires a water efficient landscape as a condition of receiving new water service, and Ordinance No. 99 requires water efficient landscape as a condition of receiving new multi-family dwellings, commercial, and/or institutional water service. Ordinance No. 103, adopted September 11, 2017 imposes water use prohibitions and restrictions, as well as penalties for noncompliance. It is important to note that, as of the adoption of the WSCP, Ordinance No. 93 is currently superseded by Ordinance No. 100, and Ordinance No. 100 is currently superseded by Ordinance No. 103; however, Ordinance No. 100 will be put back into effect if Ordinance No. 103 is rescinded by the District. Likewise, Ordinance No. 93 will be put back into effect if Ordinance No. 100 is rescinded by the District. Ordinance Nos. 93, 100, and 103 are described below, and copies of these ordinances are included **Appendix 4** herein.

6.1 Ordinance No. 93

a. Summary

The District adopted *Ordinance No. 93 Ordinance of the Board of Directors of the Indian Wells Valley Water District, Kern and San Bernardino Counties, California, Rescinding Ordinance No. 72 in its Entirety; and Adopting Voluntary and Mandatory Conservation Measures and Recommending and/or Requiring Certain Water Conservation Measures*, effective as of May 10, 2010, also referred to as the Water Efficient Landscape Ordinance.

Ordinance No. 93 sets forth landscape procedures for new development (including residential, commercial, industrial, and institutional development), including water features and new swimming pools. Additionally, Ordinance No. 93 includes certain mandatory water restrictions for all District customers.



Ordinance No. 93 is currently superseded by Ordinance No. 100, until such time that Ordinance No. 100 is rescinded by the District's Board of Directors. As noted in Section 6.2, Ordinance No. 103 supersedes Ordinance No. 100. The water use restrictions, the associated penalties, and the appeal process pursuant to Ordinance No. 93 are described in **Items b through d** below.

b. Water Use Restrictions Pursuant to Ordinance No. 93

The following water use restrictions will be in effect in accordance with Ordinance No. 93, upon rescission of Ordinance No. 100:

- 1) All new single-family residential landscape projects are subject to District Ordinance No. 98, which imposes mandatory restrictions on landscaping and rescinded Ordinance No. 90. All existing single-family residential landscape projects which are not subject to Ordinance No. 98 are encouraged to abide by these recommendations. Existing landscape areas larger than one acre may be audited so recommendations can be made for water savings.
- 2) **Item (4)** below cites the Approved Plant List. The Approved Plant List is the list formulated by District Staff and approved and/or modified by the District's Board of Directors. The Approved Plant List is a requirement for new development subject to District Ordinance Nos. 98 and 99. The Approved Plant List is a recommendation for existing single-family and multi-family dwellings, commercial, and/or institutional development.
- 3) The following is recommended for all single-family homes:
 - a) Turf landscaping should not exceed 2,000 square feet of single-family residential lots 10,000 square feet or smaller.
 - b) Turf landscaping should not exceed 3,000 square feet of single-family residential lots 10,001 square feet or larger.



- c) Irrigation and Landscape Design. Homebuilders, developers, and/or landscape contractors should provide the residential customer with an irrigation design and landscape design that would, if installed, demonstrate compliance with Ordinance No. 93. Low volume irrigation systems will be demonstrated along with low water use plant material.
 - d) The irrigation design needs to show proper drainage to eliminate water waste.
 - e) Irrigation Drainage. All irrigation water is to remain on property during normal water run cycle, such that there is minimal or limited runoff from the area being irrigated, specifically onto sidewalks and streets.
- 4) All new landscape projects for multi-family residential, commercial, industrial, or institutional customers are subject to District Ordinance No. 99, which imposes mandatory restrictions on:
- a) Turf and/or any plants not on the Approved Plant List (defined in Ordinance No. 93 in **Appendix 4** herein) are limited to up to 50% of the landscape area.
 - b) Only the plants from the Approved Plant List, on file and maintained by the District, shall be used within the remaining landscape area.
 - c) The irrigation system in the remaining landscape area must be a Low Volume Irrigation System, as defined in Ordinance No. 93.
 - d) All of the landscape area shall be designed to eliminate any runoff.
 - e) An irrigation and landscape plan shall be submitted to the City of Ridgecrest Planning Department, containing low volume irrigation systems and low water use plants. The irrigation plan shall demonstrate drainage to eliminate water waste. The plan must provide adequate water supply such that all of the water needed can be delivered every other day



within the water window of 8:00 PM - 8:00 AM during the months of May, June, July, August, September, and October.

- f) Irrigation Drainage. All irrigation water is to remain on property during normal water run cycle, such that there is no runoff from the area being irrigated, specifically onto sidewalks and streets.
- 5) Public and private swimming pools and water bodies over 300 square feet shall adhere to the goal of water efficiency, as follows:
- a) New swimming pools shall have a swimming pool cover.
 - b) New swimming pools shall have a drainage plan.
 - c) Water features, including swimming pools, must have recycling or recirculation features.
- 6) No water user shall waste water, as described in the following **Items (a) through (d)**.
- a) Landscape irrigation to an extent which allows water to runoff the area being irrigated, specifically onto sidewalks and streets creating an undue, continuous flow of water.
 - b) Washing down hard or paved surfaces, including but not limited to sidewalks, walkways, driveways, parking areas, tennis courts, patios, or alleys, is prohibited except when necessary to alleviate safety or sanitary hazards, and then only by use of hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off device or a low-volume water broom, high-pressure cleaning machine equipped to recycle any water used. General maintenance cleaning shall be performed by other means, such as by using a broom.



- c) Knowingly allowing water to leak through water connections, hoses, faucets, pipes, outlets, or plumbing fixtures.
 - d) Limits on washing vehicles: Using water to wash or clean a vehicle, including but not limited to any automobile, truck, van, bus, motorcycle, boat, motor home, or trailer, whether motorized or not is prohibited, except by use of a hand-held bucket or similar container or a hand-held hose equipped with a positive self-closing water shut-off nozzle or device. This subsection does not apply to any commercial car washing facility that recycles water.
- 7) Landscape shall not be irrigated on the surface, except for hand watering and/or the use of a drip irrigation system, between the hours of 8:00 AM - 8:00 PM during the months of May, June, July, August, September, and October, unless a special permit is issued to accommodate newly planted material.
- 8) No water shall be provided to any structure hereafter constructed or remodeled unless the plumbing fixtures to be installed conform to requirements of law as to flow capacity.
- c. Notice and Penalties for Violation of Water Use Restrictions Pursuant to Ordinance No. 93
- 1) Upon confirmation by the District of any violation of Ordinance No. 93, if in effect, the District shall provide written notice, along with educational materials to the owner of record and/or occupant. The notice shall be dated and shall specify the address, the nature of the violation, list the steps that must be taken to comply with Ordinance No. 93 and the name and telephone number of a District staff person from whom additional information can be obtained. In addition, the notice shall advise the owner/occupant that termination of water service will result from continued non-compliance. These provisions are for a first violation within any consecutive twelve month period.
 - 2) If the owner/occupant fails to comply with the requirements of the notice pursuant to **Item (c)(1)** above, within a reasonable amount of time, a second violation shall



occur and a second notice containing the information specified in **Item (c)(1)** shall be issued. The second violation shall impose a fine in an amount not to exceed fifty dollars (\$50) and will be charged to and billed on the water user's account. If, under the discretion of the District, satisfactory progress is being made on steps to correct the violation, a second notice will not be issued.

- 3) If the owner/occupant fails to comply with the requirements of the notice pursuant to **Item (c)(2)** above, within a reasonable amount of time, a third violation shall occur and a third notice containing the information specified in **Item (c)(1)** shall be issued. The third violation shall impose a fine in an amount not to exceed two hundred dollars (\$200) and will be charged to and billed on the water user's account.

The third notice shall also notify the owner/occupant that water service will be terminated within thirty (30) calendar days unless the owner/occupant is in compliance with the provisions of Ordinance No. 93. If the owner/occupant fails to comply with the provisions of Ordinance No. 93, the final notice of service termination shall be posted at the entrance to the dwelling/property, which indicates that water service shall be terminated in forty-eight (48) hours.

The District's General Manager shall have the authority to extend any deadlines by a period of time not to exceed an additional 30 days as set forth in Ordinance No. 93.

d. Appeal Process Under Ordinance No. 93

Should a property owner/occupant determined to be in violation of the provisions of Ordinance No. 93 dispute the findings of staff or if said property owner/occupant believes they have sufficient justification for said violation, said property owner/occupant may request a hearing with an appropriate committee of the Board of Directors. The hearing shall be scheduled within thirty (30) calendar days of the request. The hearing shall be attended by the District's General Manager or a designated representative of the General Manager.



The District's General Manager or a designated representative of the General Manager shall mail the property owner/occupant a written decision within ten (10) calendar days of the hearing. If the property owner/occupant is dissatisfied with the outcome of the hearing, the property owner/occupant may request the matter be placed on the agenda of the District's regularly scheduled Board Meeting. The property owner/occupant may then make his or her petition to the Board of Directors. The Board's determination shall be final.

6.2 Ordinance No. 100

a. Summary

On January 11, 2016, the District adopted *Ordinance No. 100 Ordinance of the Board of Directors of the Indian Wells Valley Water District, Kern and San Bernardino Counties, California, Rescinding Ordinance Number 97 in its Entirety and Adopting Emergency Water Conservation Mandatory Restrictions*, a copy of which is included in **Appendix 4** herein. Ordinance No. 100 includes provisions for compliance with the mandatory restrictions imposed by the State Water Resources Control Board's (SWRCB's) emergency water conservation regulations. Ordinance No. 100 supersedes Ordinance No. 93 until such time that Ordinance No. 100 is rescinded by the District's Board. **Ordinance No. 100 is currently superseded by Ordinance No. 103, until such time that Ordinance No. 103 is rescinded by the District's Board of Directors.**

The water use restrictions set forth in Ordinance No. 100 are described below.



b. Water Use Restrictions Pursuant to Ordinance No. 100

The following water use restrictions are in effect in accordance with Ordinance No. 100 (until rescinded by the District's Board of Directors):

- 1) No water user shall waste water. For the purposes of this section, "waste" includes the following and is prohibited:
 - a) Landscape irrigation to an extent which allows water to runoff the landscape area being irrigated, specifically onto sidewalks and streets creating an undue, continuous flow of water.
 - b) Washing down hard or paved surfaces, including but not limited to sidewalks, walkways, driveways, parking areas, tennis courts, patios or alleys, is prohibited except when necessary to alleviate safety or sanitary hazards, and then only by use of handheld bucket or similar container, a handheld hose equipped with a positive self-closing water shut-off device or a low-volume water broom, high-pressure cleaning machine equipped to recycle any water used. General maintenance cleaning shall be performed by other means, such as by using a broom.
 - c) Knowingly allowing water to leak through water connections, hoses, faucets, pipes, outlets, or plumbing fixtures.
 - d) Limits on washing vehicles: Using water to wash or clean a vehicle, including but not limited to any automobile, truck, van, bus, motorcycle, boat, motor home, or trailer, whether motorized or not is prohibited, except by use of a handheld bucket or similar container or a handheld hose equipped with a positive self-closing water shut-off nozzle or device. This subsection does not apply to any commercial car washing facility that recycles water.
- 2) During the months of April, May, June, July, August, September, and October, all customers of the District (including residential, commercial, public, and industrial)



with even-numbered addresses may only operate irrigation systems on Tuesday, Thursday, and Saturday, and odd-numbered addresses may only operate irrigation systems on Wednesday, Friday, and Sunday. Irrigation systems may not be operated on Mondays. Landscape Areas shall not be irrigated on the surface, except for hand watering and/or the use of a drip irrigation system, between the hours of 8:00 AM - 8:00 PM, unless a special permit is issued to accommodate newly planted material.

During the months of November, December, January, and February, all customers of the District (including residential, commercial, public, and industrial) with even-numbered addresses may only operate irrigation systems on Saturday and odd-numbered addresses may only operate irrigation systems on Sunday. Irrigation systems may not be operated on Mondays, Tuesdays, Wednesdays, Thursdays, or Fridays. There will be no daytime watering restrictions during these months.

- 3) Turf or ornamental landscapes shall not be irrigated during the 48 hours following measurable precipitation.
- 4) Restaurants and other food service establishments shall only serve water to customers upon request by customer.
- 5) Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily and prominently display notice of this option.
- 6) Operating a fountain or Decorative Water Feature is prohibited, unless the water is part of a recirculating system.
- 7) No water service shall be provided to any structure hereafter constructed or remodeled unless the plumbing fixtures to be installed conform to the requirements of law as to flow capacity.
- 8) The District's General Manager or designee may provide health and safety exceptions with regards to mandatory measures on a case by case basis.



c. Notice and Penalties for Violation of Water Use Restrictions Pursuant to Ordinance No. 100

Upon confirmation by the District of any violation of Ordinance No. 100, the District shall provide written notice (warning) to the owner of record, and/or occupant, and/or property manager (owner/occupant/manager). The notice shall be dated and shall specify the address, the nature of the violation, list the steps that must be taken to comply with the water use restrictions, and the name and telephone number of a District staff person from whom additional information can be obtained. In addition, the notice shall advise the owner/occupant/manager that termination of water service may result from continued non-compliance. These provisions are for a first violation of the water use restrictions.

Once a warning has been issued to any owner/occupant/manager, they shall be considered duly informed of the District's mandatory restrictions pursuant to Ordinance 100, and any future violations shall be subject to the provisions in **Items (1) through (4)** below.

- 1) If the owner/occupant/manager fails to comply with the requirements of the written notice described above, within a reasonable amount of time but not less than two weeks, a second violation shall occur and the District shall provide a second written notice to the owner/occupant/manager. The notice shall be dated and shall specify the address, the nature of the violation, list the steps that must be taken to comply with the water use restrictions, how to obtain educational water conservation materials electronically, and the name and telephone number of a District staff person that can provide additional information including hard copies of educational water conservation materials. In addition, the notice shall advise the owner/occupant/manager that a monetary fine in the amount of fifty dollars (\$50) shall be imposed for a third violation of the water use restrictions and that termination of water service may result from continued non-compliance.
- 2) If the owner/occupant/manager fails to comply with the requirements of the notice given pursuant to **Item (1)** above, within a reasonable amount of time but not less than two weeks, a third violation shall occur and a third notice containing the date, the address, the nature of the violation, and the steps that must be taken to comply with the water use restrictions shall be issued. The third notice shall further advise



the owner/occupant/manager that a fine in the amount of two hundred dollars (\$200) shall be imposed for a fourth violation of the water use restrictions. The third violation shall impose a fifty dollar (\$50) fine charged to and billed on the water user's account. This fine shall be subject to the District's delinquent charges section, as described in the current Water Sales and Service Policy Manual (refer to **Appendix 3** herein). If, in the sole discretion of the District, satisfactory progress is being made on steps to correct the violation, a third notice will not be issued.

- 3) If the owner/occupant/manager fails to comply with the requirements of the notice given pursuant to **Item (2)** above, within a reasonable amount of time but not less than two weeks, a fourth violation shall occur and a fourth notice containing the date, the address, the nature of the violation, and the steps that must be taken to comply with the water use restrictions shall be issued. The fourth violation shall impose a two hundred dollar (\$200) fine charged to and billed on the water user's account on a monthly basis until the violation(s) ceases. This fine shall be subject to the District's delinquent charges section as described in the current Water Sales and Service Policy Manual (refer to **Appendix 3** herein).

- 4) If the owner/occupant/manager fails to comply with the requirements of the notice given pursuant to **Item (3)** above, resulting in repeated and significant water loss as determined by the District, the District may terminate water service within ten (10) calendar days unless the owner/occupant/manager is in compliance with the water use restrictions. If the owner/occupant/manager fails to comply with the water use restrictions, then the final notice of service termination, subject to the District's current 48-hour notice of termination charge, shall be posted at the entrance to the dwelling/property stating that water service shall be terminated in forty-eight (48) hours.

Service may only be restored if the violation has been corrected. Owner/occupant/manager will be required to pay all fines and penalties previously assessed, plus a service reinstatement charge per the Customer Service Charges section of the current Water Sales and Service Policy Manual (refer to **Appendix 3** herein).



d. Appeal Process Under Ordinance No. 100

Should an owner/occupant/manager determined to be in violation of the water use restrictions set forth in Ordinance No. 100 dispute the findings of staff or if said owner/occupant/manager believes they have sufficient justification for said violation, said owner/occupant/manager may request a hearing with an appropriate committee of the Board of Directors. The hearing shall be scheduled within thirty (30) calendar days of the request. The hearing shall be attended by the District's General Manager or a designated representative of the General Manager.

The District's General Manager or a designated representative of the General Manager shall mail the owner/occupant/manager a written decision within ten (10) calendar days of the hearing. If the owner/occupant/manager is dissatisfied with the outcome of the hearing, the owner/occupant/manager may request the matter be placed on the agenda of the District's regularly scheduled Board Meeting. The owner/occupant/manager may then make his or her petition to the Board of Directors. The Board's determination shall be final.

e. Administrative Exceptions Under Ordinance No. 100

The General Manager of the District or District's designee may provide administrative exceptions to the landscape and irrigation plan requirements of Ordinance No. 100 on a case by case basis.

The General Manager of the District or designee will notify the City Manager of any administrative exemption granted pursuant to Ordinance No. 100 prior to the date the exception becomes effective.

The City Manager or designee after consultation with and approval from the General Manager of Indian Wells Valley Water District may grant an administrative exception.



6.3 Ordinance No. 103

a. Summary

On September 11, 2017, the District adopted *Ordinance No. 103 Ordinance of the Board of Directors of the Indian Wells Valley Water District, Kern and San Bernardino Counties, California, Rescinding Ordinance Number 100 in its Entirety and Adopting Emergency Water Conservation Mandatory Restrictions*, a copy of which is included in **Appendix 4** herein. Ordinance No. 103 includes provisions for compliance with the mandatory restrictions imposed by the SWRCB's emergency water conservation regulations. Ordinance No. 103 supersedes Ordinance No. 100 until such time that Ordinance No. 103 is rescinded by the District's Board. **Ordinance No. 100 is currently superseded by Ordinance No. 103, until such time that Ordinance No. 103 is rescinded by the District's Board of Directors.**

The water use restrictions set forth in Ordinance No. 103 are identical to those described in Ordinance No. 100, except with regard to landscape irrigation restrictions during the months of November through February. Ordinance No. 103 allows for landscape irrigation on three days per week (alternating days for even- and odd-numbered addresses), while Ordinance No. 100 allowed for landscape irrigation only one day per week (on different days for even- and odd-numbered addresses).

Ordinance No. 103 states the following with regard to irrigation during the months of November through February:

"During the months of November, December, January, and February, all customers of the District (residential/commercial/public/industrial) with even-numbered addresses may only operate irrigation systems on Tuesday, Thursday and Saturday and odd numbered addresses may only operate irrigation systems on Wednesday, Friday and Sunday. Irrigation systems may not be operated on Mondays. Landscape Areas may be irrigated by hand watering and/or the use of a drip irrigation system at any time. There will be no daytime watering restriction during these months."



For comparison, Ordinance No. 100, currently rescinded, states the following with regard to irrigation during the months of November through February: "**During the months of November, December, January, and February**, all customers of the District (including residential, commercial, public, and industrial) with even-numbered addresses may only operate irrigation systems on Saturday and odd-numbered addresses may only operate irrigation systems on Sunday. Irrigation systems may not be operated on Mondays, Tuesdays, Wednesdays, Thursdays, or Fridays. There will be no daytime watering restrictions during these months."

6.4 Fines and Penalties for Exceeding Allotments

Water Code

- 366(b)(C)**
- (i) A violation of an excessive use ordinance, rule, or tariff condition established pursuant to subparagraph (A) shall result in an infraction or administrative civil penalty. The penalty for a violation may be based on conditions identified by the urban retail water supplier and may include, but is not limited to, a fine of up to five hundred dollars (\$500) for each hundred cubic feet of water, or 748 gallons, used above the excessive water use threshold established by the urban retail water supplier in a billing cycle.
 - (ii) Any fine imposed pursuant to this subparagraph shall be added to the customer's water bill and is due and payable with that water bill.
 - (iii) Each urban retail water supplier shall have a process for nonpayment of the fine, which shall be consistent with due process and reasonably similar to the water supplier's existing process for nonpayment of a water bill.

The District has established fines and penalties for water use in excess of Tier 2 of the District's rate structure. If a Level 4, 5, or 6 shortage condition exists, the Governor declares a Drought State of Emergency, or a Local Water Supply Shortage has been declared by the District, the fines and penalties described below will be implemented.



Level 4, 5, or 6 Shortage Condition or Local Water Supply Shortage

During a Level 4, Level 5, or Level 6 shortage condition or a Local Water Supply Shortage, the following will apply:

1. Water use in excess of Tier 1 of the District's rate structure in a single billing cycle shall be considered Excessive Water Use.
2. A customer exceeding Tier 1 usage in a single billing cycle shall be assessed a fine of \$100 for the initial HCF of usage in Tier 2. An additional fine of \$10 for each HCF of usage over the initial Tier 2 HCF of usage shall be assessed in addition to the base rate.
3. For each consecutive billing cycle that a customer's usage exceeds Tier 1 usage, the previous fine shall be increased by \$100 for the initial HCF of usage in Tier 2. The additional \$10 fine for each HCF of usage over the initial Tier 2 HCF of usage shall similarly increase \$10 in addition to the base rate. For example, a second consecutive billing cycle will result in an Excessive Water Use fine of \$200 for the initial HCF of Tier 2 usage. For each additional HCF of Tier 2, a penalty of \$20 shall be assessed in addition to the base rate. A third consecutive billing cycle will result in an Excessive Water Use fine of \$300 for the initial HCF of Tier 2 usage. For each additional HCF of Tier 2, a penalty of \$30 shall be assessed in addition to the base rate. The fines shall increase in increments of \$100 and \$10, respectively, up to a maximum of \$500 for the initial HCF of Tier 2 usage and \$50 for each additional HCF over the initial HCF of Tier 2 usage in addition to the base rate.
4. Any fine resulting from violation of this WSCP will be added to the customer's water bill and is due and payable with that water bill.
5. Non-payment of a fine shall be addressed with due process in mind.



Drought State of Emergency

During a period for which the Governor has issued a proclamation of a Drought State of Emergency, that includes mandatory water usage restrictions, the following will apply:

1. Water use in excess of Tier 1 of the District's rate structure in a single billing cycle shall be considered Excessive Water Use.
2. Water use in excess of Tier 1 of the District's rate structure in a single billing cycle will be assessed a fine of 1% of the total Tier 2 use during that billing cycle until the Drought State of Emergency is declared over by proclamation of the Governor or like action.
3. Any fine resulting from violation of this WSCP will be added to the customer's water bill and is due and payable with that water bill.
4. Non-payment of a fine shall be addressed with due process in mind.

6.5. Appeals Process

Water Code

366(b)(D)

- (i) Consistent with due process, an urban retail water supplier shall establish a process and conditions for the appeal of a fine imposed pursuant to subparagraph (C) whereby the customer may contest the imposition of the fine for excessive water use.
- (ii) As part of the appeal process, the customer shall be provided with an opportunity to provide evidence that there was no excessive water use or of a bona fide reason for the excessive water use, including evidence of a water leak, a medical reason, or any other reasonable justification for the water use, as determined by the urban retail water supplier.
- (iii) As part of the appeal process, the urban retail water supplier shall provide documentation demonstrating the excessive water use.

A customer determined to have Excessive Water Use may appeal the imposition of the fine for same either by submitting a written appeal or by requesting a hearing with the Administrative and Executive Committee of the Board of Directors, within thirty (30) days of receipt of the billing statement on which the fine was first imposed. The hearing shall be scheduled within thirty (30)



calendar days of the request. The hearing shall be attended by the District's General Manager and/or a designated representative of the General Manager.

The customer shall be provided with an opportunity to provide evidence that there was no excessive use of water or of a bona fide reason for the excessive use, as determined by the District. The District will provide the customer with documentation demonstrating the excessive water use.

The District's General Manager or a designated representative of the General Manager shall mail the customer a written decision within ten (10) calendar days of the hearing. If the customer is dissatisfied with the outcome of the hearing, the customer may request the matter be placed on the agenda of the District's regularly scheduled Board meeting, by submitting such request in writing within fifteen (15) days of the date of the decision. The customer may then present his or her position to the Board of Directors. The Board of Director's Determination shall be final.

SECTION 7
LEGAL AUTHORITY



**SECTION 7
LEGAL AUTHORITY**

Water Code

10632(a)(7) (A) A description of the legal authorities that empower the urban water supplier to implement and enforce its shortage responses actions specified in paragraph (4) that may include, but are not limited to statutory authorities, ordinances, resolutions, and contract provisions.

(B) A statement that an urban water supplier shall declare a water shortage emergency in accordance with Chapter 3 (commencing with Section 350) of Division 1.

(C) A statement that an urban water supplier shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code.

350 The governing body of a distributor of a public water supply, whether publicly or privately owned and including a mutual water company, shall declare a water shortage emergency condition to prevail within the area served by such distributor whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.

7.1 Statutory Authority

Indian Wells Valley Water District (the District) is a County Water District, formed and operating under and pursuant to California Water District Law (CWC Sections 30000 *et seq*), and pursuant to said law, the District is authorized to perform all acts necessary to fully carry out its functions (CWC Section 31001).

Additionally, pursuant to CWC Section 31026, the District is authorized to restrict the use of district water during any emergency caused by drought, or other threatened or existing water shortage, and to prohibit the wastage of district water or the use of district water during such periods, for any purpose other than household uses or such other restricted uses as may be determined to be necessary by the District and may prohibit use of such water during such periods for specific uses which the District may from time to time find to be nonessential.

In accordance with CWC Section 350, the District will declare a water shortage emergency condition to prevail within the District's service area when its Board of Directors determines that



the ordinary demands and requirements if its customers cannot be satisfied without depleting the District's water supply to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.

Further, the District will coordinate with the City of Ridgecrest, County of Kern, and County of San Bernardino for a possible proclamation of a local emergency under the California Emergency Services Act (California Government Code Section 8558).

7.2 Ordinances

Consistent with its statutory authority, the District has adopted the following ordinances pertaining to water conservation and the District's response to water shortage conditions:

- **Ordinance No. 93:** Ordinance of the Board of Directors of the Indian Wells Valley Water District, Kern and San Bernardino Counties, California, rescinding Ordinance No. 72 in its entirety; and adopting voluntary and mandatory conservation measures and recommending and/or requiring certain water conserving measures, adopted May 10, 2010.
- **Ordinance No. 98:** Ordinance of the Board of Directors of the Indian Wells Valley Water District, Kern and San Bernardino Counties, California, rescinding Ordinance No. 90 in its entirety; and requiring water efficient landscape as a condition of receiving new single family dwelling water service, adopted December 14, 2015.
- **Ordinance No. 99:** Ordinance of the Board of Directors of The Indian Wells Valley Water District, Kern and San Bernardino Counties, California, rescinding Ordinance No. 91 in its entirety; and requiring water efficient landscape as a condition of receiving new multi-family dwellings, commercial and/or institutional water service, adopted December 14, 2015.
- **Ordinance No. 100:** Ordinance of the Board of Directors of the Indian Wells Valley Water District, Kern and San Bernardino Counties, California, rescinding Ordinance No. 97 in its entirety and adopting emergency water conservation mandatory restrictions, adopted January 11, 2016.



- **Ordinance No. 103:** Ordinance of the Board of Directors of the Indian Wells Valley Water District, Kern and San Bernardino Counties, California, rescinding Ordinance No. 100 in its entirety and adopting emergency water conservation mandatory restrictions, adopted September 11, 2017.

Copies of Ordinance Nos. 93, 98, 99, 100, and 103 are included in **Appendix 4** herein.

SECTION 8

FINANCIAL CONSEQUENCES OF WSCP ACTIVATION



SECTION 8
FINANCIAL CONSEQUENCES OF WSCP ACTIVATION

Water Code
10632(a) Every urban water supplier shall prepare and adopt a water shortage contingency plan as part of it urban water management plan that consists of each of the following elements:
(8) A description of the financial consequences of, and responses for, drought conditions, including, but not limited to, all of the following:
(A) A description of potential revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4).
(B) A description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4).
(C) A description of the cost of compliance with Chapter 3.3 (commencing with Section 365) of Division 1.

8.1 Potential Revenue Reductions and Mitigation Actions

Surplus revenues from water sales are placed in the District's reserve, which is used to fund emergency repairs, water system capital improvements, conservation, alternative water supply and other needs. The District maintains a financial reserve that is adequate to address the costs of multiple plant repairs. The District does not project a substantial impact on water revenues due to a Water Supply Shortage and is adequately funded to respond to emergencies. Tables 8-1 through 8-4 below summarize actions and conditions that impact revenues and expenditures, as well as proposed measures to overcome the impacts of such actions and conditions.

Table with 2 columns: Type, Anticipated Revenue Reduction. Rows include Natural Disaster, Plant Failure, and Contamination.



TABLE 8-2 ACTIONS AND CONDITIONS THAT IMPACT EXPENDITURES	
Category	Anticipated Cost
Natural Disaster	Increased staff costs; facility repair costs
Plant Failure	Facility repair costs
Water Supply Contamination	Increased costs of supply and treatment

TABLE 8-3 PROPOSED MEASURES TO OVERCOME REVENUE IMPACTS	
Names of Measures	Summary of Effects
Rate adjustment or assessment	Increased revenue
Development of reserves	IWVWD has a reserve fund
FEMA/Cal OES ⁽¹⁾	Funding assistance during a disaster

⁽¹⁾ United States Department of Homeland Security Federal Emergency Management Agency/California Office of Emergency Services

TABLE 8-4 PROPOSED MEASURES TO OVERCOME EXPENDITURE IMPACTS	
Names of Measures	Summary of Effects
Rate adjustment or assessment	Increased revenue
Maintain reserve fund	IWVWD currently maintains a reserve fund
FEMA/Cal OES ⁽¹⁾	Funding assistance during a disaster

⁽¹⁾ United States Department of Homeland Security Federal Emergency Management Agency/California Office of Emergency Services

In the event of a short-term Water Supply Shortage lasting six months or less, the District has established an emergency reserve equal to six months of operating expenses less depreciation. The use of this reserve is intended to guard the District from the temporary effects of reduced revenues and increased expenses. Should the Water Supply Shortage be expected to extend past six months, a change to the regular rate structure, or similar measure, would be considered to responsibly budget for the District's continued operations during the Water Supply Shortage.

8.2 Cost of Compliance with Chapter 3.3

CWC Section 10632(a)(8)(C) requires that the WSCP include a description of the cost of compliance with Chapter 3.3 (commencing with Section 365) of Division 1 of the CWC. Chapter 3.3 consists of CWC Sections 365-367.



To comply with CWC Sections 365-367, the District prepared and adopted its 2017 WSCP, and developed and adopted Ordinance Nos. 100 and 103, which cost the District a combined total of approximately \$37,330.

SECTION 9
MONITORING AND REPORTING



SECTION 9 MONITORING AND REPORTING

Water Code

10632(a)(9) For an urban retail water supplier, monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance and to meet state reporting requirements.

Through its Supervisory Control and Data Acquisition System (SCADA) the District routinely tracks the groundwater extracted from each well on a monthly basis, metered water usage utilizing Automated Metering Infrastructure (AMI) for each customer type (single-family residential, multi-family residential, commercial/industrial/institutional, and landscape irrigation). The District also conducts an annual water loss audit to estimate annual water losses. This data is routinely provided to the District's General Manager and Board of Directors.

All of the District's service connections are metered, and metered data is used to monitor quantities of water used. The monitoring data will be used to determine actual reductions in water use pursuant to this WSCP. Monthly reports will be provided to the District's Board of Directors, to the Customer Accounts Department, and to the District's Water Shortage Response Team. If reduction goals are not met, the Water Shortage Response Team will examine individual customer usages, and corrective action will be taken.

Monitoring and reporting of water use within the District varies depending on the current water supply conditions. Water supply shortage levels are described in **Table 4-1** herein. Monitoring and reporting for each shortage level is described in the following paragraphs.

9.1. Monitoring During Normal or Level 1 Water Shortage Conditions

In normal and Level 1 water supply conditions, production figures are recorded daily in the District's computerized database. Total production and consumption by all categories of customers are reported monthly to District management and incorporated into a monthly water supply report. The monthly water supply report is presented to the Board of Directors at regularly scheduled Board meetings. Tank levels and pumping plants are monitored on a continuous basis by telemetry at the District's headquarters, with alarms for abnormal conditions.



9.2 Monitoring During a Level 2 or 3 Water Shortage Condition

During a Level 2 or 3 water shortage condition, daily production figures will be reported to the Operations Manager, who will compare the weekly production to the target weekly production to verify that the reduction goal is being met. Weekly reports will be forwarded to the District's General Manager.

9.3 Monitoring During a Level 4, 5, or 6 Water Shortage Condition

During a Level 4, 5, or 6 water shortage condition, the same procedure for a Level 2 or 3 water shortage will be followed, with the addition of a daily production report to the District's General Manager.

9.4 Catastrophic Interruption of Water Supplies

During a catastrophic interruption of water supplies, production figures will be reported to the Operations Manager hourly, and to the General Manager and the Water Shortage Response Team daily. Reports will also be provided to the City of Ridgecrest Emergency Services Committee.

SECTION 10

WSCP REFINEMENT PROCEDURES



SECTION 10 WSCP REFINEMENT PROCEDURES

Water Code

10632(a)(10) Reevaluation and improvement procedures for systematically monitoring and evaluating the functionality of the water shortage contingency plan in order to ensure shortage risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented as needed.

Following implementation of the WSCP, District staff will consider the experience and make any recommendations for how to improve the WSCP. It is the intent of the District that the WSCP will be periodically reevaluated to ensure that its shortage risk tolerance is adequate and that its shortage response actions are effective.

Comments and recommendations from District staff, customers, and other interested parties will be considered in reevaluating and improving the WSCP. If certain procedural refinements or new actions are identified by District staff or suggested by customers or other interested parties, the District will evaluate their effectiveness and will incorporate them into the WSCP, as appropriate.

At a minimum, the District will reevaluate its WSCP every five years during preparation of its Urban Water Management Plan.

SECTION 11

SPECIAL WATER FEATURE DISTINCTION



SECTION 11 SPECIAL WATER FEATURE DISTINCTION

Water Code

10632(b) For purposes of developing the water shortage contingency plan pursuant to subdivision (a), an urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

Health and Safety Code

115921(a) "Swimming pool" or "pool" means any structure intended for swimming or recreational bathing that contains water over 18 inches deep. "Swimming pool" includes in-ground and aboveground structures and includes, but is not limited to, hot tubs, spas, portable spas, and nonportable wading pools.

Swimming pools and spas are defined and analyzed by the District separately from other water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains. Said features are defined in the definitions "Swimming Pool" and "Decorative Water Feature" below and as set forth in **Section 1.3** herein.

"Swimming Pool" means any structure intended for swimming or recreational bathing that contains water over 18 inches deep. "Swimming Pool" includes in-ground and aboveground structures and includes, but is not limited to, hot tubs, spas, portable spas, and nonportable wading pools.

"Decorative Water Feature" means a man-made fountain, pond, waterfall, or other water-using feature that is provided solely for aesthetic or beautification purposes.

Pursuant to District Ordinance No. 103, "Operating a fountain or other decorative water feature is prohibited, unless the water is part of a recirculating system." A copy of Ordinance 103 is included in **Appendix 4** herein.

SECTION 12

PLAN ADOPTION, SUBMITTAL, AND AVAILABILITY



**SECTION 12
PLAN ADOPTION, SUBMITTAL, AND AVAILABILITY**

Water Code

10632(c) The urban water supplier shall make available the water shortage contingency plan prepared pursuant to this article to its customers and any city or county within which it provides water supplies no later than 30 days after adoption of the water shortage contingency plan.

This WSCP has been prepared in accordance with all applicable sections of the CWC as summarized in **Section 1.2** herein. In accordance with CWC Section 10632(a), the 2020 WSCP is included in the District's 2020 UWMP. The 2020 WSCP was adopted by the District's Board of Directors on August 9, 2021 by Ordinance No. 105.

Prior to adoption of this 2023 WSCP, the District provided notice of the availability of the draft 2023 WSCP and notice of the public hearing to consider adoption of the WSCP. Prior to the public hearing, the public review draft was posted on the District's website, and copies of the draft were also made available for inspection at the District's office.

The 2023 WSCP has been provided to City of Ridgecrest, County of Kern, County of San Bernardino, and DWR, and is also available to the public on the District's website at www.iwvwd.com/public-documents/public-reports/ and at the District's office located at 500 W. Ridgecrest Boulevard, Ridgecrest, California 93556-1329.

APPENDIX 1

**ORDINANCE NO. 108
ADOPTING THE 2023 WATER SHORTAGE CONTINGENCY PLAN**

ORDINANCE NO. 108

ORDINANCE OF THE BOARD OF DIRECTORS OF THE
INDIAN WELLS VALLEY WATER DISTRICT, KERN AND
SAN BERNARDINO COUNTIES, CALIFORNIA,
RESCINDING ORDINANCE 105 AND ADOPTING THE 2023
WATER SHORTAGE CONTINGENCY PLAN.

WHEREAS, California Water Code (“CWC”) Section 10632 and CWC Sections 365 through 367 require urban water suppliers to prepare an analysis of the elements within a water shortage contingency plan and to set forth actions, prohibitions, and penalties to be implemented during the various stages of a water shortage or a catastrophic interruption of water supplies.

WHEREAS, the Indian Wells Valley Water District (“District”) is an urban water supplier within the meaning of CWC Section 10632 and CWC Sections 365 through 367.

WHEREAS, the District prepared the 2020 Water Shortage Contingency Plan (“2020 WSCP”) and adopted same by Ordinance No. 105 on August 9, 2021.

WHEREAS, the Board of Directors (“Board”) of the District has determined it is necessary to revise and update the 2020 WSCP.

WHEREAS, this Ordinance No. 108, adopting the 2023 WSCP, will supersede and replace Ordinance No. 105 and the 2020 WSCP.

NOW, THEREFORE, BE IT ORDAINED, by the Board of Directors of the Indian Wells Valley Water District, as follows:

Section 1. District Ordinance No. 105 and the 2020 WSCP are hereby rescinded.

Section 2. The 2023 WSCP includes an analysis of the contingency plan and sets forth actions, prohibitions, and penalties to be implemented during the various stages of a water shortage or a catastrophic interruption of water supplies to help ensure that the District can provide continuous service to its customers during a severe or extended water shortage in which the District has access to as little as 50% of its normal water supply.

Section 3. The Indian Wells Valley Water District 2023 Water Shortage Contingency Plan, attached hereto and incorporated herein by reference, is hereby adopted.

Section 4. Ordinance No. 108 will become effective on January 8, 2024.

Section 5. The General Manager is hereby authorized to file the 2023 Water Shortage Contingency Plan with the California Department of Water Resources, and/or any other State

agency, as required by law.

Section 6. The Secretary is hereby directed to cause a summary of Ordinance No. 108 to be published once in a newspaper of general circulation, printed, published and circulated in the District within fifteen (15) days of adoption.

All the foregoing being on the motion of Director Saint-Amand seconded by Director Boyd, and authorized by the following vote, namely:

AYES: President Kicinski
Vice President Saint-Amand
Director Boyd

NOES: Director Rajtora

ABSENT: Director Griffin

ABSTAIN: None

I HEREBY CERTIFY that all the foregoing ordinance is the ordinance of the Indian Wells Valley Water District as duly passed and adopted by said Board of Directors at a legally convened meeting held on the 8th day of January, 2024.

WITNESS my hand and the official seal of said Board of Directors this 8th day of January, 2024.

President, Board of Directors of the Indian
Wells Valley Water District

ATTEST:

Secretary, Board of Directors of the Indian
Wells Valley Water District

(SEAL)

STATE OF CALIFORNIA)

COUNTIES OF KERN)
AND SAN BERNARDINO)

I, GEORGE CROLL, Secretary of the Board of Directors of the Indian Wells Valley Water District, DO HEREBY CERTIFY, as follows:

The foregoing Ordinance is a full, true and correct copy of Ordinance No. 108, duly adopted at a Regular Board Meeting of the Board of Directors of said District, duly and held at the regular meeting place of the Board on the 8th day of January, 2024, for which all of the members of said Board of Directors had due notice and at which a majority of the Board of Directors were present. All the foregoing being on the motion of Director Saint-Amand seconded by Director Boyd, and authorized by the following vote, namely:

AYES: President Kicinski
Vice President Saint-Amand
Director Boyd

NOES: Director Rajtora

ABSENT: Director Griffin


ABSTAIN: None

I have carefully compared the foregoing with the original Minutes of said meeting on file and of record in my office, and the foregoing is a full, true and correct copy of the original Ordinance adopted at said Meeting and entered into said Minutes.

Ordinance No. 108 has not been amended, modified or rescinded since the date of its adoption on January 8th, 2024 and the same is now in full force and effect.

WITNESS my hand and the official seal of said Board of Directors this 8th day of January, 2024.


Secretary, Board of Directors of the Indian Wells Valley Water District


President, Board of Directors of the Indian Wells Valley Water District

(SEAL)

APPENDIX 2

RELEVANT SECTIONS OF THE CALIFORNIA WATER CODE


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WATER CODE - WAT

DIVISION 1. GENERAL STATE POWERS OVER WATER [100 - 540] (*Division 1 enacted by Stats. 1943, Ch. 368.*)

CHAPTER 3.3. Excessive Residential Water Use During Drought [365 - 367] (*Chapter 3.3 added by Stats. 2016, Ch. 230, Sec. 1.*)

365. (a) The Legislature finds and declares that this chapter furthers important state policies of encouraging water conservation and protecting water resources in the interest of the people and for the public welfare.

(b) For the purposes of this chapter, "urban retail water supplier" has the same meaning as provided in Section 10608.12.

(*Added by Stats. 2016, Ch. 230, Sec. 1. (SB 814) Effective January 1, 2017.*)

366. (a) During periods described in subdivision (a) of Section 367, excessive water use is prohibited by a residential customer in a single-family residence or by a customer in a multiunit housing complex in which each unit is individually metered or submetered by the urban retail water supplier.

(b) Each urban retail water supplier shall establish a method to identify and discourage excessive water use, through one of the following options:

(1) Establishing a rate structure, subject to applicable constitutional and statutory limitations, that includes block tiers, water budgets, or rate surcharges over and above base rates for excessive water use by a residential water customer.

(2) (A) Establishing an excessive water use ordinance, rule, or tariff condition, or amending an existing ordinance, rule, or tariff condition, that includes a definition of or a procedure to identify and address excessive water use by metered single-family residential customers and customers in multiunit housing complexes in which each unit is individually metered or submetered and may include a process to issue written warnings to a customer and perform a site audit of customer water usage prior to deeming the customer in violation.

(B) For the purposes of subparagraph (A), excessive water use shall be measured in terms of either gallons or hundreds of cubic feet of water used during the urban retail water supplier's regular billing cycle. In establishing the definition of excessive use, the urban retail water supplier may consider factors that include, but are not limited to, all of the following:

(i) Average daily use.

(ii) Full-time occupancy of households.

(iii) Amount of landscaped land on a property.

(iv) Rate of evapotranspiration.

(v) Seasonal weather changes.

(C) (i) A violation of an excessive use ordinance, rule, or tariff condition established pursuant to subparagraph (A) shall result in an infraction or administrative civil penalty. The penalty for a violation may be based on conditions identified by the urban retail water supplier and may include, but is not limited to, a fine of up to five hundred dollars (\$500) for each hundred cubic feet of water, or 748 gallons, used above the excessive water use threshold established by the urban retail water supplier in a billing cycle.

(ii) Any fine imposed pursuant to this subparagraph shall be added to the customer's water bill and is due and payable with that water bill.

(iii) Each urban retail water supplier shall have a process for nonpayment of the fine, which shall be consistent with due process and reasonably similar to the water supplier's existing process for nonpayment of a water bill.

(D) (i) Consistent with due process, an urban retail water supplier shall establish a process and conditions for the appeal of a fine imposed pursuant to subparagraph (C) whereby the customer may contest the imposition of the fine for excessive water use.

(ii) As part of the appeal process, the customer shall be provided with an opportunity to provide evidence that there was no excessive water use or of a bona fide reason for the excessive water use, including evidence of a water leak, a medical reason, or any other reasonable justification for the water use, as determined by the urban retail water supplier.

(iii) As part of the appeal process, the urban retail water supplier shall provide documentation demonstrating the excessive water use.

(c) (1) The provisions of subdivision (b) do not apply to an urban retail water supplier that is not fully metered in accordance with Section 527. An urban retail water supplier shall comply with the provisions of subdivision (b) when all of the water supplier's residential water service connections are being billed based on metered water usage.

(2) An urban retail water supplier that is not fully metered shall prohibit water use practices by an ordinance, resolution, rule, or tariff condition that imposes penalties for prohibited uses of water supplied by the water supplier. The urban retail water supplier may include a process to issue written warnings prior to imposing penalties as well as increased penalty amounts for successive violations.

(Amended by Stats. 2017, Ch. 561, Sec. 260. (AB 1516) Effective January 1, 2018.)

367. (a) This chapter applies only as follows:

(1) During a period for which the Governor has issued a proclamation of a state of emergency under the California Emergency Services Act (Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code) based on statewide drought conditions to an urban retail water supplier that has moved to a stage of action in response to a local water supply shortage condition under the water supplier's contingency plan pursuant to paragraph (1) of subdivision (a) of Section 10632 that requires mandatory water use reductions.

(2) To an urban retail water supplier during a period in which the water supplier has moved to a stage of action in response to a local water supply shortage condition under the water supplier's contingency plan pursuant to paragraph (1) of subdivision (a) of Section 10632 that requires mandatory water use reductions.

(3) To an urban retail water supplier affected during a period for which the Governor has issued a proclamation of a state of emergency under the California Emergency Services Act (Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code) based on local drought conditions.

(b) The provisions of this chapter are in addition to, and do not supersede or limit, any other measures or remedies implemented by an urban retail water supplier.

(Added by Stats. 2016, Ch. 230, Sec. 1. (SB 814) Effective January 1, 2017.)


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WATER CODE - WAT

DIVISION 6. CONSERVATION, DEVELOPMENT, AND UTILIZATION OF STATE WATER RESOURCES [10000 - 12999] (
Heading of Division 6 amended by Stats. 1957, Ch. 1932.)

PART 2.6. URBAN WATER MANAGEMENT PLANNING [10610 - 10657] (*Part 2.6 added by Stats. 1983, Ch. 1009, Sec. 1.*)

CHAPTER 3. Urban Water Management Plans [10620 - 10645] (*Chapter 3 added by Stats. 1983, Ch. 1009, Sec. 1.*)

ARTICLE 2. Contents of Plans [10630 - 10634] (*Article 2 added by Stats. 1983, Ch. 1009, Sec. 1.*)

10632. (a) Every urban water supplier shall prepare and adopt a water shortage contingency plan as part of its urban water management plan that consists of each of the following elements:

- (1) The analysis of water supply reliability conducted pursuant to Section 10635.
- (2) The procedures used in conducting an annual water supply and demand assessment that include, at a minimum, both of the following:
 - (A) The written decisionmaking process that an urban water supplier will use each year to determine its water supply reliability.
 - (B) The key data inputs and assessment methodology used to evaluate the urban water supplier's water supply reliability for the current year and one dry year, including all of the following:
 - (i) Current year unconstrained demand, considering weather, growth, and other influencing factors, such as policies to manage current supplies to meet demand objectives in future years, as applicable.
 - (ii) Current year available supply, considering hydrological and regulatory conditions in the current year and one dry year. The annual supply and demand assessment may consider more than one dry year solely at the discretion of the urban water supplier.
 - (iii) Existing infrastructure capabilities and plausible constraints.
 - (iv) A defined set of locally applicable evaluation criteria that are consistently relied upon for each annual water supply and demand assessment.
 - (v) A description and quantification of each source of water supply.
- (3) (A) Six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, and 50 percent shortages and greater than 50 percent shortage. Urban water suppliers shall define these shortage levels based on the suppliers' water supply conditions, including percentage reductions in water supply, changes in groundwater levels, changes in surface elevation or level of subsidence, or other changes in hydrological or other local conditions indicative of the water supply available for use. Shortage levels shall also apply to catastrophic interruption of water supplies, including, but not limited to, a regional power outage, an earthquake, and other potential emergency events.
 - (B) An urban water supplier with an existing water shortage contingency plan that uses different water shortage levels may comply with the requirement in subparagraph (A) by developing and including a cross-reference relating its existing categories to the six standard water shortage levels.
- (4) Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following:
 - (A) Locally appropriate supply augmentation actions.

- (B) Locally appropriate demand reduction actions to adequately respond to shortages.
- (C) Locally appropriate operational changes.
- (D) Additional, mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions and appropriate to the local conditions.
- (E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action.
- (5) Communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments, regarding, at a minimum, all of the following:
- (A) Any current or predicted shortages as determined by the annual water supply and demand assessment described pursuant to Section 10632.1.
- (B) Any shortage response actions triggered or anticipated to be triggered by the annual water supply and demand assessment described pursuant to Section 10632.1.
- (C) Any other relevant communications.
- (6) For an urban retail water supplier, customer compliance, enforcement, appeal, and exemption procedures for triggered shortage response actions as determined pursuant to Section 10632.2.
- (7) (A) A description of the legal authorities that empower the urban water supplier to implement and enforce its shortage response actions specified in paragraph (4) that may include, but are not limited to, statutory authorities, ordinances, resolutions, and contract provisions.
- (B) A statement that an urban water supplier shall declare a water shortage emergency in accordance with Chapter 3 (commencing with Section 350) of Division 1.
- (C) A statement that an urban water supplier shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code.
- (8) A description of the financial consequences of, and responses for, drought conditions, including, but not limited to, all of the following:
- (A) A description of potential revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4).
- (B) A description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4).
- (C) A description of the cost of compliance with Chapter 3.3 (commencing with Section 365) of Division 1.
- (9) For an urban retail water supplier, monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance and to meet state reporting requirements.
- (10) Reevaluation and improvement procedures for systematically monitoring and evaluating the functionality of the water shortage contingency plan in order to ensure shortage risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented as needed.
- (b) For purposes of developing the water shortage contingency plan pursuant to subdivision (a), an urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.
- (c) The urban water supplier shall make available the water shortage contingency plan prepared pursuant to this article to its customers and any city or county within which it provides water supplies no later than 30 days after adoption of the water shortage contingency plan.

(Repealed and added by Stats. 2018, Ch. 14, Sec. 32. (SB 606) Effective January 1, 2019.)

10632.1. An urban water supplier shall conduct an annual water supply and demand assessment pursuant to subdivision (a) of Section 10632 and, on or before July 1 of each year, submit an annual water shortage assessment report to the department with information for anticipated shortage, triggered shortage response actions, compliance and enforcement actions, and communication actions consistent with the supplier's water shortage contingency plan. An urban water supplier that relies on imported water from the State Water Project or the Bureau of Reclamation shall submit its annual water supply and demand assessment within 14 days of receiving its final allocations, or by July 1 of each year, whichever is later.

(Amended by Stats. 2019, Ch. 239, Sec. 9. (AB 1414) Effective January 1, 2020.)

10632.2. An urban water supplier shall follow, where feasible and appropriate, the prescribed procedures and implement determined shortage response actions in its water shortage contingency plan, as identified in subdivision (a) of Section 10632, or reasonable alternative actions, provided that descriptions of the alternative actions are submitted with the annual water shortage assessment report pursuant to Section 10632.1. Nothing in this section prohibits an urban water supplier from taking actions not specified in its water shortage contingency plan, if needed, without having to formally amend its urban water management plan or water shortage contingency plan.

(Added by Stats. 2018, Ch. 14, Sec. 34. (SB 606) Effective January 1, 2019.)

10632.3. It is the intent of the Legislature that, upon proclamation by the Governor of a state of emergency under the California Emergency Services Act (Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code) based on drought conditions, the board defer to implementation of locally adopted water shortage contingency plans to the extent practicable.

(Added by Stats. 2018, Ch. 14, Sec. 35. (SB 606) Effective January 1, 2019.)

10632.5. (a) In addition to the requirements of paragraph (3) of subdivision (a) of Section 10632, beginning January 1, 2020, the plan shall include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities.

(b) An urban water supplier shall update the seismic risk assessment and mitigation plan when updating its urban water management plan as required by Section 10621.

(c) An urban water supplier may comply with this section by submitting, pursuant to Section 10644, a copy of the most recent adopted local hazard mitigation plan or multihazard mitigation plan under the federal Disaster Mitigation Act of 2000 (Public Law 106-390) if the local hazard mitigation plan or multihazard mitigation plan addresses seismic risk.

(Added by Stats. 2015, Ch. 681, Sec. 1. (SB 664) Effective January 1, 2016.)

APPENDIX 3

**WATER SALES & SERVICE POLICY MANUAL
(ORDINANCE NO. 106 & 107)**

ORDINANCE NO. 106

ORDINANCE OF THE BOARD OF DIRECTORS OF THE INDIAN WELLS VALLEY WATER DISTRICT, KERN AND SAN BERNARDINO COUNTIES, CALIFORNIA, RESCINDING ORDINANCE NUMBER 104 IN ITS ENTIRETY; AND PROVIDING FOR A REFERENCE DOCUMENT ENTITLED "WATER SALES AND SERVICE POLICY MANUAL"

BE IT ORDAINED, by the Board of Directors of the Indian Wells Valley Water District, as follows:

Section 1. PURPOSE.

The purpose of this Ordinance is to rescind Ordinance No. 104 in its entirety and provide for a reference document entitled "Water Sales and Service Policy Manual" covering Water Rates, and Other Rates, Fees, Charges, and Regulations of the District.

Section 2. REPEAL, RESCISION AND AMENDMENT.

Ordinance No. 104 is hereby rescinded in its entirety.

Section 3. WATER SALES AND SERVICE POLICY MANUAL ADOPTION.

The Water Sales and Service Policy Manual attached hereto is hereby adopted.

Section 4. EFFECTIVE DATE.

This Ordinance will take effect on March 1st, 2023.

Section 5. PUBLICATION.

The Secretary is hereby directed to cause this Ordinance to be published once in full in a newspaper of general circulation, printed, published and circulated in the District.

All the foregoing being on the motion of Director Saint-Amand seconded by Director Kicinski, and authorized by the following vote, namely:

AYES: President Boyd
Vice-President Kicinski
Director Griffin
Director Saint-Amand

NOES: Director Rajtora

ABSENT: None.

ABSTAIN: None.

I HEREBY CERTIFY that all the foregoing ordinance is the ordinance of the Indian Wells Valley Water District as duly passed and adopted by said Board of Directors at a legally convened meeting held on the February 27, 2023.

WITNESS my hand and the official seal of said Board of Directors this 27th day of February 2023.



Mallory J. Boyd
President of the Indian Wells Valley Water
District and of the Board of Directors
thereof.

ATTEST:



Donald M. Zdeba
Secretary of the Indian Wells Valley Water
District and of the Board of Directors thereof.

(SEAL)

STATE OF CALIFORNIA)
COUNTIES OF KERN)
AND SAN BERNARDINO)

I, DONALD M. ZDEBA, Secretary of the Board of Directors of the Indian Wells Valley Water District, DO HEREBY CERTIFY, as follows:

The foregoing Ordinance is a full, true and correct copy of Ordinance No. 106, duly adopted at a Special Board Meeting of the Board of Directors of said District, duly and held at the regular meeting place of the Board on the 27th day of February, 2023, for which all of the members of said Board of Directors had due notice and at which a majority of the Board of Directors were present. All the foregoing being on the motion of Director seconded by Director, and authorized by the following vote, namely:

AYES: President Boyd
 Vice-President Kicinski
 Director Griffin
 Director Saint-Amand

NOES: Director Rajtora

ABSENT: None.

ABSTAIN: None.


I have carefully compared the foregoing with the original Minutes of said meeting on file and of record in my office, and the foregoing is a full, true and correct copy of the original ordinance adopted at said Meeting and entered into said Minutes.

Ordinance No. 106 has not been amended, modified or rescinded since the date of its adoption on February 27th, 2023, and the same is now in full force and effect.

WITNESS my hand and the official seal of said Board of Directors this 27th day of February 2023.



Mallory J. Boyd
President of the Indian Wells Valley Water District
and of the Board of Directors thereof.

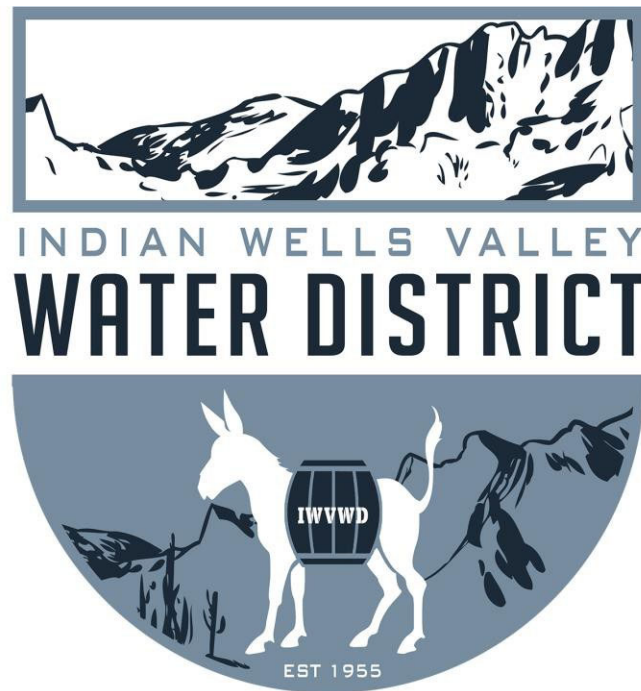


Donald M. Zdeba
Secretary of the Indian Wells Valley Water District
and of the Board of Directors thereof.

(SEAL)

Indian Wells Valley Water District

WATER SALES & SERVICE POLICY MANUAL



Adopted:

By Ordinance No. 106

Effective Date: March 1, 2023

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GENERAL PROVISIONS - CONDITIONS OF SERVICE

For conditions of service applicable to new connections to the District's system, see the various fee and charge provisions included within this manual and the District's Standard Construction Specifications, which is under separate cover.

New service is when an applicant 1) would like to start service with the District but does not have an active account, 2) has an active account and would like to open another active account at a new address, or 3) would like to close the active account and start service at a new address.

Before new service is started, applicants shall pay the refundable deposit and service charge.

Before new service is started, applicants and/or others in the residence or business benefitting from the new water service who have existing delinquent accounts shall pay the balance in full including interest. Lease agreements listing all tenants may be required before starting new service.

The District will at all times attempt to deliver to its customers a continuous and sufficient supply of water at adequate pressure at the meter to meet reasonable service demands. However, the District is not and will not be liable for any loss, damage, or inconvenience to any person by reason of shortage, insufficiency, suspension, or discontinuance of water service, or for increases or decreases in water pressure. Additionally, partial or total interruptions in service are sometimes necessary for the repair, maintenance, alteration, or extension of the District's facilities and the District shall not be liable or responsible for such interruptions.

The District reserves the right at any and all times to shut off water delivery for the purpose of maintenance or for making repairs and alterations to its system. Whenever possible, advance notice of interruption of service will be given to all affected water users; however, the District cannot guarantee complete freedom from service interruption.

The District will endeavor to provide potable water (water meeting the applicable water quality requirements of the California State Water Resources Control Board) to its customers. The District does not and shall not accept liability or responsibility for water that meets such applicable standards at the meter but reacts or interacts with non-District owned facilities causing damage or harm.

All water sold or dispensed by the District shall be metered or measured. By applying for and/or receiving water service from the District, each consumer irrevocably licenses the District and its authorized employees and agents to enter upon the consumer's property at reasonable times for the purpose of reading, inspecting, testing, checking, repairing, maintaining, or replacing the District's meters, customer's backflow prevention devices, and other facilities. Meters and service laterals shall be located in dedicated easements that allow entry for reading, repair and other necessary District activity by District personnel, without limitation. When the meter and service lateral are not located in a dedicated easement, the same irrevocable license provisions shall apply.

If a meter cannot be accessed due to a customer-caused obstruction or situation that prevents the reading of a meter and said obstruction/situation cannot be easily remedied by the District, the customer will be notified to correct the obstruction/situation in a timely manner. If the obstruction/situation prevents the meter from being read, the usage will be estimated for billing purposes until the meter can be properly read by District personnel. At the District's sole discretion, the customer may be billed for expenses incurred by the District to remedy the obstruction/situation, including time and materials plus an overhead and administrative charge of 15%.

District service facilities including meters, boxes and service laterals from the District's water main to and through the meter and customer service valve shall belong to and be maintained by the District. It is the customer's responsibility for installation and maintenance of the customer service line, including all service piping, valves and appurtenances on the discharge side of the meter including the customer service valve. The meter valve (angle stop) on the street side of the meter shall be operated by District personnel only. If a meter valve (angle stop) is damaged by non-District personnel, the customer will be responsible for all repair charges including the cost of time and materials plus an overhead and administrative charge of 15%. If an angle stop has been locked by the District and the lock is damaged or broken, the customer shall be charged \$100.

Title to water furnished by the District, the risk of loss thereof, and full responsibility for the carriage, handling, storage, disposal and use thereof, shall pass from the District to the water user at the outlet of the District meter, the control valve of a fire hydrant, or the control valve for a fire service.

For liability reasons, the District shall not repair leaks nor loan equipment or material for repairs on the customer's side of the meter, unless the installation was done by District personnel, such as in the case of a District installed change over, and then only within one year of installation.

A meter shall not be used to service any parcel or unit other than as assigned by the District. A service line may not cross a parcel or lot to reach another parcel or lot for service. Customers shall not serve water to neighboring properties via a garden hose, similar device or any other method.

Water that has been sold by the District shall not be resold, unless the customer is a local purveyor or water system, and then only in case of an emergency water shortage, and only with written consent of the Board of Directors of the District or General Manager.

In accordance with State Code, a customer's water service may be discontinued for nonpayment of a bill for water service. The District may also discontinue service to any customer for violation of its rules and regulations, or where safety of the water supply is endangered. If an unsafe or hazardous condition is found or is reasonably likely to exist on the customer's premises, or if the use of water thereon by apparatus, appliances, equipment, or otherwise is found and is reasonably suspected to be detrimental or damaging to the District or to its customer, the service may be shut off without notice.

In the event of unusual or other circumstances deemed appropriate by the District's Board of Directors, any of the rules, regulations, rates, fees, or charges, contained herein, are subject to review and or modification as the Board of Director's may determine, in its sole and absolute discretion, on a case by case basis.

METERED AND FLAT RATES AND CHARGES - GENERAL

Flat rate private fire protection accounts shall be billed on a monthly basis. All other categories of rates shall be read and billed on a monthly basis. Since it is not always possible to read meters at exactly the same intervals every month, the period between reading dates may vary slightly. Meters will be read as nearly as possible on the same day of each month. Special readings will be made on commencement and termination of service for purposes of pro-rating opening and closing bills.

If a meter fails to register correctly or cannot be read due to a malfunction, the usage may be estimated at 75% of the customer's historical consumption for the same period of time for the previous year, if available, or estimated by taking into consideration seasonal water demand, or any other factors that are material and significant to arriving at fair usage, or the District may use any other reasonable usage deemed appropriate after consultation with the customer. The District will endeavor to correct in a timely manner those situations that prevent a meter from being read so that the meter reading will not have to be estimated for a second consecutive billing period.

If a meter is not registering water usage, through no fault of the customer, the non-working meter will be repaired or replaced by the District by the next scheduled meter reading date, or the customer will be billed the minimum rate only until such time as repairs are made except in circumstances where prompt repair or replacement may be impossible, including circumstances such as natural disasters.

Meter boxes will be scheduled for cleanout or meters will be replaced, as circumstances dictate, in a prompt manner.

The 3/4- inch meter is the standard size meter for the District's smallest sized water service.

The following rates and charges are listed for a monthly billing schedule. All meter connections, excepting Private Fire Protection Service, will be charged the monthly Ready-to-Serve charge, the Arsenic Compliance charge plus metered monthly quantity rates and a zone charge if applicable. Landscape meter usage shall be billed at the Non-Single Family Residence rates.

MONTHLY READY-TO-SERVE CHARGES

The Monthly Ready-to-Serve Charge is generally intended to cover the fixed expenses of the District, excluding interest expense.

Meter Size	Effective <u>03/01/2023</u>	Effective <u>01/01/2024</u>	Effective <u>01/01/2025</u>	Effective <u>01/01/2026</u>	Effective <u>01/01/2027</u>
3/4"	\$35.70	\$38.56	\$41.64	\$44.14	\$46.79
1"	\$54.88	\$59.27	\$64.01	\$67.85	\$71.93
1-1/2"	\$102.80	\$111.03	\$119.91	\$127.11	\$134.74
2"	\$160.32	\$173.14	\$186.99	\$198.21	\$210.10
3"	\$313.72	\$338.82	\$365.93	\$387.89	\$411.16
4"	\$486.28	\$525.18	\$567.20	\$601.23	\$637.31
6"	\$965.60	\$1,042.86	\$1,126.28	\$1,193.86	\$1,265.49
8"	\$1,540.80	\$1,664.07	\$1,797.20	\$1,905.03	\$2,019.33
10"	\$2,211.88	\$2,388.83	\$2,579.94	\$2,734.73	\$2,898.81

MONTHLY ARSENIC COMPLIANCE CHARGES

The Monthly Arsenic Compliance Charge is intended to cover the District's total arsenic compliance costs, including both debt principal and operations expenses.

Meter Size	Effective <u>03/01/2023</u>	Effective <u>01/01/2024</u>	Effective <u>01/01/2025</u>	Effective <u>01/01/2026</u>	Effective <u>01/01/2027</u>
3/4"	\$10.28	\$11.10	\$11.99	\$12.71	\$13.47
1"	\$17.13	\$18.50	\$19.98	\$21.18	\$22.45
1-1/2"	\$34.27	\$37.01	\$39.97	\$42.37	\$44.91
2"	\$54.83	\$59.22	\$63.96	\$67.80	\$71.87
3"	\$109.65	\$118.42	\$127.89	\$135.56	\$143.69
4"	\$171.33	\$185.04	\$199.84	\$211.83	\$224.54
6"	\$342.67	\$370.08	\$399.69	\$423.67	\$449.09
8"	\$548.27	\$592.13	\$639.50	\$677.87	\$718.54
10"	\$788.13	\$851.18	\$919.27	\$974.43	\$1,032.90

ZONE CHARGE

The Zone Charge is intended to recover from customers all the variable direct costs of power to supply water to the higher zones. Other variable direct costs could be charged to these customers when there is a reasonable way to identify and quantify them.

The Zone Charge is assessed as a multiple of the customer’s zone against their usage. Each zone represents a difference of approximately 100 feet in elevation. The zones are designated A (lowest), B, C, D, and E (highest). Zone Charges are applied to customers in zones B, C, D, and E.

The zone charges are, per 100 cubic feet:

	<u>Effective</u> 03/01/2023	<u>Effective</u> 01/01/2024	<u>Effective</u> 01/01/2025	<u>Effective</u> 01/01/2026	<u>Effective</u> 01/01/2027
B-Zone	\$0.27	\$0.29	\$0.31	\$0.33	\$0.35
C-Zone	\$0.50	\$0.54	\$0.58	\$0.61	\$0.65
D-Zone	\$0.77	\$0.83	\$0.90	\$0.95	\$1.01
E-Zone	\$1.04	\$1.12	\$1.21	\$1.28	\$1.36

METERED MONTHLY QUANTITY RATES BASED UPON METER SIZE

Rate per Hundred Cubic Feet (HCF)

3/4" Meter
Rate per HCF

	<u>Hundred Cubic</u> <u>Feet (HCF)</u>	<u>Effective</u> 03/01/2023	<u>Effective</u> 01/01/2024	<u>Effective</u> 01/01/2025	<u>Effective</u> 01/01/2026	<u>Effective</u> 01/01/2027
Tier 1	0 - 20	\$2.06	\$2.21	\$2.37	\$2.50	\$2.64
Tier 2	20.01 and Over	\$7.31	\$7.46	\$7.62	\$7.75	\$7.89

+ zone charge

1" Meter
Rate per HCF

	<u>Hundred Cubic</u> <u>Feet (HCF)</u>	<u>Effective</u> 03/01/2023	<u>Effective</u> 01/01/2024	<u>Effective</u> 01/01/2025	<u>Effective</u> 01/01/2026	<u>Effective</u> 01/01/2027
Tier 1	0 - 33	\$2.06	\$2.21	\$2.37	\$2.50	\$2.64
Tier 2	33.01 and Over	\$7.31	\$7.46	\$7.62	\$7.75	\$7.89

+ zone charge

1-1/2" Meter
Rate per HCF

	<u>Hundred Cubic Feet (HCF)</u>	<u>Effective 03/01/2023</u>	<u>Effective 01/01/2024</u>	<u>Effective 01/01/2025</u>	<u>Effective 01/01/2026</u>	<u>Effective 01/01/2027</u>
Tier 1	0 - 65	\$2.06	\$2.21	\$2.37	\$2.50	\$2.64
Tier 2	65.01 and Over	\$7.31	\$7.46	\$7.62	\$7.75	\$7.89
+ zone charge						

2" Meter
Rate per HCF

	<u>Hundred Cubic Feet (HCF)</u>	<u>Effective 03/01/2023</u>	<u>Effective 01/01/2024</u>	<u>Effective 01/01/2025</u>	<u>Effective 01/01/2026</u>	<u>Effective 01/01/2027</u>
Tier 1	0 - 104	\$2.06	\$2.21	\$2.37	\$2.50	\$2.64
Tier 2	104.01 and Over	\$7.31	\$7.46	\$7.62	\$7.75	\$7.89
+ zone charge						

3" Meter
Rate per HCF

	<u>Hundred Cubic Feet (HCF)</u>	<u>Effective 03/01/2023</u>	<u>Effective 01/01/2024</u>	<u>Effective 01/01/2025</u>	<u>Effective 01/01/2026</u>	<u>Effective 01/01/2027</u>
Tier 1	0 - 208	\$2.06	\$2.21	\$2.37	\$2.50	\$2.64
Tier 2	208.01 and Over	\$7.31	\$7.46	\$7.62	\$7.75	\$7.89
+ zone charge						

4" Meter
Rate per HCF

	<u>Hundred Cubic Feet (HCF)</u>	<u>Effective 03/01/2023</u>	<u>Effective 01/01/2024</u>	<u>Effective 01/01/2025</u>	<u>Effective 01/01/2026</u>	<u>Effective 01/01/2027</u>
Tier 1	0 - 325	\$2.06	\$2.21	\$2.37	\$2.50	\$2.64
Tier 2	325.01 and Over	\$7.31	\$7.46	\$7.62	\$7.75	\$7.89
+ zone charge						

**6" Meter
Rate per HCF**

	<u>Hundred Cubic Feet (HCF)</u>	<u>Effective 03/01/2023</u>	<u>Effective 01/01/2024</u>	<u>Effective 01/01/2025</u>	<u>Effective 01/01/2026</u>	<u>Effective 01/01/2027</u>
Tier 1	0 - 650	\$2.06	\$2.21	\$2.37	\$2.50	\$2.64
Tier 2	650.01 and Over	\$7.31	\$7.46	\$7.62	\$7.75	\$7.89

+ zone charge

**8" Meter
Rate per HCF**

	<u>Hundred Cubic Feet (HCF)</u>	<u>Effective 03/01/2023</u>	<u>Effective 01/01/2024</u>	<u>Effective 01/01/2025</u>	<u>Effective 01/01/2026</u>	<u>Effective 01/01/2027</u>
Tier 1	0 – 1,040	\$2.06	\$2.21	\$2.37	\$2.50	\$2.64
Tier 2	1,040.01 and Over	\$7.31	\$7.46	\$7.62	\$7.75	\$7.89

+ zone charge

**10" Meter
Rate per HCF**

	<u>Hundred Cubic Feet (HCF)</u>	<u>Effective 03/01/2023</u>	<u>Effective 01/01/2024</u>	<u>Effective 01/01/2025</u>	<u>Effective 01/01/2026</u>	<u>Effective 01/01/2027</u>
Tier 1	0 – 1,495	\$2.06	\$2.21	\$2.37	\$2.50	\$2.64
Tier 2	1,495.01 and Over	\$7.31	\$7.46	\$7.62	\$7.75	\$7.89

+ zone charge

CONSTRUCTION METER CHARGES, RATES & PROVISIONS

ACCOUNT SETUP CHARGES

A \$20.00 processing charge will be applied each time a construction meter permit, including permit extensions, is approved.

The construction meter applicant shall submit a deposit in the amount of \$1,550.00. This deposit amount represents the value of replacing a construction meter. The deposit is refundable provided the meter is returned in working condition determined by a District inspection before the account is closed and the meter is returned to service. The inspection results will be documented on the Temporary

Construction Meter Use Permit. The final bill, which includes Monthly Ready-to-Serve Charge, Metered Monthly Usage Rates, and any cost to repair damages to the construction meter, shall be deducted from the deposit.

The District may hold a deposit for up to five days for immediate return to the permittee if the meter is returned within the designated timeframe and passes a District inspection.

MONTHLY SERVICE CHARGE

Construction meters will be charged a monthly ready-to-serve charge and metered monthly usage rates.

\$206.65 effective July 1, 2022

METERED MONTHLY USAGE RATES

(Rate per HCF)

(All Usage)

\$4.71 effective July 1, 2022

+ zone charge

GENERAL PROVISIONS - CONDITIONS OF SERVICE

Construction Meter Water Service means service provided through a temporary construction water meter that is installed on a fire hydrant generally for construction and other legitimate non-potable water use as determined by the General Manager.

Fire hydrants are for use by Water District personnel or by organized fire protection agencies, pursuant to contract with the Water District. Other parties desiring to use fire hydrants for any purpose must first obtain a permit from the District prior to the use and shall operate said fire hydrants according to the regulations set forth herein and as otherwise directed by the Water District. The permittee must furnish said permit for inspection if requested to do so by a District employee or by a law enforcement officer. Unauthorized use of fire hydrants shall be prosecuted according to law.

Construction meters may only be connected to District facilities.

Construction meters may be portable or locked onto a fire hydrant by the District.

Each permit will allow for temporary metered water usage from a specific hydrant for up to 90 consecutive days. Permits may be extended up to 270 additional consecutive days at no less than 30-day increments at the discretion of the District. Meters may be returned prior to the permit expiration date.

The permittee must use a wrench specifically designed for opening and closing fire hydrant valves and said opening and closing shall be done slowly to prevent damage to the valve and distribution system. Pipe wrenches or crescent wrenches shall not be used, as these will damage valve stems. The permittee shall be responsible and solely liable for any damage to said fire hydrant, valves or the system for failing to exercise proper care in the opening and closing of any fire hydrant valve.

The permittee is responsible for closing the hydrant and removing any portable construction meter at the completion of each day. If there is water loss over night or over a weekend from a hydrant that was recently opened for construction meter use, the permittee shall be charged the estimated usage at the current construction meter monthly metered usage rates if the loss is due to the permittee's action or inaction as determined by the District.

If a meter becomes damaged or fails to record the water usage properly, it must be returned immediately to the Water District for repair and/or replacement. The permittee is responsible for any and all labor and material costs associated with repair or replacement of a lost or damaged construction meter.

If the calibration vane, calibration screen, register pin and/or seal pin is missing from the meter or there is other evidence the meter has been tampered with, damaged or removed from the hydrant for the purpose of receiving water without paying the full lawful charge, the permittee shall be charged for estimated usage at the current construction meter monthly metered usage rates plus any and all labor and material costs associated with repair or replacement of the damaged construction meter. These costs are subject to an overhead and administrative charge of 15%. No further service will be allowed until all fees and charges are paid in full.

All construction meters must be read by District personnel at approximately 30 day intervals for billing purposes. Locked-on meters may be routinely read in the field by District personnel. Permittees with portable construction meters shall return portable construction meters to District Headquarters for a reading by the due date set by the District unless meter is equipped with an AMI register. Permittees of portable non-AMI equipped construction meters who do not bring in the meter by the due date will be charged a minimum of \$73.00 for all costs associated with dispatching District personnel to locate and read a portable construction meter, including the cost of time and materials plus an overhead and administrative charge of 15%. Failure of the permittee to make the meter available for reading on a monthly basis or failure to pay charges when due may result in cancellation of said permit in which case the meter will be subject to immediate confiscation.

At the expiration date of the permit or upon completion of use, if sooner, the permittee shall return the permit, and if applicable, the portable meter to the Water District for inspection and final billing. Monthly service charges will not be pro-rated for meters returned prior to the billing due date. The deposit, minus any charges for water use and applicable meter repair, will be returned to the permittee by mail, or the permittee may be billed for any applicable charges exceeding the deposit. If the permit and/or the portable meter is not returned as set forth herein, or within ten days after District provides written or telephone communication to do so, the permit shall be deemed revoked, however the construction meter shall still be deemed property of the District subject to immediate return.

Smaller angle-stop construction meters are prohibited. When permanent service is paid for in advance, construction water may be taken from the permanent meter and service connection intended to serve the parcel. District facilities damaged during construction will be repaired by the District and charged to the developer on a time and material basis plus an overhead and administrative charge of 15%.

Additional terms and conditions of the construction meter agreement are listed in the permit agreement. The District reserves the right to amend the permit agreement.

Consult Ordinance Number 87 and successor agreements for the backflow prevention requirements for construction meters.

BULK WATER STATION CHARGES, RATES & PROVISIONS

METERED RATES

	Effective 07/01/2022
Monthly Fixed	\$32.29
Volumetric Per HCF	\$2.96

The Monthly Fixed charge will be applied on the 1st of the month.

Bulk water is water obtained by the customer from the District's bulk water station facility.

If the bulk water account holder does not haul their own water, the name, address and phone number of the account holder's designated agent must be on file with the District.

It is the responsibility of any applicant who proposes to utilize hauled water as the source of domestic supply to satisfy the requirements of the Indian Wells Valley Water District. Applicants are advised that there may be California State Water Resources Control Board regulations that applicant may need to comply with as well.

PRIVATE FIRE PROTECTION SERVICE CHARGES, RATES & PROVISIONS

FLAT MONTHLY SERVICE RATE

Connection <u>Size</u>	Effective <u>07/01/2022</u>
1"	\$1.75
2"	\$10.84
3"	\$31.47
4"	\$67.05
6"	\$194.77
8"	\$415.07
10"	\$746.44

A Private Fire Protection Service consists of facilities serving building sprinkler systems, hydrants, hose reels and other facilities installed on private property for fire protection purposes.

The applicant for private fire protection service shall pay the actual cost of installation of the service from the distribution main to the customer's premises, including the cost of a detector check meter or other suitable and equivalent device, valve, and meter box. The District may also require a check valve of a type approved by the National Board of Fire Underwriters or similar organization, and the District may also require that said check valve be equipped with a bypass meter, at the expense of the property owner. The District may agree to install the connection and meter on a time and material basis plus an overhead and administrative charge of 15%.

There shall be no connections between a fire protection service or system and any other water distribution system on the premises except when the service or system requires a remote fixture connection. There shall be no water used through a non-remote fixture connection fire protection service except to extinguish fires and for testing firefighting equipment. A fire protection service with a remote fixture connection may use up to one hundred cubic feet of water per month at the current metered monthly quantity rate based on meter type and size. If water consumption exceeds one hundred cubic feet in a month or if any consumption is recorded on a non-remote fixture connection meter, the private fire protection service customer shall be charged double the regular flat monthly service rates, except that no charge shall be made for water used to extinguish fires where such fires were reported to the fire department. If the District does not require a meter and if water is used through a fire service connection for any other purpose than extinguishing of fires, the District shall have the right to place a meter on the fire service connection at the owner's expense. If water is used from a private fire service in violation of these regulations, the District may, at its option, discontinue the service. The District assumes no responsibility for loss or damage due to lack of water or pressure, and merely agrees to endeavor to furnish such water quantities and pressures that are available at the time of use. The service is subject to shutdowns and variations required by the operation of the system.

INDIAN WELLS VALLEY WATER DISTRICT'S POLICY ON DISCONTINUATION OF WATER SERVICE FOR NON-PAYMENT

Notwithstanding any other policy, rule, or ordinance of the Indian Wells Valley Water District ("District"), this Policy on Discontinuation of Water Service for Non-Payment ("Policy") shall apply to the discontinuation of residential water service for non-payment. In the event of any conflict between this Policy and any other policy, rule or ordinance, this Policy shall prevail.

DELINQUENCY:

All charges for residential water furnished by the District are due and payable when billed and become delinquent if not paid within thirty (30) days from the date the bill is mailed. Upon becoming delinquent, a late charge of \$2.00 plus five percent (5%) will be assessed on unpaid amounts outstanding at the time of the next billing (typically 30 days). Typically, this notice of an outstanding balance and levying of the late charge will be on the following month's bill for service. Those customers who have entered into payment arrangements prior to the next billing will not be assessed a delinquent fee on amounts subsequently paid according to the arrangement terms.

DISCONTINUATION OF SERVICE:

The District will not discontinue residential water service for non-payment until payment by the customer has been delinquent for at least sixty (60) days. Prior to the District discontinuing water service, the following notices will be provided or attempted:

1. **MAILED NOTICE OF DISCONTINUATION (15 days prior to shut-off/45 days after delinquent):**

If payment has not been received within forty-five (45) days of becoming delinquent, a notice will be mailed to the customer at the address where service is provided. If the customer's billing address is different from the service address, the notice will be sent to the billing address as well as to the address of the property to which residential service is provided, and addressed as "Occupant." The notice shall include, but is not limited to, all of the following information:

- a. Customer's name and address;
- b. The amount that is past due;
- c. Date by which payment or payment arrangements are required to avoid discontinuation of service;
- d. Description of the process to apply for an extension of time to pay the delinquent charges;
- e. Description of the process to dispute or appeal a bill;
- f. A description of the procedure by which the customer may request a deferred, reduced, or alternative payment schedule, including an amortization of the delinquent residential service charges; and
- g. District phone number and a web link to the District's written collection policy.

2. **48-HOUR SHUT-OFF NOTICE (by phone and/or door hanger with copy of this Policy):**

In addition to the Notice of Discontinuance, the District will provide a 48-Hour Shut-Off Notice advising of the impending termination of water service at least forty-eight (48) hours in advance of the termination of service. This 48-Hour Shut-Off Notice will be by door hanger and/or via phone call to the telephone number on record, and will notify the customer that service will be discontinued if payment is not received by a specific date.

If the District is unable to make contact with the customer or an adult occupying the residence by telephone, the District shall make a good faith effort to visit the residence and leave, or make other arrangements for placement in a conspicuous place of, a notice of imminent discontinuation of residential service for nonpayment and the District's policy for discontinuation of residential service for nonpayment.

3. All delinquent water service charges and associated fees must be received by the District by 4:00 p.m. on the day specified in the written 48-Hour Shut-Off Notice. If payment has not been received within the time stated in the 48-Hour Shut-Off Notice, water service will be discontinued and will not be turned back on until the next business day following payment of all past due fees and charges, including any reconnection fees, has been made in full or alternative arrangements

have been made pursuant to this Policy.

ALTERNATIVE PAYMENT PLANS:

Any customer who is unable to pay for water service within the normal payment period may request, in writing, an alternative payment arrangement to avoid late fees or disruption of service. The District will consider all circumstances surrounding the request and make a determination as to whether the payment arrangement is warranted.

Any payment arrangements that extend into the next billing period are considered an amortization plan, which must be in writing and signed by the customer. An amortization plan will amortize the unpaid balance over a period defined by the customer, not to exceed twelve (12) months from the original date of the bill. The amortized payments will be combined with, and subject to the due date of, the customer's regular bill. **The customer must comply with the terms of the amortization plan and remain current as charges accrue in each subsequent billing period. The customer may not request further amortization of any subsequent unpaid charges while paying delinquent charges pursuant to an amortization plan. Failure to comply with the terms of an amortization plan will result in the issuance of a written disconnection notice. The disconnection notice will be in the form of a door hanger delivered to the premises no less than five (5) business days in advance of discontinuance of service.**

DISPUTED BILLS OR APPEALS:

In the event of a disputed meter reading, the meter shall be reread. If the accuracy of the meter is questioned by a customer, the customer shall be given the option of placing a \$75.00 deposit with the District for a meter registration accuracy test. The District recommends that the customer be present to watch the meter being removed from the meter box and to record the serial number. The meter will then be shipped to a third-party tester.

If the results of the test show the meter is greater than 101.5% accurate, the meter is over-reading usage, the meter will be replaced, a pro-rated adjustment will be made on previous bills up to a maximum of six months and the \$75.00 deposit will be returned to the customer. If the meter is less than 98.5% accurate, the meter is under-reading usage, the meter will be replaced, the \$75.00 deposit will be forfeited and no further action will be taken. If the results of the test show that the meter is at least 98.5% to 101.5% accurate, the customer shall forfeit the \$75.00 deposit to cover the District's expense to perform the meter accuracy test.

A customer can contest or appeal a bill by submitting a written appeal to the District's General Manager within thirty (30) calendar days of the date of the bill. The written appeal should clearly state all reasons and all supporting facts for the appeal. Any written appeal should be provided to the District at:

Indian Wells Valley Water District
Attn: General Manager
500 W. Ridgecrest Blvd. Ridgecrest, CA 93555 iwvwd@iwvwd.com

The General Manager or his designee shall make a ruling within fifteen (15) calendar

days of date of the written appeal.

CIRCUMSTANCES WHERE THE DISTRICT WILL NOT DISCONTINUE SERVICE:

Notwithstanding the foregoing, the District will not discontinue residential service for nonpayment if all of the following conditions are met:

1. The customer, or a tenant of the customer, submits to the District the certification of a primary care provider that discontinuation of residential service will be life-threatening to, or pose a serious threat to the health and safety of, a resident of the premises where residential service is provided.¹

2. The customer demonstrates that he or she is financially unable to pay for residential service within the District's normal billing cycle. The customer shall be deemed financially unable to pay for residential service within the District's normal billing cycle if any member of the customer's household is a current recipient of CalWORKs, CalFresh, general assistance, Medi-Cal, Supplemental Security Income/State Supplementary Payment Program, or California Special Supplemental Nutrition Program for Women, Infants, and Children, or the customer declares that the household's annual income is less than 200% of the federal poverty level.

3. The customer is willing to enter into an amortization agreement, alternative payment schedule, or a plan for deferred or reduced payment, consistent with this Policy.

If all of these three conditions are met, the customer may request that the delinquent charges be amortized over a period of twelve (12) months. The burden of proving compliance with the three conditions described above is on the customer. Upon receipt of documentation alleging compliance with the three conditions, the District General Manager shall review that documentation and make a determination of compliance within seven (7) business days of submittal to either request additional information or accept or deny the request.

Exceptions to this Policy deemed worthy and appropriate may be granted on a case-by-case basis by the General Manager or the General Manager's designate.

¹ "Primary care provider" is defined in subparagraph (A) of paragraph (1) of subdivision (b) of Welfare and Institutions Code Section 14088(b)(1) as either of (A) Any internist, general practitioner, obstetrician-gynecologist, pediatrician, family practice physician, nonphysician medical practitioner, or any primary care clinic, rural health clinic, community clinic or hospital outpatient clinic currently enrolled in the Medi-Cal program, which agrees to provide case management to Medi-Cal beneficiaries OR (B) A county or other political subdivision that employs, operates, or contracts with, any of the primary care providers listed in subparagraph (A), and that agrees to use that primary care provider for the purposes of contracting under this article.

FAILURE TO COMPLY WITH AMORTIZATION PLAN:

If the customer fails to comply with the amortization agreement for delinquent charges, OR while undertaking an amortization agreement for delinquent charges, and the customer does not pay his or her current residential service charges for sixty (60) days or more, residential service will be discontinued no sooner than five (5) business days after the District posts a 5-Day Final Notice of intent to disconnect service in a prominent and conspicuous location at the property.

In the event that the District discontinues residential service for nonpayment, it will provide the customer with information on how to restore residential service.

RE-ESTABLISHMENT OF SERVICE:

Subject to any contrary provisions in this Policy, where service has been discontinued for violation of rules or for nonpayment of bills, the District will charge the fees stated below for reconnection of service:

Service Reinstatement Charge (Regular Hours) \$38.00* Service Reinstatement Charge (After Hours) \$150.00*

** If the actual cost of reinstatement is less than the amounts above, the lesser amount will be invoiced and charged.*

Water service will be turned on no later than next business day unless after hours service is requested and paid.

Water service that is turned on by any person other than District personnel or without District authorization may be subject to fines or additional charges or fees, as well as criminal prosecution for the theft of water. Any damages that occur as a result of unauthorized restoration of service are the responsibility of the customer.

DEPOSITS REQUIRED AFTER DISCONTINUED SERVICE FOR NON-PAYMENT:

Any service discontinued for nonpayment shall require a security deposit, if said deposit is not already on file, in addition to payment of all other applicable fees and charges, before water service is resumed. The amount of the security deposit for reinstatement of discontinued service will be the estimated average monthly water bill, but in no case less than the fixed deposit schedule stated below:

<u>METER SIZE</u>	<u>DEPOSIT</u>
3/4" & Bulk Customers	\$70.00
1"	\$90.00
1-1/2"	\$160.00
2"	\$230.00
3"	\$460.00

4"	\$570.00
6"	\$805.00
8"	\$1,145.00
10"	\$2,290.00

Any account having three or more delinquencies within the past twelve months will be required to pay and maintain a deposit according to the schedule stated above, even though water service may not have actually been disconnected, if said deposit is not already on file.

A security deposit will be refunded on any account that has remained in good standing for twelve consecutive months. Accounts will be reviewed for potential refund on an annual anniversary basis. Any security deposits on file when service is discontinued will be applied towards the final billing.

LANDLORD-TENANT SITUATIONS:

Where the District furnishes individually metered residential service to residential occupants of a detached single-family dwelling, a multiunit residential structure, mobile home park, or permanent residential structure in a labor camp, and the owner, manager, or operator of the dwelling, structure, or park is the customer of record, the District will make every good faith effort to inform the residential occupants, by means of written notice, when the account is in arrears that service will be terminated at least 10 days prior to the termination. The written notice shall further inform the residential occupants that they have the right to become customers, to whom the service will then be billed, without being required to pay any amount which may be due on the delinquent account so long as the tenant provides verification oftenancy in the form of a rental agreement or proof of rent payments.

For multi-unit complexes with a master meter, the District is not required to make service available to the residential occupants unless each residential occupant agrees to the terms and conditions of service and meets the requirements of law and the District's rules and regulations. However, if one or more of the residential occupants are willing and able to assume responsibility for the subsequent charges to the account to the satisfaction of the District, or if there is a physical means legally available to the District of selectively terminating service to those residential occupants who have not met the requirements of the District's rules and regulations, the District will make service available to those residential occupants who have met those requirements.

Before receiving service, each applicant for a metered connection will be required to establish credit, which will be deemed established under any one of the following conditions:

1. Applicant makes a cash deposit to secure payment of his water bills as required in this Policy.
2. Applicant has been a customer of the District and during the last twelve (12) consecutive months of that prior service has paid all water bills without disconnection for nonpayment.

In the case of a detached single-family dwelling, the District may do any of the following:

1. Give notice of termination at least seven (7) days prior to the proposed termination.
2. In order for the amount due on the delinquent account to be waived, require an occupant who becomes a customer to verify that the delinquent account customer of record is or was the landlord, manager, or agent of the dwelling. Verification may include, but is not limited to, a lease or rental agreement, rent receipts, a government document indicating that the occupant is renting the property, or information disclosed pursuant to Section 1962 of the Civil Code.

BACKFLOW PREVENTION DEVICE TEST

All backflow prevention devices, which are required by the District, must be tested on an annual basis according to District Ordinance 87 or succeeding ordinances. An additional fee of \$6.00 will be charged when a 10-Day Notice of Termination letter is issued and a fee of \$13.00 will be charged when a 48-hour notice is issued to the customer's premises. Upon failure to provide successful test results within the time specified in a final notice, service shall be discontinued until the device is tested and passes, and a \$38.00 Service Reinstatement charge is paid.

RETURNED PAYMENT CHARGES

If a check, credit card transaction or automatic payment service is used for payment of District fees, rates or charges and the payment is declined by the bank upon which it is drawn, for whatever reason, the customer will be charged the amount payable to cover the returned check, credit card transaction or automatic payment; the actual Non-Sufficient Funds (NSF) bank fees assessed to the District; and a Returned Payment Charge of \$20.00. Payment to cover these charges must be made in cash or with certified funds. Customers having more than two returned payment transactions within six months may be required to pay future bills in cash or with certified funds and may be removed from Auto-Pay at the discretion of the District.

DISPUTED BILLS

In the event of a disputed reading, the meter shall be reread. If the accuracy of the meter is questioned by a customer, the customer shall be given the option of placing a \$75.00 deposit with the District for a meter registration accuracy test. The District recommends that the customer be present to watch the meter being removed from the meter box and to record the serial number. The meter will then be shipped to a third party tester. If the results of the test show the meter is greater than 101.5% accurate, the meter is over-reading usage, the meter will be replaced, a pro-rated adjustment will be made on previous bills up to a maximum of six months and the \$75.00 deposit will be returned to the customer.

If the meter is less than 98.5% accurate, the meter is under-reading usage, the meter will be replaced, the \$75.00 deposit will be forfeited and no further action will be taken.

If the results of the test show that the meter is at least 98.5% to 101.5% accurate, the customer shall forfeit the \$75.00 deposit to cover the District's expense to perform the meter accuracy test.

CUSTOMER DEPOSITS

Applicants for metered and bulk rate water service shall deposit with the District, an amount equal to the estimated average monthly water bill, fixed as follows:

<u>METER SIZE</u>	<u>DEPOSIT</u>
3/4" & Bulk Customers	\$70.00
1"	\$90.00
1-1/2"	\$160.00
2"	\$230.00
3"	\$460.00
4"	\$570.00
6"	\$805.00
8"	\$1,145.00
10"	\$2,290.00

Security deposits are required of all applicants for water service.

Any service discontinued for nonpayment shall require a security deposit, if said deposit is not already on file, in addition to payment of all other applicable fees and charges, before water service is resumed. The amount of the security deposit for reinstatement of discontinued service will be the estimated average monthly water bill, but in no case less than the fixed deposit schedule stated above.

Any account having three or more delinquencies within the past twelve months will be required to pay and maintain a deposit according to the schedule stated above, even though water service may not have actually been disconnected, if said deposit is not already on file.

A security deposit will be refunded on any account that has remained in good standing for twelve consecutive months. Accounts will be reviewed for potential refund on an annual anniversary basis. Any security deposits on file when service is discontinued will be applied towards the final billing.

Developers/Customers may be required to provide the District with a deposit when applying for a new service. The amount will be determined on a case by case basis. The deposit will be returned upon final approval by the District's Field Service Department of the meter, meter box installation and all other connection facilities. In the event the meter, meter box and other connection facilities do not meet the time and/or other requirements of the District, the deposit will be used to pay for District labor, materials and/or outside contracts to remedy the situation plus an overhead and administrative charge of 15%.

CUSTOMER SERVICE CHARGES

New Account Charge (Regular hours turn-on)	\$20.00
New Account Charge (After hours turn-on)	\$150.00
Service Reinstatement Charge (Regular hours)	\$38.00
Service Reinstatement Charge (After hours)	\$150.00

In addition to the above, other customer service visits may include, but are not limited to, emergency turn-offs, turn-ons and meter re-readings and may be subject to a \$38.00 charge during regular working hours or a \$195.00 charge during non-working hours. Other applicable fees, charges and security deposits may also be required for customer service visit requests.

These Customer Service Charges are not applicable to Continuity of Service Agreements to accounts that are in good standing.

WATER THEFT

California law, including but not limited to Penal codes 498, 624 and 625, defines various methods of water theft. In the event that a suspected water theft is discovered, District personnel will contact law enforcement personnel. Water theft can result in the District pressing charges.

To prevent further water delivery from occurring, the District may remove or lock the meter or confiscate the equipment or materials that allow the unauthorized connection. The customer/individual will be charged all costs incurred by the District associated with reporting the incident including but not limited to labor, materials and equipment used to report the incident and all costs incurred by the District to replace or repair any District facilities or other items that were tampered with, damaged or removed for the purpose of receiving water without paying the full lawful charge. These costs are subject to an overhead and administrative charge of 15%. No further service will be allowed at the address until all fees and charges are paid in full.

When the District has discovered that a customer has obtained water service by fraudulent means, or has diverted the water service for unauthorized use, the service to that customer may be discontinued without notice. The District shall not restore service until the customer has complied with all rules and requirements of the District and the District has been reimbursed for the full amount of the actual cost to the District incurred by reason of the said fraudulent use. For additional information on the District's unauthorized service policy, refer to Ordinance No. 82 adopted August 23, 1993, and any successor ordinances.

Tampering, altering, modifying, reconnecting, bypassing, or any otherwise unauthorized or fraudulent control of water meters and appurtenances are violations of the California Penal Code. Breaking or obstructing water pipes or meters, diverting flow or drawing water from any stopcock or faucet by which the flow of water is controlled, after the service has been closed or shut off for a specific cause, is also a violation of the California Penal Code and will be addressed according to the "Procedure for Suspected Water Theft" adopted on June 12, 2006.

Any violation that causes the District to repair, restore, replace, or relocate a District-owned facility will be billed on a time and material basis plus an overhead and administrative charge of 15%. Nonpayment of such amounts may result in termination of service or collection action.

CUSTOMER COMPLAINTS

Should Customer Accounts staff be unable to satisfy a customer's billing complaint, the customer may file a complaint with the Chief Financial Officer. Should the Chief Financial Officer be unable to satisfy the customer's complaint, the customer may file a complaint with the General Manager.

Should the General Manager be unable to satisfy the customer's complaint, the customer may file a complaint with the Board of Directors by submitting the complaint in writing. The decision of the Board of Directors shall be final.

METER EXCHANGES

A customer, upon request, may exchange an existing meter for a meter of lesser or greater size, subject to District approval. Installation of the new meter and service lateral, if required, for a 2" or smaller service, will be billed on a time and material basis plus an overhead and administrative charge of 15%. New meters, 3" or larger, or compound meters, shall be purchased and installed at the sole cost of the applicant and shall be subject to Engineering Dept. specifications, review and inspection. Once installed, the meter and service connection become the property and maintenance responsibility of the District; however, the applicant must warrant the installation for a period of two years.

Customers shall only be allowed to exchange meters with the approval of the District, and the meter and installation charge shall be computed on an individual basis.

Inasmuch as Capital Facility Fees are based solely upon meter size, any customer/developer who requests a larger meter, whether domestic or landscape, will be responsible for payment of the Capital Facility Fee (aka Basic Facility Fee) differential between the current meter size originally paid and the larger meter Capital Facility Fee in existence at the time of the exchange, in addition to payment of time and material costs plus an overhead and administrative charge of 15% associated with the actual meter and service installation change.

In the event that a customer requests a meter exchange for the purpose of downsizing his/her service, the District will not refund the Capital Facility Fees differential between the current meter size originally paid and the smaller meter Capital Facility Fee. The District will issue a letter to the customer that can be remitted anytime within ten years to permit the service to be restored to the original size without having to pay an additional Capital Facilities Fee. This letter is transferrable to a future property owner.

Single family residential customers will not generally be permitted to exchange an existing meter for a meter size greater than 3/4-inch, since such request shall constitute a significant change in water demand and service. If the District requests the change in meter size, charges, if any, will be determined on an individual basis.

CONTINUITY OF SERVICE AGREEMENT

In order to accommodate interim water service for "clean and show" purposes, an owner or agent may have water service for specific water meter(s) automatically placed in the owner's or agent's name at the time a tenant requests discontinuance of service, if the owner or agent applies for and executes an Application for Continuity of Service Agreement.

Please note that the District reserves the right to disconnect water service to a tenant for nonpayment of water bills, regardless of whether or not a Continuity of Service Agreement is on file. The District will not require that the owner or agent pay the standard Customer Service Charges and/or deposits for establishing a new account for any meter for which there is a Continuity of Service

Agreement on file and if the account is in good standing.

When responsibility for a meter reverts to an owner or agent under a Continuity of Service Agreement, the meter must remain on until a new tenant or a new owner applies for the water service or until the Continuity of Service Agreement is canceled with ten days' written notice.

CAPITAL FACILITY FEE

Connection fees are composed of Capital Facility Fees and Distribution System Fees.

<u>Meter Size</u>	<u>Capital Facility Fee</u>
3/4"	\$ 5,068.00
1"	\$ 8,463.00
1-1/2"	\$ 16,875.00
2"	\$ 27,011.00
3"	\$ 54,072.00
4"	\$ 84,478.00
6"	\$ 168,905.00
8"	\$ 270,258.00
10"	\$ 388,537.00

Capital Facility Fees and all other Rates, Charges and Fees associated with new service can only be accepted on behalf of a parcel that has an adjacent District water main that extends completely across one or more sides of the parcel to be served, and only if said main is of adequate size, age and service pressure to serve the development proposed, and for which a meter will be installed within 90 days, or as otherwise allowed or required by the District's Board of Directors in unusual circumstances. Payment of all other Rates, Charges and Fees applicable to the proposed parcel must accompany the payment of Capital Facility Fees.

If an applicant or developer desires to serve a parcel or lot that has had no previous authorized service from the District, and said parcel or lot is not adjacent to an existing water main of a size, condition, and service pressure deemed necessary by the District to serve the proposed development or property, the applicant or developer shall be required to construct all necessary water system facilities, including a water main line extension to and across the entire frontage of the parcel(s) to be served, at the applicant or developer's sole expense, in accordance with District specifications, rules, and regulations. In such case, the applicant or developer shall bear the entire cost of all design, construction, and inspection. The applicant or developer must contact the Engineering Department for more information about District specifications, rules and regulations regarding the construction of water system facilities and to be issued a permit for construction.

In a parcel split situation, only one division of the original parcel will be given credit for the residential service originally paid for. The remaining newly-formed parcels shall be subject to payment of all applicable Water District connection fees currently in effect for obtaining water service. In addition, in order to receive water service, the newly-created parcels must be completely fronted on at least one side by a Water District pipeline of a size and pressure adequate to service the newly-created parcels. If additional distribution pipelines are required to reach remote parcel locations, the labor and materials to install such pipelines, to District specifications, will be at the owner's or developer's sole

expense.

All residential, commercial, public, industrial and agricultural connections shall be levied a Capital Facility Fee based upon their meter size. Capital Facility Fees are a one-time charge and are used to finance the upgrading and/or rehabilitation or replacement of existing water supply, storage, and transmission facilities as well as the construction of new water supply, water treatment, storage, and transmission facilities in order to service the demand caused by the new development, and must be paid in advance of any service connection to the benefited parcel. It is a charge for facilities in existence at the time a charge is imposed or charges for new facilities to be constructed in the future that are of benefit to the person or property being charged. It is appropriate and necessary to provide for system facilities that have not been constructed, or that have been constructed, but for which new development has not contributed its fair share of the cost. The Capital Facility Fees collected shall be used to cover the cost of the source of supply, storage, major transmission and distribution lines, and any additional related facilities as required to service the demand load caused by the new development.

The Fee shall be solely used to pay (1) for public facilities constructed or to be constructed by the District, (2) for reimbursing the District for the development's fair share of those capital improvements already constructed by the District and/or (3) to reimburse other developers who have constructed basic facilities, where those facilities were beyond those needed for the other developer's project(s).

Certain properties may not be subject to Capital Facility Fees due to an agreement or memorandum of understanding covering the tract or property.

When a customer desires to individually meter a multiple unit building (residential or commercial) that is master metered and where the Capital Facility Fee or Basic Facility Fee was paid for the master metered service, and where individual meters would not constitute a material increase in capacity or demand, as determined by the District, no additional Capital Facility Fee will be charged.

The District reserves the right to determine the appropriate meter size for the development or proposed development from information provided by the applicant and as investigated by the District. Applicants for water service shall have the right to appeal to the Board of Directors a determination made by staff. The decision of the Board of Directors shall be final and binding.

A customer must notify the District of any new construction or placement of new living structures upon a parcel with existing water service. Any new construction/structures will be evaluated by the District to determine whether a larger meter, additional meter or other system modifications would be required to accommodate increased capacity or demand needs caused by new or additional improvements. If the District determines that an additional capacity or demand need will be placed upon the District's water production, transmission, and storage facilities as a result of the new construction, the District reserves the right to charge and collect from the customer an additional Capital Facility Fee to be determined on a case-by-case basis.

Except in unusual circumstances, as determined by the District, Private Fire Service shall be exempt from the payment of Connection Fees (Capital Facility Fees and Distribution System Fees). Landscape-only meters may be exempt from Connection Fees (Capital Facility Fees and Distribution

Fees), at the sole discretion of the District, provided the landscape-only meter serves no facility whatsoever and is no larger than the meter used to monitor domestic water for which appropriate connection fees have been paid, or for which no structure whatsoever is involved, such as a meter for street island landscaping. All landscape-only meters are subject to engineering analysis by the District.

DISTRIBUTION SYSTEM FEE

The Distribution System Fee is a charge for the water distribution system typically located between transmission lines and service laterals. The applicant shall pay the following Distribution System Fee where a water main abuts applicant's benefited parcel, provided, however, that the applicant shall be exempted from such Distribution System Fee whenever water service is provided from a water main constructed and installed at the sole cost of said applicant or the applicant's predecessor-in-interest:

<u>Meter Size</u>	<u>Distribution System Fee</u>
3/4"	\$ 3,724.00
1"	\$ 6,206.00
1-1/2"	\$ 12,412.00
2"	\$ 19,860.00
3"	\$ 39,719.00
4"	\$ 62,061.00
6"	\$ 124,122.00
8"	\$ 198,595.00
10"	\$ 285,480.00

An additional fee may also be imposed to include the estimated cost of modifications or additions to infrastructure that may become necessary to bring existing infrastructure up to current District standards or due to unusual or exceptional circumstances related to a customer's application for service.

An applicant shall not be required to pay any Distribution System Fee if the applicant can prove to the satisfaction of the District that the same or a similar charge was imposed upon applicant's predecessor-in-interest and was paid within twenty years of the date of applicant's request for water service from a steel main, or within thirty years of the date of applicant's request for water service from an asbestos cement or polyvinyl chloride pipe main. A predecessor-in-interest shall be deemed to exist where the subject lot is within a subdivision of land in which the developer has installed and dedicated to the District a distribution system which provides service to the lot. A predecessor-in-interest shall be deemed to exist where the property to be served is within Assessment District No. 14 (a City assessment district), 82-1, 87-1, 91-1, or within the Bradley Tract No. 2460.

As with Capital Facility Fees, Distribution System Fees must be paid in advance of any service connection to the benefited parcel.

Distribution System Fees may also be required from an applicant not otherwise covered by the above, if in the discretion of the District, such charge is reasonably necessary to ensure the applicant pays an equitable fee or charge associated with the District's distribution system.

MASTER METERS

Generally, all residential units must be individually metered, and multiple meters are encouraged for conservation purposes; however, master metering may, at the sole discretion of the District, be allowed with respect to residential developments, under the following circumstances:

1. The property served is a single parcel, owned by a single person, entity, or organization and consisting of more than three residential units.
2. All master meters permitted shall be in the owner's name and all bills shall be the primary responsibility of and shall be paid by said owner. Any agent of the owner shall have their name on file with the District.
3. The master meter shall be located at the property line adjacent to the street or easement.
4. The District reserves the right to require additional meters or to impose conditions in special or unusual circumstances, such as for heavy landscaping or for widely separated buildings on large parcels.
5. An approved backflow prevention device(s) will be required for all master meters, installed and maintained by the owner, at the owner's expense.

The meter size, as required for any particular development, may be determined by the District, at the District's sole discretion, based upon information provided by the applicant and investigation by the District. In the case of more than one service to the same development, the total charge shall be the sum of the appropriate individual charges. The District reserves the right to require an increase in meter size at any time. The owner-applicant must, at that time, pay any additional fees due, including but not limited to Capital Facility Fees.

Generally, all commercial, public, industrial, and agricultural units must be individually metered, and multiple meters are encouraged for conservation and safety purposes; however, master metering may, at the sole discretion of the District, be allowed with respect to commercial, public, industrial, and agricultural developments in circumstances where separate meters would be impractical, such as hotels and motels or facilities of common use such as common bathrooms or washrooms. If master metering is allowed, an approved backflow prevention device(s) must be installed and maintained by the owner, at the owner's expense. There shall be at least one separate meter for each separate sewer lateral. There shall be a separate meter to each customer for which a backflow prevention device is required. There shall be a separate meter for each culinary establishment, each commercial/industrial establishment which uses water as a part of its commercial or industrial business or process, each medical and dental office, each veterinary clinic and animal grooming or boarding or sales establishment, each grocery and food handling or sales establishment, and as otherwise required by the District in its sole discretion; whether or not such establishments are in separate freestanding buildings and whether or not such establishments require backflow prevention devices. There shall also be a separate meter for all commercial and industrial establishments which contains fifty or more fixture units per Uniform Plumbing Code.

SERVICE INSTALLATION CHARGES

Service Installation Charges cover the cost of a water service lateral (from the water main to the customer's meter location) and the installation of a water meter, meter box, valves, and other appurtenances up to the discharge side of the customer valve. Service Installation Charges are collected at the time application for service is made. Where the premises to which water is to be furnished does not have a meter for use on said premises, the applicant shall pay an installation charge based on all costs of installation, including meters, appurtenances, and appurtenant work and shall make a deposit of the estimated amount. Said charge shall be paid in advance of water service. Once installed, the water service lateral, water meter, meter box, valves, and appurtenances become the property of the District.

Payment for meter installation, in addition to all other usual and regular charges of the District, is as follows:

<u>Meter Size</u>	<u>Amount</u>
3/4"	\$ 382.00
1"	\$ 506.00
1-1/2"	\$ 920.00
2"	\$ 1,056.00

For most meter installations, the above amounts are payment in full. However, when District costs exceed the deposit amount due to special circumstances (such as a non-plastic meter box and lid) the customer shall be billed the additional costs on a time and materials basis plus an overhead and administrative charge of 15%. When it is also necessary for the District to install the service lateral from the main to the meter location, an additional charge of \$757.00 for 3/4" and 1" meters (1" lateral) or \$1,013.00 for 1-1/2" and 2" meters (2" lateral) must be paid by the customer. This charge does not include excavation, backfill and street repair, which must be performed by the developer/customer and inspected by the District to ensure the District's installation specifications are met. Meter and service connections must be installed by the District; however, a service connection may be installed by a California licensed contractor, with the District's prior approval, and in such event, the applicant must warrant the installation for a period of two years.

At the discretion of the District, prior to installation, the developer must provide the final grade and curb stake information placed by a California licensed Surveyor or California licensed Professional Civil Engineer.

Meter and service connections larger than two-inches in size, or any size compound meter, shall be installed by a California licensed contractor at the sole cost of the applicant. Once installed, the meter and service connection become the property and maintenance responsibility of the District; however, the applicant must warrant the installation for a period of two years.

If the service cannot be located, it will be classified as abandoned. Abandoned services may be considered as new services for purposes of collection of some or all rates, charges and fees for obtaining service. Upon receipt of an application, an abandoned service may be activated, provided the applicant pays actual time and materials costs plus an overhead and administrative charge of 15% required to locate the service, restore it, and/or upgrade it to current District standards.

An existing service connection may be relocated on the same property, or upgraded, with the approval of the District; however, it may not be moved to a new property. All work by the District will be done on a time and material basis plus an overhead and administrative charge of 15%.

If the meter and service installation requires a backflow prevention device, the costs associated with the installation and maintenance of the backflow prevention device are the sole responsibility of the applicant. (Refer to Ordinance No. 87 and any other successor ordinances.)

PRESSURE VARIANCES

An applicant for service from a main through which the static water pressure will be lower than the normal minimum operating pressure of forty (40) pounds per square inch (psi) must apply for a Low Water Pressure Agreement, in recordable form, and if granted, shall be responsible for installation and maintenance of privately owned pressure equipment, including a District approved backflow device or other devices, as required.

An applicant for service from a main through which the static water pressure will be higher than the normal operating limit of 90 psi must apply for a High Water Pressure Agreement, in recordable form, and if granted, shall be responsible for installation and maintenance of privately owned pressure equipment, including a pressure regulator on applicant's side of the meter or other devices as required to mitigate the potential problems/damages from high water service pressure. Customer may elect to have the District provide and install said pressure regulator on Customer's side of the meter on the service line to the Customer's Property. District will warranty the installation of the pressure regulator only for one year at which time the pressure regulator will become the sole responsibility of Customer to be maintained by Customer in accordance with District Regulations.

CONCEPT/PLAN CHECK FEES/INSPECTION DEPOSITS

An applicant/developer must first submit an application for water system improvements with the Engineering Department. The Engineer will then review the requirements and process for obtaining a permit to install new water system improvements with the applicant/developer. A permit will not be issued until the concept plan and construction plans have been approved in writing and the appropriate fees paid. In addition, the construction inspection deposit must be paid and construction submittals approved before a permit will be issued. The fees for Concept Plan Approval, Plan Check and Construction Inspection are listed below. Once a water system improvements permit is issued, it is valid for two (2) years from the date of approval. If the construction of water system improvements has not been completed and those improvements dedicated to the District within said two years, the applicant/developer will be subject to any new standards and construction specifications that have been adopted by the District, AWWA, or State of California since the permit was issued.

An applicant/developer will be required to provide waterworks plans designed by a California licensed Professional Engineer and to adhere to the District's Standard Construction Specifications and Drawings, which are provided under separate cover and available through the District's Engineering Department. Please refer to the Standard Construction Specifications and Drawings for details on requirements for project bonding, insurance, environmental impact reports, and easements.

1. Concept Plan Approval: Applicant must make an advance payment of a Concept Plan Fee in the amount of \$100.00 to cover facility design requirements review and approval. When required, the applicant must also pay all costs for the District engineering staff, District engineering consultant and/or legal counsel related to the applicant's request plus an overhead and administrative charge of 15%. Any Concept Plan Approval granted is valid for a period of one year from the date of said approval. If construction plans are not submitted to the District during such 12 months, the applicant must resubmit a new concept plan and pay an additional Concept Plan Fee.

A Concept Plan Fee is also required for those variance requests where a conceptual plan or drawing needs to be reviewed by District engineering staff.

2. Plan Check: Applicant must pay a fee, as follows, in advance, to cover engineering review and approval of construction plans and specifications submitted for each proposed water system improvement project:

<u>Engineer's Cost Estimate</u>	<u>Fee</u>
\$0 - \$200,000	2% (minimum \$500)
> \$200,000	1% (minimum \$4,000)

Applicant must also pay (if applicable) actual costs incurred by the District for engineering consultant and/or legal counsel review plus an overhead and administrative charge of 15%.

3. Construction Inspection: Applicant must pay a deposit before construction begins to cover the cost of District inspection of water system improvements. The applicant must deposit 3% of the actual construction cost of the water system improvement work (\$180.00 minimum). Inspections or tests shall be charged on an actual time basis, calculated at \$120.00 per hour with a minimum one hour charge for each official inspection. All construction work necessitating the District Inspector to appear at the construction site before or after District's regular business hours may require the applicant to pay an after hour rate of \$155.00 per hour subject to a minimum charge of \$265.00 per after- hours inspection. Any after-hours inspection must be pre-paid and pre-arranged with the District Inspector.

Any refund of the unused portion of the 3% deposit will not be granted until all water system improvements have been completed and dedicated to the District with approval by the Board of Directors.

WILL-SERVE LETTERS

The City of Ridgecrest, the Counties of Kern and San Bernardino, as well as other public and governmental agencies, financial entities and private individuals frequently require developers to obtain "Will-Serve" letters from the Water District to establish that the District water service is available for a proposed project. If deemed necessary by the District, the developer will be required to submit a tentative project map or site plan for review. The fee for a requested "Will-Serve" letter is \$25.00. The District may require submittal and/or approval of a concept/plan prior to issuance of a will-serve letter.

The District will review the proposed project to determine if the project lies within the District's

boundaries and the extent of the expected impacts on District facilities and/or District customers.

For projects requiring extensive review and consultation, the developer will pay all costs for District engineering staff, District engineering consultant and or legal/counsel plus an overhead and administrative charge of 15% exceeding \$25.00 related to the developer's request for a "Will- Serve" letter.

If appropriate, as determined in its sole discretion and upon terms and conditions it deems appropriate, the District will send the requesting agency a "Will-Serve" letter on behalf of the developer's proposed project. Generally this letter will state that the District can provide service, upon demand, to any location within its boundaries, subject to all District Ordinances, Rules and Policies, and upon construction by the developer of any water system facility extensions; relocation of any existing water lines and/or existing fire hydrants; and/or additional improvements or requirements which may be found necessary, and the deposit of applicable charges and fees for obtaining water service. All such offers of service shall be valid for a period of one year.

REFUND AGREEMENTS

Developers may be required, at their sole expense, to install or replace or upgrade existing water system facilities, including, but not limited to, water mains, valves, fire hydrants, backflow prevention devices and service connections, as a condition to receiving water service. If required, developers must furnish all labor and materials necessary to install or replace the water system facilities, in accordance with District-approved plans and specifications.

If the District requires the installation or replacement of a water main to service an applicant's benefited parcel as a condition to receiving water service, and said water main, once installed, may provide water service to neighboring parcels other than those benefiting the applicant, the applicant may be entitled to receive partial reimbursement for eligible costs of improvements. Developers may request such a reimbursement by applying for a Refund Agreement, at or prior to the time of dedication.

The District may, under the terms and conditions elsewhere described, impose a DistributionSystem Fee to be paid by new connections where the property owner requesting service or predecessor-in-interest has not participated in the costs of the water main abutting said property. During the term of the Refund Agreement, the District shall credit the developer with 100% of said Distribution System Fees collected on said eligible water line.

The Refund Agreement shall expire ten years from the date of said agreement, or when the developer has been repaid 100% of the eligible costs of said improvements, whichever occurs first. Eligible costs include, but are not limited to, construction, engineering and surveying. Refund Agreements must be approved by the Board of Directors.

CONTINUITY/SPECIAL CONDITIONS/SEVERABILITY

Continuity – Adoption of these rules shall not be construed as a waiver of any right or obligation under any prior agreement, contract or commitment.

Special Conditions – In the event that conditions arise which are not specifically covered by these rules, the Board may take whatever action which, in its sole discretion, is warranted.

Severability – If any section, subsection, subdivision, paragraph, sentence, clause, or phrase of this regulation, or any part thereof, is for any reason held to be invalid, such decision shall not affect the validity of the remaining portions of this regulation, or any part thereof. The Board hereby declares that it would have passed each section, subsection, subdivision, paragraph, sentence, clause, or phrase thereof, irrespective of the fact that any one or more sections, subsections, subdivisions, paragraphs, sentences, clauses, or phrases be declared invalid.

ORDINANCE NO. 107

ORDINANCE OF THE BOARD OF DIRECTORS OF THE INDIAN WELLS VALLEY WATER DISTRICT, KERN AND SAN BERNARDINO COUNTIES, CALIFORNIA, AMENDING ORDINANCE NUMBER 106 - PROVIDING FOR A REFERENCE DOCUMENT ENTITLED "WATER SALES AND SERVICE POLICY MANUAL"

WHEREAS, The Board of Directors of the Indian Wells Valley Water District approved and adopted Ordinance No. 106 – Providing for a Reference Document Entitled “Water Sales and Service Policy Manual on February 27, 2023;

WHEREAS, The Board of Directors of the Indian Wells Valley Water District wish to amend Ordinance No. 106 to incorporate new Charges, Rates & Provisions for Construction Meters, Bulk Water Station and Private Fire Protection Service.

BE IT ORDAINED, by the Board of Directors of the Indian Wells Valley Water District, as follows:

Section 1. PURPOSE.

The purpose of this Ordinance is to amend Ordinance No. 106 to incorporate new Charges, Rates & Provisions for Construction Meters, Bulk Water Station and Private Fire Protection Service.

Section 2. AMENDMENT.

Ordinance No. 106 is hereby amended to incorporate the new Charges, Rates & Provisions for Construction Meters (Page 8), Bulk Water Station (Page 10) and Private Fire Protection Service (Page 10), attached hereto and incorporated into the Water Sales and Service Policy Manual.

Section 3. WATER SALES AND SERVICE POLICY MANUAL ADOPTION.

The Water Sales and Service Policy Manual is hereby amended and adopted.

Section 4. EFFECTIVE DATE.

Ordinance No. 107 will take effect on April 1st, 2023.

Section 5. PUBLICATION.

The Secretary is hereby directed to cause this Amendment to Ordinance No. 106 to be published once in full in a newspaper of general circulation, printed, published and circulated in the District.

All the foregoing being on the motion of Director Kicinski seconded by Director Saint-Amand, and authorized by the following vote, namely:

AYES: President Boyd
 Vice-President Kicinski
 Director Griffin
 Director Rajtora
 Director Saint-Amand

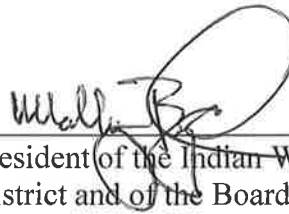
NOES: None.

ABSENT: None.

ABSTAIN: None.

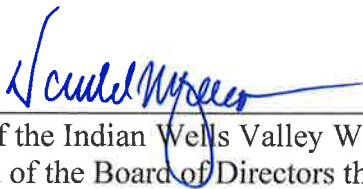
I HEREBY CERTIFY that all the foregoing ordinance is the ordinance of the Indian Wells Valley Water District as duly passed and adopted by said Board of Directors at a legally convened meeting held on the March 13, 2023.

WITNESS my hand and the official seal of said Board of Directors this 13th day of March 2023.



President of the Indian Wells Valley Water District and of the Board of Directors thereof.

ATTEST:



Secretary of the Indian Wells Valley Water District and of the Board of Directors thereof.

(SEAL)

STATE OF CALIFORNIA)
COUNTIES OF KERN)
AND SAN BERNARDINO)

I, DONALD M. ZDEBA, Secretary of the Board of Directors of the Indian Wells Valley Water District, DO HEREBY CERTIFY, as follows:

The foregoing Ordinance is a full, true and correct copy of Ordinance No. 107, duly adopted at a Regular Board Meeting of the Board of Directors of said District, duly and held at the regular meeting place of the Board on the 13th day of March, 2023, for which all of the members of said Board of Directors had due notice and at which a majority of the Board of Directors were present. All the foregoing being on the motion of Director seconded by Director, and authorized by the following vote, namely:

AYES: President Boyd
Vice-President Kicinski
Director Griffin
Director Rajtora
Director Saint-Amand

NOES: None.


ABSENT: None.

ABSTAIN: None.

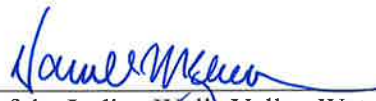
I have carefully compared the foregoing with the original Minutes of said meeting on file and of record in my office, and the foregoing is a full, true and correct copy of the original ordinance adopted at said Meeting and entered into said Minutes.

Ordinance No. 107 has not been amended, modified or rescinded since the date of its adoption on March 13th, 2023, and the same is now in full force and effect.

WITNESS my hand and the official seal of said Board of Directors this 13th day of March, 2023.



President of the Indian Wells Valley Water District
and of the Board of Directors thereof.



Secretary of the Indian Wells Valley Water District
and of the Board of Directors thereof.

(SEAL)

CONSTRUCTION METER CHARGES, RATES & PROVISIONS

MONTHLY SERVICE CHARGE

Construction meters will be charged a \$25 Meter Handling Service Charge, monthly ready-to-serve charge and metered monthly usage rates.

\$25 + 34.87 effective April 1, 2023
\$25 + 37.66 effective January 1, 2024
\$25 + 40.67 effective January 1, 2025
\$25 + 43.11 effective January 1, 2026
\$25 + 45.70 effective January 1, 2027

METERED MONTHLY USAGE RATES

(Rate per HCF)
(All Usage)

\$7.31 effective April 1, 2023
\$7.46 effective January 1, 2024
\$7.62 effective January 1, 2025
\$7.75 effective January 1, 2026
\$7.89 effective January 1, 2027
+ zone charge

BULK WATER STATION CHARGES, RATES & PROVISIONS

	Effective 04/01/2023	Effective 01/01/2024	Effective 01/01/2025	Effective 01/01/2026	Effective 01/01/2027
Monthly Fixed	\$34.87	\$37.66	\$40.67	\$43.11	\$45.70
Volumetric Per HCF	\$6.93	\$7.48	\$8.08	\$8.56	\$9.07

PRIVATE FIRE PROTECTION SERVICE CHARGES, RATES & PROVISIONS

FLAT MONTHLY SERVICE RATE

Connection Size	Effective <u>04/01/2023</u>	Effective <u>01/01/2024</u>	Effective <u>01/01/2025</u>	Effective <u>01/01/2026</u>	Effective <u>01/01/2027</u>
1"	\$1.89	\$2.04	\$2.20	\$2.33	\$2.47
2"	\$11.71	\$12.65	\$13.66	\$14.48	\$15.35
3"	\$33.99	\$36.71	\$39.65	\$42.03	\$44.55
4"	\$72.41	\$78.20	\$84.46	\$89.53	\$94.90
6"	\$210.35	\$227.18	\$245.35	\$260.07	\$275.67
8"	\$448.28	\$484.14	\$522.87	\$554.24	\$587.49
10"	\$806.16	\$870.65	\$940.30	\$996.72	\$1,056.52

APPENDIX 4

ORDINANCE NOS. 93, 98, 99, 100, AND 103

ORDINANCE NO. 93

ORDINANCE OF THE BOARD OF DIRECTORS OF THE INDIAN WELLS VALLEY WATER DISTRICT, KERN AND SAN BERNARDINO COUNTIES, CALIFORNIA, RESCINDING ORDINANCE NO. 72 IN ITS ENTIRETY; AND ADOPTING VOLUNTARY AND MANDATORY CONSERVATION MEASURES AND RECOMMENDING AND/OR REQUIRING CERTAIN WATER CONSERVING MEASURES

WHEREAS, the Indian Wells Valley Water District (District) is a County Water District formed and operating under and pursuant to California Water District Law (California Water Code §§ 30000 *et seq.*); and

WHEREAS, pursuant to Water Code § 31001, the District is authorized to perform all acts necessary to fully carry out its functions; and

WHEREAS, pursuant to Water Code § 31035, the District may undertake a water conservation program to reduce water use and may require as a condition of new service that reasonable watersaving devices and water reclamation devices be installed to reduce water use; and

WHEREAS, the Board of Directors of the District find that the water sources available to the District and all the other water users in the Indian Wells Valley is a limited resource and must be conserved to the fullest extent possible.

WHEREAS, a Memorandum of Understanding was made and entered into by and between the District and the City of Ridgecrest (City) for the mutual goal of conserving groundwater and adopting a water efficient landscape ordinance.

NOW THEREFORE, BE IT ORDAINED by the Board of Directors of the Indian Wells Valley Water District, as follows:

SECTION 1. TITLE

This Section shall be known and may be cited as the Water Efficient Landscape Ordinance.

SECTION 2. PURPOSE AND INTENT

- A. Promote the values and benefits of landscaping while recognizing the need to utilize water and other resources as efficiently as possible;
- B. establish a water conservation plan to reduce water consumption in the residential and commercial landscape environment by encouraging single-family residential water conservation, and, in multi-family, commercial and manufacturing zone districts, limiting the use of turf and requiring the utilization of low water use plant materials in new projects;
- C. establish provisions for water management practices and water waste prevention for new development;
- D. establish a plan for designing, installing and maintaining water efficient landscapes in new projects; and
- E. implement a more efficient use of water through swimming pool and water body design by the use of efficient water body management and proper recirculation of water.

SECTION 3. DEFINITIONS

Approved Plant List shall mean the list formulated by District staff and approved and/or modified by the District Board of Directors.

Drainage system shall mean a landscape or irrigation system design to drain the water to be reused on the property or to channel the water off the property.

Drip Irrigation System shall mean the use of a drip emitter system that permits no more than 5 gallons of water per hour from each emitter.

Emitter shall mean a drip irrigation component that dispenses water to plants at a predictable rate, measured in gallons or liters per hour.

Hand Watering shall mean the actual watering of landscape by a person who remains present and holds onto and directs the watering device.

Irrigation Systems shall mean appropriately designed system that utilizes water sprinklers, emitters and bubblers.

Landscape area shall mean all permeable area located on the property and land set aside exclusively for shrubs, flowers, trees, water features and other landscape material to enhance the natural beauty of an area.

Low volume irrigation systems shall mean appropriately designed irrigation systems that utilize low volume sprinklers appropriate to the climatic and site factors. Such heads include low volume sprinkler heads, drip emitters and bubbler emitters.

Low water use plants shall mean trees, shrubs and ground covers that survive with a limited amount of supplemental water as recommended by the Approved Plant List or as identified in the booklet "*Landscape Plants for the California High Desert*" published by the Indian Wells Valley Water District, Rosamond Community Services District, Palmdale Water District, City of Palmdale, Kern County Water Agency and Naval Air Weapons Station China Lake. A copy of the Approved Plant List and booklet shall be on file and available for inspection in the City Planning Department and Indian Wells Valley Water District Offices. Other plant material that is believed to be low water use may be added to the Approved Plant List by special application to the Indian Wells Valley Water District or City Planning Commission.

Recirculation shall mean the reuse of water in a pool or pond in such a way that the water would enter from one point and be reused in another portion in such a way that the water is not wasted or lost by reuse in the pool or pond.

Recycling shall mean the reuse of water in a pool or pond through a series of pumps and filters.

Runoff shall mean water which is not absorbed by the soil or landscape to which it is applied and flows from the landscape area. For example, runoff may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or when there is a slope.

Turf shall mean a surface layer of earth containing mowed or un-mowed grass with its roots.

SECTION 4: APPLICABILITY

All new developer, homeowner and/or commercial installed landscape projects within the boundaries of the District shall be subject to this Ordinance as well as Ordinances No. 90 and/or 91 adopted by the District Board of Directors on December 14, 2009. All water users within the boundaries of the District shall be subject to Section 9 of this Ordinance

SECTION 5: SINGLE-FAMILY RESIDENTIAL LANDSCAPE PROCEDURE

- A. All new single-family residential landscape projects are subject to District Ordinance No. 90 which imposes mandatory restrictions on landscaping. All existing single-family residential landscape projects which are not subject to Ordinance No. 90 are encouraged to abide by these recommendations. Existing landscape areas larger than one acre may be audited so recommendations can be made for water savings.
- B. The following is recommended for all single-family residential homes:
1. Turf landscaping should not exceed 2,000 square feet of single-family residential lots 10,000 square feet or smaller.
 2. Turf landscaping should not exceed 3,000 square feet of single-family residential lots 10,001 square feet or larger.
 3. Irrigation and Landscape Design. Homebuilders, developers and/or landscape contractors should provide the residential customer an irrigation design and landscape design that would, if installed, demonstrate compliance with this Ordinance. Low volume irrigation systems will be demonstrated along with low water use plant material.
 4. The irrigation design needs to show proper drainage to eliminate water waste.
 5. Irrigation Drainage. All irrigation water is to remain on property during normal water run cycle, such that there is minimal or limited runoff from the area being irrigated, specifically onto sidewalks and streets.

SECTION 6. MULTI-FAMILY RESIDENTIAL, COMMERCIAL, INDUSTRIAL OR INSTITUTIONAL LANDSCAPE PROCEDURE

- A. All new landscape projects for multi-family residential, commercial, industrial or institutional are subject to District Ordinance No. 91.

- B. The following limitations apply:
 - 1. Turf and/or any plants not on the Approved Plant List are limited up to 50% of the landscape area.
 - 2. Only the plants from the Approved Plant List, on file and maintained by the District, shall be used within the remaining Landscape Area.
 - 3. The irrigation system in the remaining Landscape Area must be a Low Volume Irrigation System.
 - 4. All of the Landscape Area shall be designed to eliminate any runoff.
 - 5. An irrigation and landscape plan shall be submitted to the City of Ridgecrest Planning Department, containing low volume irrigation systems and low water use plants. The irrigation plan shall demonstrate drainage to eliminate water waste. The plan must provide adequate water supply such that all of the water needed can be delivered every other day within the water window of 8:00 PM – 8:00 AM during the months of May, June, July, August, September and October.
 - 6. Irrigation Drainage. All irrigation water is to remain on property during normal water run cycle, such that there is no runoff from the area being irrigated, specifically onto sidewalks and streets.

SECTION 7. SWIMMING POOLS AND WATER BODIES

- A. Public and private swimming pools and water bodies over 300 square feet shall adhere to the goal of water efficiency as set forth in this Section.
 - 1. New swimming pools shall have a swimming pool cover.
 - 2. New swimming pools shall have a drainage plan.

3. Water features including swimming pools must have recycling or recirculation features.

SECTION 8. APPROVED PLANT LIST

The Approved Plant List is a recommendation for existing single-family and multi-family dwellings, commercial and/or institutional development. The Approved Plant List is a requirement for new development subject to District Ordinances No. 90 and 91.

SECTION 9. MANDATORY MEASURES

The General Manager of the Indian Wells Valley Water District or designee may provide health and safety exceptions with regards to mandatory measures on a case by case basis.

- A. No water user shall waste water. For the purposes of this section enforcement shall be to that degree necessary to prevent the waste of water. "Waste" means the following:
 1. Landscape irrigation to an extent which allows water to runoff the area being irrigated, specifically onto sidewalks and streets creating an undue, continuous flow of water.
 2. Washing down hard or paved surfaces, including but not limited to sidewalks, walkways, driveways, parking areas, tennis courts, patios or alleys, is prohibited except when necessary to alleviate safety or sanitary hazards, and then only by use of hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off device or a low-volume water broom, high-pressure cleaning machine equipped to recycle any water used. General maintenance cleaning shall be performed by other means such as by using a broom.
 3. Knowingly allowing water to leak through water connections, hoses, faucets, pipes, outlets or plumbing fixtures.
 4. Limits on washing vehicles: Using water to wash or clean a vehicle, including but not limited to any automobile, truck, van, bus, motorcycle, boat, motor home, or trailer, whether motorized or not is prohibited, except by use of a hand-held bucket or similar container or a hand-held hose equipped with a positive self-closing water shut-off nozzle or device. This subsection does not apply to any commercial car washing facility that recycles water.

- B. Landscape shall not be irrigated on the surface, except for hand watering and/or the use of a drip irrigation system, between the hours of 8:00 AM – 8:00 PM during the months of May, June, July, August, September and October unless a special permit is issued to accommodate newly planted material.
- C. No water shall be provided to any structure hereafter constructed or remodeled unless the plumbing fixtures to be installed conform to requirements of law as to flow capacity.

SECTION 10. NOTICE AND PENALTIES

- A. Upon confirmation by the District of any violation of this Ordinance, the District shall provide written notice along with educational materials to the owner of record and/or occupant. The notice shall be dated and shall specify the address, the nature of the violation, list the steps that must be taken to comply with this Ordinance and the name and telephone number of a District staff person whom additional information can be obtained. In addition, the notice shall advise the owner/occupant that termination of water service will result from continued non-compliance. These provisions are for a first violation within any consecutive twelve month period.
- B. If the owner/occupant fails to comply with the requirements of the notice pursuant to Section 10.A above, within a reasonable amount of time, a second violation shall occur and a second notice containing the information specified in Section 10.A above shall be issued. The second violation shall impose a fine in an amount not to exceed Fifty Dollars (\$50.00) and will be charged to and billed on the water user's account.

If under the discretion of the District, satisfactory progress is being made on steps to correct the violation, a second notice will not be issued.

- C. If the owner/occupant fails to comply with the requirements of the notice pursuant to Section 10.B above, within a reasonable amount of time, a third violation shall occur and a third notice containing the information specified in Section 10.A shall be issued. The third violation shall impose a fine in an amount not to exceed Two Hundred Dollars (\$200.00) and will be charged to and billed on the water user's account.

The third notice shall also notify the owner/occupant that water service will be terminated within thirty (30) calendar days unless the owner/occupant is in compliance with the provisions of this Ordinance. If the owner/occupant fails to comply with the provisions of this Ordinance, the final notice of service termination shall be posted at the entrance to the dwelling/property which indicates that water service shall be terminated in forty-eight (48) hours.

SECTION 11. EXTENSION

The General Manager shall have the authority to extend any deadlines by a period of time not to exceed an additional 30 days as set forth in this Ordinance.

SECTION 12. APPEAL

1. Should a property owner/occupant determined to be in violation of this Ordinance dispute the findings of staff or if said property owner/occupant believes they have sufficient justification for said violation, said property owner/occupant may request a hearing with an appropriate committee of the Board of Directors. The hearing shall be scheduled within thirty (30) calendar days of the request. The hearing shall be attended by the District's General Manager or a designated representative of the General Manager.
2. The District's General Manager or a designated representative of the General Manager shall mail the property owner/occupant a written decision within ten (10) calendar days of the hearing. If the property owner/occupant is dissatisfied with the outcome of the hearing, the property owner/occupant may request the matter be placed on the agenda of the District's Regularly Scheduled Board Meeting. The property owner/occupant may then make his or her petition to the Board of Directors. The Board's determination shall be final.

SECTION 11. ADMINISTRATIVE EXCEPTIONS

The General Manager of the District or designee may provide administrative exceptions to the landscape and irrigation plan requirements of this Ordinance on a case by case basis.

The General Manager of the District or designee will notify the City Manager of any administrative exemption granted pursuant to this Section prior to the date the exception becomes effective.

The City Manager or designee after consultation with the General Manager of Indian Wells Valley Water District may grant an administrative exception.

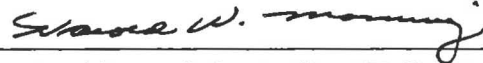
SECTION 12. EFFECTIVE DATE

1. The foregoing Ordinance shall become effective upon adoption of same by the Board of Directors of the Indian Wells Valley Water District.

SECTION 13. PUBLICATION

1. The Secretary is hereby directed to cause this Ordinance to be published once in full in a newspaper of general circulation, printed, published and circulated within the District.

ADOPTED this 10th day of May, 2010.



Vice-President of the Indian Wells Valley Water
District Board of Directors

ATTEST



Secretary of the Indian Wells Valley Water
District Board of Directors

(SEAL)

ORDINANCE NO. 98

ORDINANCE OF THE BOARD OF DIRECTORS OF THE INDIAN WELLS VALLEY WATER DISTRICT, KERN AND SAN BERNARDINO COUNTIES, CALIFORNIA, RESCINDING ORDINANCE NUMBER 90 IN ITS ENTIRETY; AND REQUIRING WATER EFFICIENT LANDSCAPE AS A CONDITION OF RECEIVING NEW SINGLE FAMILY DWELLING WATER SERVICE.

WHEREAS, the Indian Wells Valley Water District (District) is a County Water District formed and operating under and pursuant to California Water District Law (California Water Code §§ 30000, *et seq.*); and

WHEREAS, pursuant to Water Code § 31001, the District is authorized to perform all acts necessary to fully carry out its functions; and

WHEREAS, pursuant to Water Code § 31035, the District may undertake a water conservation program to reduce water use and may require as a condition of new service that reasonable water saving devices and water reclamation devices be installed to reduce water use; and

WHEREAS, the Board of Directors of the District find that the water sources available to the District and all the other water users in the Indian Wells Valley is a limited resource and must be conserved to the fullest extent possible.

NOW THEREFORE, BE IT ORDAINED by the Board of Directors of the Indian Wells Valley Water District, as follows:

SECTION 1. PURPOSE

The purpose of this Ordinance is to conserve water by requiring all Front Yards of Single Family Dwellings to at all times comply with the provisions herein as a condition of receiving District water service.

SECTION 2. REPEAL, RESCISION AND AMENDMENT.

Ordinance No. 90 is hereby rescinded in its entirety.

SECTION 3. DEFINITIONS

- A. “**Approved Plant List**” means the list formulated by staff and approved and/or modified by the District Board of Directors.

- B. **“Front Yard”** means the Landscape Area that is between the Single Family Dwelling and any street or road, including any Landscape Area between the sidewalk and the street/road that is the responsibility of the property owner.
- C. **“Landscape Area”** means all non-hardscape or non-building area located on the Front Yard.
- D. **“Low Volume Irrigation System”** means appropriately designed irrigation systems that utilize low volume watering devices appropriate to the climatic and site factors including microsprinkler heads, drip emitters, and bubbler emitters.
- E. **“Master Shutoff Valve”** is an automatic valve installed at the irrigation supply point which controls water flow into the irrigation system.
- F. **“Runoff”** means water from irrigation that leaves the Landscape Area and flows onto sidewalks, streets, or roads.
- G. **“Single Family Dwelling”** means a newly constructed single family residential dwelling or existing single family residential dwelling whose owner/occupant is making application to the District for new water service on a property where District water service did not previously exist.
- H. **“Turf”** means a surface layer of earth containing mowed or unmowed living grass with its roots.

SECTION 4. RESTRICTIONS ON LANDSCAPE

- A. There shall be no Turf allowed in the Landscape Area of the Front Yard.
- B. Only the plants from the Approved Plant List, on file and maintained by the District, shall be used within the Landscape Area of the Front Yard.
- C. The irrigation system in the Landscape Area of the Front Yard must be a Low Volume Irrigation System.
- D. All irrigation devices must use high efficiency sprinkler heads.
- E. All irrigation systems must have pressure regulators and master shut-off valves.
- F. The Landscape Area shall be designed to eliminate any runoff.

SECTION 5. NOTICE

A. District shall record a Covenant of Landscape Restrictions on each Single Family Dwelling that is subject to this Ordinance with the Kern County Recorder as notice to each and every owner of said Single Family Dwelling of the provisions of this Ordinance.

B. Upon confirmation by the District of any violation of this Ordinance, the District shall provide written notice along with educational materials to the owner of record of the Single Family Dwelling and the occupant of the Single Family Dwelling. The notice shall be dated and shall specify the address of the Single Family Dwelling, the nature of the violation, list the steps that must be taken to comply with this Ordinance and the name and telephone number of a District staff person from whom additional information can be obtained. In addition, the notice shall advise the owner/occupant that termination of water service will result from continued non-compliance. These provisions are for a first violation within any consecutive twelve month period.

C. If the owner/occupant fails to comply with the requirements of the notice pursuant to Section 5(A) above, within thirty (30) calendar days, a second violation shall occur and a second notice containing the information specified in Section 5(B) above shall be issued. The second violation shall impose a fine in an amount not to exceed Fifty Dollars (\$50.00) and will be charged to and billed on the water user's account.

If, under the discretion of the District, satisfactory progress is being made on steps to correct the violation, a second notice will not be issued.

D. If the owner/occupant fails to comply with the requirements of the notice pursuant to Section 5(C) above, within thirty (30) calendar days, a third violation shall occur and a third notice containing the information specified in Section 5(B) above shall be issued. The third violation shall impose a fine in an amount not to exceed Two Hundred Dollars (\$200.00) and will be charged to and billed on the water user's account.

The third notice shall also notify the owner/occupant that water service will be terminated in thirty (30) calendar days unless the Single Family Dwelling is in compliance with the provisions of this Ordinance. If the owner/occupant fails to comply with the provisions of this Ordinance, the final notice of service termination shall be posted at the entrance to the Single Family Dwelling which indicates that water service shall be terminated in forty-eight (48) hours.

SECTION 6. EXTENSION

A. The General Manager shall have the authority to extend any deadlines by a period of time not to exceed an additional 30 days as set forth in this Ordinance.

SECTION 7. APPEAL

A. Should a property owner/occupant of a Single Family Dwelling determined to be in violation of this Ordinance dispute the findings of staff, said property owner/occupant may request a hearing with an appropriate committee of the Board of Directors. The hearing shall be scheduled within thirty (30) calendar days of the request. The hearing shall be attended by the District's General Manager or a designated representative of the General Manager.

B. The District's General Manager or a designated representative of the General Manager shall mail the property owner/occupant a written decision within ten (10) calendar days of the hearing. If the property owner/occupant is dissatisfied with the outcome of the hearing, the property owner/occupant may request the matter be placed on the agenda of the District's Regularly Scheduled Board Meeting. The property owner may then make his or her petition to the Board of Directors. The Board's determination shall be final.


SECTION 8. EFFECTIVE DATE

A. The foregoing Ordinance shall become effective on December 1, 2015 upon adoption of same by the Board of Directors of the District.

SECTION 9. PUBLICATION

A. The Secretary is hereby directed to cause this Ordinance to be published once in full in a newspaper of general circulation, printed, published and circulated within the District.

ADOPTED this 14th day of December, 2015.



President of the Indian Wells Valley
Water District Board of Directors

ATTEST



Secretary of the Indian Wells Valley
Water district Board of Directors

(SEAL)

ORDINANCE NO. 99

ORDINANCE OF THE BOARD OF DIRECTORS OF THE INDIAN WELLS VALLEY WATER DISTRICT, KERN AND SAN BERNARDINO COUNTIES, CALIFORNIA, RESCINDING ORDINANCE NUMBER 91 IN ITS ENTIRETY; AND REQUIRING WATER EFFICIENT LANDSCAPE AS A CONDITION OF RECEIVING NEW MULTI-FAMILY DWELLINGS, COMMERCIAL AND/OR INSTITUTIONAL WATER SERVICE.

WHEREAS, the Indian Wells Valley Water District (District) is a County Water District formed and operating under and pursuant to California Water District Law (California Water Code §§ 30000, *et seq.*); and

WHEREAS, pursuant to Water Code § 31001, the District is authorized to perform all acts necessary to fully carry out its functions; and

WHEREAS, pursuant to Water Code § 31035, the District may undertake a water conservation program to reduce water use and may require as a condition of new service that reasonable water saving devices and water reclamation devices be installed to reduce water use; and

WHEREAS, the Board of Directors of the District find that the water sources available to the District and all the other water users in the Indian Wells Valley is a limited resource and must be conserved to the fullest extent possible.

NOW THEREFORE, BE IT ORDAINED by the Board of Directors of the Indian Wells Valley Water District, as follows:

SECTION 1. PURPOSE

The purpose of this Ordinance is to conserve water by requiring all Landscape Areas of Multi-Family Dwellings, Commercial and/or Institutional buildings/facilities to at all times comply with the provisions herein as a condition of receiving District water service.

SECTION 2. REPEAL, RESCISSION AND AMENDMENT.

Ordinance No. 91 is hereby rescinded in its entirety.

SECTION 3. DEFINITIONS

- A. **“Approved Plant List”** means the list formulated by staff and approved and/or modified by the District Board of Directors.

- B. **“Landscape Area”** means all non-hardscape or non-building area.
- C. **“Low Volume Irrigation System”** means appropriately designed irrigation systems that utilize low volume watering devices appropriate to the climatic and site factors including microsprinkler heads, drip emitters, and bubbler emitters.
- D. **“Master Shut-off Valve”** is an automatic valve installed at the irrigation supply point which controls water flow into the irrigation system. When this valve is closed water will not be supplied to the irrigation system.
- E. **“Multi-Family Dwellings, Commercial and/or Institutional”** means a newly constructed or existing multi-family residential dwelling, commercial and/or institutional building/facility whose owner/occupant is making application to the District for new water service on a property where District water service did not previously exist (collectively referred to herein as “Multi-Family Dwelling”).
- F. **“Plant Factor”** or “plant water use factor” is a factor, when multiplied by evapotranspiration (ET_o), estimates the amount of water needed by plants.
- G. **“Runoff”** means water from irrigation that leaves the Landscape Area and flows onto sidewalks, streets, or roads.
- F. **“Turf”** means a surface layer of earth containing mowed or unmowed living grass with its roots.

SECTION 4. RESTRICTIONS ON LANDSCAPE

- A. Turf and/or any plants not on the Approved List are limited up to 50% of the Landscape Area.
- B. High water use plants, characterized by a plant factor of 0.7 to 1.0, are prohibited in street medians.
- C. Only the plants from the Approved Plant List, on file and maintained by the District, shall be used within the remaining Landscape Area.
- D. The irrigation system in the remaining Landscape Area must be a Low Volume Irrigation System.
- E. All irrigation devices must use high efficiency sprinkler heads.
- F. All irrigation systems must have pressure regulators and master shut-off valves.
- G. All of the Landscape Area shall be designed to eliminate any runoff.

- H. Areas less than 10 feet wide must be irrigated with subsurface drip or other technology that produces no over spray or runoff.

SECTION 5. NOTICE

A. District shall record a Covenant of Landscape Restrictions on each Multi-Family Dwelling that is subject to this Ordinance with the Kern County Recorder as notice to each and every owner of said Multi-Family Dwelling of the provisions of this Ordinance.

B. Upon confirmation by the District of any violation of this Ordinance, the District shall provide written notice along with educational materials to the owner of record of the Multi-Family Dwelling and the occupant of the Multi-Family Dwelling. The notice shall be dated and shall specify the address of the Multi-Family Dwelling, the nature of the violation, list the steps that must be taken to comply with this Ordinance and the name and telephone number of a District staff person from whom additional information can be obtained. In addition, the notice shall advise the owner/occupant that termination of water service will result from continued non-compliance. These provisions are for a first violation within any consecutive twelve month period.

C. If the owner/occupant fails to comply with the requirements of the notice pursuant to Section 5(A) above, within thirty (30) calendar days, a second violation shall occur and a second notice containing the information specified in Section 5(B) above shall be issued. The second violation shall impose a fine in an amount not to exceed Fifty Dollars (\$50.00) and will be charged to and billed on the water user's account.

If, under the discretion of the District, satisfactory progress is being made on steps to correct the violation, a second notice will not be issued.

D. If the owner/occupant fails to comply with the requirements of the notice pursuant to Section 5(C) above, within thirty (30) calendar days, a third violation shall occur and a third notice containing the information specified in Section 5(B) above shall be issued. The third violation shall impose a fine in an amount not to exceed Two Hundred Dollars (\$200.00) and will be charged to and billed on the water user's account.

The third notice shall also notify the owner/occupant that water service will be terminated in thirty (30) calendar days unless the Multi-Family Dwelling is in compliance with the provisions of this Ordinance. If the owner/occupant fails to comply with the provisions of this Ordinance, the final notice of service termination shall be posted at the entrance to the Multi-Family Dwelling which indicates that water service shall be terminated in forty-eight (48) hours.

SECTION 6. EXTENSION

A. The General Manager shall have the authority to extend any deadlines by a period of time not to exceed an additional 30 days as set forth in this Ordinance.

SECTION 7. APPEAL

A. Should a property owner/occupant of a Multi-Family Dwelling determined to be in violation of this Ordinance dispute the findings of staff, said property owner/occupant may request a hearing with an appropriate committee of the Board of Directors. The hearing shall be scheduled within thirty (30) calendar days of the request. The hearing shall be attended by the District's General Manager or a designated representative of the General Manager.

B. The District's General Manager or a designated representative of the General Manager shall mail the property owner/occupant a written decision within ten (10) calendar days of the hearing. If the property owner/occupant is dissatisfied with the outcome of the hearing, the property owner/occupant may request the matter be placed on the agenda of the District's Regularly Scheduled Board Meeting. The property owner may then make his or her petition to the Board of Directors. The Board's determination shall be final.


SECTION 8. EFFECTIVE DATE

A. The foregoing Ordinance shall become effective on December 1, 2015 upon adoption of same by the Board of Directors of the District.

SECTION 9. PUBLICATION

A. The Secretary is hereby directed to cause this Ordinance to be published once in full in a newspaper of general circulation, printed, published and circulated within the District.

ADOPTED this 14th day of December, 2015.



President of the Indian Wells Valley
Water District Board of Directors

ATTEST



Secretary of the Indian Wells Valley
Water district Board of Directors

(SEAL)

ORDINANCE NO. 100

ORDINANCE OF THE BOARD OF DIRECTORS OF THE INDIAN WELLS VALLEY WATER DISTRICT, KERN AND SAN BERNARDINO COUNTIES, CALIFORNIA, RESCINDING ORDINANCE NUMBER 97 IN ITS ENTIRETY AND ADOPTING EMERGENCY WATER CONSERVATION MANDATORY RESTRICTIONS

WHEREAS, the Indian Wells Valley Water District (District) is a County Water District formed and operating under and pursuant to California Water District Law (California Water Code §§ 30000 *et seq.*); and

WHEREAS, pursuant to Water Code § 31001, the District is authorized to perform all acts necessary to fully carry out its functions; and

WHEREAS, pursuant to Water Code § 31026, the District may restrict the use of district water during any emergency caused by drought, or other threatened or existing water shortage, and to prohibit the wastage of district water or the use of district water during such periods, for any purpose other than household uses or such other restricted uses as may be determined to be necessary by the district and may prohibit use of such water during such periods for specific uses which the district may from time to time find to be nonessential;

WHEREAS, the Board of Directors of the District find that the water sources available to the District and all the other water users in the Indian Wells Valley is a limited resource and must be conserved to the fullest extent possible;

WHEREAS, the State Water Resources Control Board adopted emergency regulations to safeguard the state's remaining water supplies by imposing mandatory water restrictions more stringent than those of the District's Ordinance No. 93;

WHEREAS, this Ordinance will supersede Ordinance No. 93 until rescinded by the District's Board of Directors.

NOW THEREFORE, BE IT ORDAINED by the Board of Directors of the Indian Wells Valley Water District, as follows:

SECTION 1. TITLE

This Section shall be known and may be cited as the Emergency Water Conservation Regulation.

SECTION 2. PURPOSE AND INTENT

- A. Establish a drought water conservation plan to reduce water consumption in residential, commercial, public and industrial landscape, and the hotel/motel, and restaurant industry; and
- B. implement a more efficient use of water.

SECTION 3. REPEAL, RECISSION AND AMENDMENT

Ordinance 97 is hereby rescinded in its entirety.

SECTION 4. DEFINITIONS

Drip Irrigation System shall mean the use of a drip emitter system that permits no more than 5 gallons of water per hour from each emitter.

Hand Watering shall mean the actual watering of landscape by a person who remains present and holds onto and directs the watering device.

Irrigation System shall mean an irrigation system that utilizes water sprinklers, emitters and/or bubblers.

Recirculation shall mean the reuse of water in a pool or pond in such a way that the water would enter from one point and be reused in another portion in such a way that the water is not wasted or lost by reuse in the pool or pond.

Runoff shall mean water which is not absorbed by the soil or landscape to which it is applied and flows from the landscape area. For example, runoff may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or when there is a slope.

Landscape Area means all non-hardscape or non-building area on the property.

Turf shall mean a surface layer of earth containing mowed or un-mowed grass with its roots.

SECTION 5. MANDATORY RESTRICTIONS

A. No water user shall waste water. For the purposes of this section “waste” includes the following and is prohibited:

1. Landscape irrigation to an extent which allows water to runoff the Landscape Area being irrigated, specifically onto sidewalks and streets creating an undue, continuous flow of water.
2. Washing down hard or paved surfaces, including but not limited to sidewalks, walkways, driveways, parking areas, tennis courts, patios or alleys, is prohibited except when necessary to alleviate safety or sanitary hazards, and then only by use of hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off device or a low-volume water broom, high-pressure cleaning machine equipped to recycle any water used. General maintenance cleaning shall be performed by other means such as by using a broom.
3. Knowingly allowing water to leak through water connections, hoses, faucets, pipes, outlets or plumbing fixtures.
4. Limits on washing vehicles: Using water to wash or clean a vehicle, including but not limited to any automobile, truck, van, bus, motorcycle, boat, motor home, or trailer, whether motorized or not is prohibited, except by use of a hand-held bucket or similar container or a hand-held hose equipped with a positive self-closing water shut-off nozzle or device. This subsection does not apply to any commercial car washing facility that recycles water.

B. During the months of April, May, June, July, August, September and October, all customers of the District (residential/commercial/public/industrial) with even-numbered addresses may only operate irrigation systems on Tuesday, Thursday and Saturday and odd numbered addresses may only operate irrigation systems on Wednesday, Friday and Sunday. Irrigation systems may not be operated on Mondays. Landscape Areas shall not be irrigated on the surface, except for hand watering and/or the use of a drip irrigation system, between the hours of 8:00 AM – 8:00 PM, unless a special permit is issued to accommodate newly planted material.

During the months of November, December, January and February, all customers of the District (residential/commercial/public/industrial) with even-numbered addresses may only operate irrigation systems on Saturday and odd numbered addresses may only operate irrigation systems on Sunday. Irrigation systems may not be operated on

Mondays, Tuesdays, Wednesdays, Thursdays or Fridays. There will be no daytime watering restriction during these months.

- C. Turf or ornamental landscapes shall not be irrigated during the 48 hours following measurable precipitation.
- D. Restaurants and other food service establishments shall only serve water to customers on their request.
- E. Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily and prominently display notice of this option.
- F. Operating a fountain or decorative water feature is prohibited, unless the water is part of a recirculating system.
- G. No water service shall be provided to any structure hereafter constructed or remodeled unless the plumbing fixtures to be installed conform to requirements of law as to flow capacity.

The General Manager of the Indian Wells Valley Water District or designee may provide health and safety exceptions with regards to mandatory measures on a case by case basis.

SECTION 6. NOTICE AND PENALTIES

- A. Upon confirmation by the District of any violation of this Ordinance, the District shall provide written notice (warning) to the owner of record, and/or occupant and/or property manager (owner/occupant/manager). The notice shall be dated and shall specify the address, the nature of the violation, list the steps that must be taken to comply with this Ordinance and the name and telephone number of a District staff person from whom additional information can be obtained. In addition, the notice shall advise the owner/occupant/manager that termination of water service may result from continued non-compliance. These provisions are for a first violation of the provisions of this Ordinance 100 by the owner/occupant/manager.
 - 1. Once a warning has been issued to any owner/occupant/manager, they shall be considered duly informed of the District's Mandatory Restrictions pursuant to this Ordinance 100 and any future violations shall be subject to Sections 6.B through E below.

- B. If the owner/occupant/manager fails to comply with the requirements of the notice given pursuant to Section 6.A above, within a reasonable amount of time but not less than two weeks, a second violation shall occur and the District shall provide a second written notice to the owner/occupant/manager. The notice shall be dated and shall specify the address, the nature of the violation, list the steps that must be taken to comply with this Ordinance, how to obtain educational water conservation materials electronically, and the name and telephone number of a District staff person that can provide additional information including hard copies of educational water conservation materials. In addition, the notice shall advise the owner/occupant/manager that a monetary fine in the amount of Fifty Dollars (\$50.00) shall be imposed for a third violation of this Ordinance and that termination of water service may result from continued non-compliance.
- C. If the owner/occupant/manager fails to comply with the requirements of the notice given pursuant to Section 6.B above, within a reasonable amount of time but not less than two weeks, a third violation shall occur and a third notice containing the date, the address, the nature of the violation and the steps that must be taken to comply with this Ordinance shall be issued. The third notice shall further advise the owner/occupant/manager that a fine in the amount of Two Hundred Dollars (\$200.00) shall be imposed for fourth violation of this Ordinance and that termination of water service may result from continued non-compliance. The third violation shall impose a Fifty Dollar (\$50.00) fine charged to and billed on the water user's account. This fine shall be subject to the District's Delinquent Charges section as described in the current Water Sales and Service Policy Manual.

If, in the sole discretion of the District, satisfactory progress is being made on steps to correct the violation, a third notice will not be issued.

- D. If the owner/occupant/manager fails to comply with the requirements of the notice given pursuant to Section 6.C above, within a reasonable amount of time but not less than two weeks, a fourth violation shall occur and a fourth notice containing the date, the address, the nature of the violation and the steps that must be taken to comply with this Ordinance shall be issued. The fourth violation shall impose a Two Hundred Dollar (\$200.00) fine charged to and billed on the water user's account on a monthly basis until the violation(s) ceases. This fine shall be subject to the District's Delinquent Charges section as described in the current Water Sales and Service Policy Manual.
- E. If the owner/occupant/manager fails to comply with the requirements of the notice given pursuant to Section 6.D above resulting in repeated and significant water loss as determined by the District, the District may terminate water service within ten (10) calendar days unless the owner/occupant/manager is in compliance with the provisions of

this Ordinance. If the owner/occupant/manager fails to comply with the provisions of this Ordinance, the final notice of service termination, subject to the District's current 48-Hour Notice of Termination charge, shall be posted at the entrance to the dwelling/property stating that water service shall be terminated in forty-eight (48) hours

Service may only be restored if the violation has been corrected. Owner/occupant/manager will be required to pay all fines and penalties previously assessed pursuant to this Ordinance plus a Service Reinstatement Charge per the Customer Service Charges section as described in the current Water Sales and Service Policy Manual.

SECTION 7. EXTENSION

The General Manager shall have the authority to extend any deadlines by a period of time not to exceed an additional 30 days as set forth in this Ordinance.

SECTION 8. APPEAL

1. Should an owner/occupant/manager determined to be in violation of this Ordinance dispute the findings of staff or if said owner/occupant/manager believes they have sufficient justification for said violation, said owner/occupant/manager may request a hearing with an appropriate committee of the Board of Directors. The hearing shall be scheduled within thirty (30) calendar days of the request. The hearing shall be attended by the District's General Manager or a designated representative of the General Manager.
2. The District's General Manager or a designated representative of the General Manager shall mail the owner/occupant/manager a written decision within ten (10) calendar days of the hearing. If the owner/occupant/manager is dissatisfied with the outcome of the hearing, the owner/occupant/manager may request the matter be placed on the agenda of the District's Regularly Scheduled Board Meeting. The owner/occupant/manager may then make his or her petition to the Board of Directors. The Board's determination shall be final.

SECTION 9. ADMINISTRATIVE EXCEPTIONS

The General Manager of the District or designee may provide administrative exceptions to the landscape and irrigation plan requirements of this Ordinance on a case by case basis.

The General Manager of the District or designee will notify the City Manager of any administrative exemption granted pursuant to this Section prior to the date the exception becomes effective.

The City Manager or designee after consultation with and approval from the General Manager of Indian Wells Valley Water District may grant an administrative exception.

SECTION 10. EFFECTIVE DATE

1. The foregoing Ordinance shall become effective upon adoption of same by the Board of Directors of the Indian Wells Valley Water District.

SECTION 11. PUBLICATION

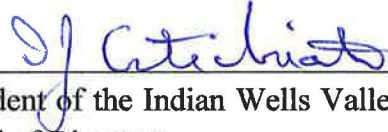
1. The Secretary is hereby directed to cause this Ordinance to be published once in full in a newspaper of general circulation, printed, published and circulated within the District within ten (10) days after adoption.

All the foregoing being on the motion of Vice-President Brown seconded by Director Corlett, and authorized by the following vote, namely:

AYES:	President Cortichiato Vice-President Brown Director Cordell Director Corlett
NOES:	Director Griffin
ABSENT:	None.
ABSTAIN:	None.

I HEREBY CERTIFY that all the foregoing ordinance is the ordinance of the Indian Wells Valley Water District as duly passed and adopted by said Board of Directors at a legally convened meeting held on the 11th day of January, 2016.

WITNESS my hand and the official seal of said Board of Directors this 11th day of January, 2016.



President of the Indian Wells Valley Water District
Board of Directors

ATTEST



Secretary of the Indian Wells Valley Water
District Board of Directors

(SEAL)

ORDINANCE NO. 103

ORDINANCE OF THE BOARD OF DIRECTORS OF THE INDIAN WELLS VALLEY WATER DISTRICT, KERN AND SAN BERNARDINO COUNTIES, CALIFORNIA, RESCINDING ORDINANCE NUMBER 100 IN ITS ENTIRETY AND ADOPTING EMERGENCY WATER CONSERVATION MANDATORY RESTRICTIONS

WHEREAS, the Indian Wells Valley Water District (District) is a County Water District formed and operating under and pursuant to California Water District Law (California Water Code §§ 30000 *et seq.*); and

WHEREAS, pursuant to Water Code § 31001, the District is authorized to perform all acts necessary to fully carry out its functions; and

WHEREAS, pursuant to Water Code § 31026, the District may restrict the use of district water during any emergency caused by drought, or other threatened or existing water shortage, and to prohibit the wastage of district water or the use of district water during such periods, for any purpose other than household uses or such other restricted uses as may be determined to be necessary by the district and may prohibit use of such water during such periods for specific uses which the district may from time to time find to be nonessential;

WHEREAS, the Board of Directors of the District find that the water sources available to the District and all the other water users in the Indian Wells Valley is a limited resource and must be conserved to the fullest extent possible;

WHEREAS, the State Water Resources Control Board adopted emergency regulations to safeguard the state's remaining water supplies by imposing mandatory water restrictions more stringent than those of the District's then current Ordinance No. 93 and required the Board of Directors of the District to adopt Ordinance No. 100 on January 11, 2016;

WHEREAS, the Board of Directors of the District have determined that restricting landscape irrigation to one day a week can be detrimental to not only turf, trees and shrubs, but also the aesthetic quality of the Ridgecrest community; and

WHEREAS, this Ordinance will supersede Ordinance No. 100 until rescinded by the District's Board of Directors.

NOW THEREFORE, BE IT ORDAINED by the Board of Directors of the Indian Wells Valley Water District, as follows:

SECTION 1. TITLE

This Section shall be known and may be cited as the Emergency Water Conservation Regulation.

SECTION 2. PURPOSE AND INTENT

- A. Establish a drought water conservation plan to reduce water consumption in residential, commercial, public and industrial landscape, and the hotel/motel, and restaurant industry; and
- B. implement a more efficient use of water.

SECTION 3. REPEAL, RECISSION AND AMENDMENT

Ordinance No. 100 is hereby rescinded in its entirety.

SECTION 4. DEFINITIONS

Drip Irrigation System shall mean the use of a drip emitter system that permits no more than 5 gallons of water per hour from each emitter.

Hand Watering shall mean the actual watering of landscape by a person who remains present and holds onto and directs the watering device.

Irrigation System shall mean an irrigation system that utilizes water sprinklers, emitters and/or bubblers.

Recirculation shall mean the reuse of water in a pool or pond in such a way that the water would enter from one point and be reused in another portion in such a way that the water is not wasted or lost by reuse in the pool or pond.

Runoff shall mean water which is not absorbed by the soil or landscape to which it is applied and flows from the landscape area. For example, runoff may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or when there is a slope.

Landscape Area means all non-hardscape or non-building area on the property.

Turf shall mean a surface layer of earth containing mowed or un-mowed grass with its roots.

SECTION 5. MANDATORY RESTRICTIONS

- A. No water user shall waste water. For the purposes of this section “waste” includes the following and is prohibited:
1. Landscape irrigation to an extent which allows water to runoff the Landscape Area being irrigated, specifically onto sidewalks and streets creating an undue, continuous flow of water.
 2. Washing down hard or paved surfaces, including but not limited to sidewalks, walkways, driveways, parking areas, tennis courts, patios or alleys, is prohibited except when necessary to alleviate safety or sanitary hazards, and then only by use of hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off device or a low-volume water broom, high-pressure cleaning machine equipped to recycle any water used. General maintenance cleaning shall be performed by other means such as by using a broom.
 3. Knowingly allowing water to leak through water connections, hoses, faucets, pipes, outlets or plumbing fixtures.
 4. Limits on washing vehicles: Using water to wash or clean a vehicle, including but not limited to any automobile, truck, van, bus, motorcycle, boat, motor home, or trailer, whether motorized or not is prohibited, except by use of a hand-held bucket or similar container or a hand-held hose equipped with a positive self-closing water shut-off nozzle or device. This subsection does not apply to any commercial car washing facility that recycles water.
- B. **During the months of April, May, June, July, August, September and October**, all customers of the District (residential/commercial/public/industrial) with even-numbered addresses may only operate irrigation systems on Tuesday, Thursday and Saturday and odd numbered addresses may only operate irrigation systems on Wednesday, Friday and Sunday. Irrigation systems may not be operated on Mondays. Landscape Areas shall not be irrigated on the surface, except for hand watering and/or the use of a drip irrigation system, between the hours of 8:00 AM – 8:00 PM, unless a special permit is issued to accommodate newly planted material.

During the months of November, December, January and February, all customers of the District (residential/commercial/public/industrial) with even-numbered addresses may only operate irrigation systems on Tuesday, Thursday and Saturday and odd numbered addresses may only operate irrigation systems on Wednesday, Friday and Sunday. Irrigation systems may not be operated on Mondays. Landscape Areas may be irrigated by hand watering and/or the use of a drip irrigation system at any time. There will be no daytime watering restriction during these months.

- C. Turf or ornamental landscapes shall not be irrigated during the 48 hours following measurable precipitation.
- D. Restaurants and other food service establishments shall only serve water to customers on their request.
- E. Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily and prominently display notice of this option.
- F. Operating a fountain or decorative water feature is prohibited, unless the water is part of a recirculating system.
- G. No water service shall be provided to any structure hereafter constructed or remodeled unless the plumbing fixtures to be installed conform to requirements of law as to flow capacity.

The General Manager of the Indian Wells Valley Water District or designee may provide health and safety exceptions with regards to mandatory measures on a case by case basis.

SECTION 6. NOTICE AND PENALTIES

- A. Upon confirmation by the District of any violation of this Ordinance, the District shall provide written notice (warning) to the owner of record, and/or occupant and/or property manager (owner/occupant/manager). The notice shall be dated and shall specify the address, the nature of the violation, list the steps that must be taken to comply with this Ordinance and the name and telephone number of a District staff person from whom additional information can be obtained. In addition, the notice shall advise the owner/occupant/manager that termination of water service may result from continued non-compliance. These provisions are for a first violation of the provisions of this Ordinance No. 103 by the owner/occupant/manager.

1. Once a warning has been issued to any owner/occupant/manager, they shall be considered duly informed of the District's Mandatory Restrictions pursuant to this Ordinance No. 103 and any future violations shall be subject to Sections 6.B through E below.
- B. If the owner/occupant/manager fails to comply with the requirements of the notice given pursuant to Section 6.A above, within a reasonable amount of time but not less than two weeks, a second violation shall occur and the District shall provide a second written notice to the owner/occupant/manager. The notice shall be dated and shall specify the address, the nature of the violation, list the steps that must be taken to comply with this Ordinance, how to obtain educational water conservation materials electronically, and the name and telephone number of a District staff person that can provide additional information including hard copies of educational water conservation materials. In addition, the notice shall advise the owner/occupant/manager that a monetary fine in the amount of Fifty Dollars (\$50.00) shall be imposed for a third violation of this Ordinance and that termination of water service may result from continued non-compliance.
- C. If the owner/occupant/manager fails to comply with the requirements of the notice given pursuant to Section 6.B above, within a reasonable amount of time but not less than two weeks, a third violation shall occur and a third notice containing the date, the address, the nature of the violation and the steps that must be taken to comply with this Ordinance shall be issued. The third notice shall further advise the owner/occupant/manager that a fine in the amount of Two Hundred Dollars (\$200.00) shall be imposed for fourth violation of this Ordinance and that termination of water service may result from continued non-compliance. The third violation shall impose a Fifty Dollar (\$50.00) fine charged to and billed on the water user's account. This fine shall be subject to the District's Delinquent Charges section as described in the current Water Sales and Service Policy Manual.

If, in the sole discretion of the District, satisfactory progress is being made on steps to correct the violation, a third notice will not be issued.

- D. If the owner/occupant/manager fails to comply with the requirements of the notice given pursuant to Section 6.C above, within a reasonable amount of time but not less than two weeks, a fourth violation shall occur and a fourth notice containing the date, the address, the nature of the violation and the steps that must be taken to comply with this Ordinance shall be issued. The fourth violation shall impose a Two Hundred Dollar (\$200.00) fine charged to and billed on the water user's account on a monthly basis until the violation(s) ceases. This fine shall be subject to the District's Delinquent Charges section as described in the current Water Sales and Service Policy Manual.

- E. If the owner/occupant/manager fails to comply with the requirements of the notice given pursuant to Section 6.D above resulting in repeated and significant water loss as determined by the District, the District may terminate water service within ten (10) calendar days unless the owner/occupant/manager is in compliance with the provisions of this Ordinance. If the owner/occupant/manager fails to comply with the provisions of this Ordinance, the final notice of service termination, subject to the District's current 48-Hour Notice of Termination charge, shall be posted at the entrance to the dwelling/property stating that water service shall be terminated in forty-eight (48) hours

Service may only be restored if the violation has been corrected. Owner/occupant/manager will be required to pay all fines and penalties previously assessed pursuant to this Ordinance plus a Service Reinstatement Charge per the Customer Service Charges section as described in the current Water Sales and Service Policy Manual.

SECTION 7. EXTENSION

The General Manager shall have the authority to extend any deadlines by a period of time not to exceed an additional 30 days as set forth in this Ordinance.

SECTION 8. APPEAL

1. Should an owner/occupant/manager determined to be in violation of this Ordinance dispute the findings of staff or if said owner/occupant/manager believes they have sufficient justification for said violation, said owner/occupant/manager may request a hearing with an appropriate committee of the Board of Directors. The hearing shall be scheduled within thirty (30) calendar days of the request. The hearing shall be attended by the District's General Manager or a designated representative of the General Manager.
2. The District's General Manager or a designated representative of the General Manager shall mail the owner/occupant/manager a written decision within ten (10) calendar days of the hearing. If the owner/occupant/manager is dissatisfied with the outcome of the hearing, the owner/occupant/manager may request the matter be placed on the agenda of the District's Regularly Scheduled Board Meeting. The owner/occupant/manager may then make his or her petition to the Board of Directors. The Board's determination shall be final.

SECTION 9. ADMINISTRATIVE EXCEPTIONS

The General Manager of the District or designee may provide administrative exceptions to the landscape and irrigation plan requirements of this Ordinance on a case by case basis.

The General Manager of the District or designee will notify the City Manager of any administrative exemption granted pursuant to this Section prior to the date the exception becomes effective.

The City Manager or designee after consultation with and approval from the General Manager of Indian Wells Valley Water District may grant an administrative exception.

SECTION 10. EFFECTIVE DATE

- 1. The foregoing Ordinance shall become effective upon adoption of same by the Board of Directors of the Indian Wells Valley Water District.

SECTION 11. PUBLICATION

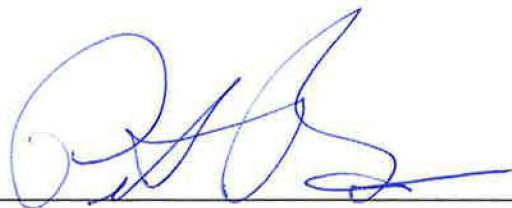
- 1. The Secretary is hereby directed to cause this Ordinance to be published once in full in a newspaper of general circulation, printed, published and circulated within the District within ten (10) days after adoption.

All the foregoing being on the motion of Director Kicinski seconded by Director Cortichiato, and authorized by the following vote, namely:

AYES:	President Brown Vice-President Cordell Director Cortichiato Director Kicinski
NOES:	Director Griffin
ABSENT:	None.
ABSTAIN:	None.

I HEREBY CERTIFY that all the foregoing ordinance is the ordinance of the Indian Wells Valley Water District as duly passed and adopted by said Board of Directors at a legally convened meeting held on the 11th day of September, 2017.

WITNESS my hand and the official seal of said Board of Directors this 11th day of September, 2017.



President of the Indian Wells Valley Water District
Board of Directors

ATTEST



Secretary of the Indian Wells Valley Water
District Board of Directors

(SEAL)

STATE OF CALIFORNIA)
COUNTIES OF KERN)
AND SAN BERNARDINO)

I, DONALD M. ZDEBA, Secretary of the Board of Directors of the Indian Wells Valley Water District, DO HEREBY CERTIFY, as follows:


The foregoing Ordinance is a full, true and correct copy of Ordinance No. 103, duly adopted at a Regular Meeting of the Board of Directors of said District, duly and held at the regular meeting place of the Board on the 11th day of September, 2017, for which all of the members of said Board of Directors had due notice and at which a majority of the Board of Directors were present. All the foregoing being on the motion of Director Kicinski seconded by Director Cortichiato, and authorized by the following vote, namely:

AYES:	President Brown Vice-President Cordell Director Cortichiato Director Kicinski
NOES:	Director Griffin
ABSENT:	None.
ABSTAIN:	None.

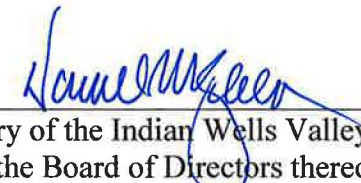
I have carefully compared the foregoing with the original Minutes of said meeting on file and of record in my office, and the foregoing is a full, true and correct copy of the original ordinance adopted at said Hearing and entered into said Minutes.

Ordinance No. 103 has not been amended, modified or rescinded since the date of its adoption on September 11, 2017, and the same is now in full force and effect.

WITNESS my hand and the official seal of said Board of Directors this 11th day of September, 2017.



President of the Indian Wells Valley Water
District and of the Board of Directors thereof.



Secretary of the Indian Wells Valley Water District
and of the Board of Directors thereof.

(SEAL)

APPENDIX 5

COUNTY OF KERN MULTI-JURISDICTION 2020 HAZARD MITIGATION PLAN



FEMA

April 9, 2021

Wendy Benson
Administrative Coordinator
Kern County Fire Department Office of Emergency Services
2601 Panorama Drive, Building B
Bakersfield, CA 93306

Dear Ms. Benson:

The *County of Kern Multi-Jurisdictional Hazard Mitigation Plan 2020 Update* was officially adopted by Kern County on February 11, 2021 and submitted for review and approved to the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA). The review is complete, and FEMA finds the plan to be in conformance with the Code of Federal Regulations, Title 44, Part 201, Section 6 (44 C.F.R. 201.6). A list of the status of participating jurisdictions is enclosed with this letter.

This plan approval ensures Kern County's continued eligibility for funding under FEMA's Hazard Mitigation Assistance programs, including the Hazard Mitigation Grant Program (HMGP), the Building Resilient Infrastructure and Communities program (BRIC), and the Flood Mitigation Assistance (FMA) program. All requests for funding are evaluated individually according to eligibility and other program requirements. Approved hazard mitigation plans may also be eligible for points under the National Flood Insurance Program's Community Rating System (CRS).

FEMA's approval is for a period of five years, effective the date of this letter. Prior to **April 9, 2026**, Kern County and all participating jurisdictions must review, revise, and submit their plan to FEMA for approval to maintain eligibility for grant funding. The enclosed plan review tool provides additional recommendations to incorporate into future plan updates.

If you have any questions regarding the planning or review processes, please contact the FEMA Region IX Hazard Mitigation Planning Team at fema-r9-mitigation-planning@fema.dhs.gov.

Sincerely,

Kathryn Lipiecki
Director, Mitigation Division
FEMA Region IX

Kern County Hazard Mitigation Plan Approval Letter
April 9, 2021
Page 2 of 3

Enclosures (2)

Status of Participating Jurisdictions

Kern County Final Plan Review Tool, dated April 9, 2021

cc: Victoria LaMar-Haas, Hazard Mitigation Planning Chief, California Governor's Office of
Emergency Services
Jennifer Hogan, State Hazard Mitigation Officer, California Governor's Office of Emergency
Services

Status of Participating Jurisdictions as of April 9, 2021

Jurisdictions – Adopted and Approved

#	Jurisdiction	Date of Adoption
1	Kern County	February 11, 2021

Jurisdictions – Approvable Pending Adoption

#	Jurisdiction
1	Tehachapi, City of
2	Wasco, City of
3	Arvin-Edison Water Storage District
4	East Niles Community Services District
5	Kern County Water Agency
6	Kern High School District
7	Lost Hills Union School District
8	Mojave Air and Space Port
9	Stallion Springs Community Services District
10	Tehachapi Unified School District
11	Tehachapi Valley Recreation and Park District

**BEFORE THE BOARD OF SUPERVISORS
COUNTY OF KERN, STATE OF CALIFORNIA**

In the matter of:

Resolution No. 2021-020

**ADOPTING THE UPDATED KERN MULTI-
JURISDICTION HAZARD MITIGATION PLAN**

I, KATHLEEN KRAUSE, Clerk of the Board of Supervisors of the County of Kern, State of California, certify that the following resolution, on motion of Supervisor Scrivner, seconded by Supervisor Maggard, was duly passed and adopted by the Board of Supervisors of the County of Kern at an official meeting on the 9th day of February, 2021, by the following vote:

AYES: Peters, Scrivner, Maggard, Couch, Perez
NOES: None
ABSENT: None



KATHLEEN KRAUSE
Clerk of the Board of Supervisors
County of Kern, State of California

Deputy Clerk

RESOLUTION

Section 1. WHEREAS:

(a) The County of Kern, a political subdivision of the State of California, is an official participating jurisdiction in the updated Kern Multi-Jurisdiction Hazard Mitigation Plan ("MJHMP"); and

(b) The County of Kern recognizes the updated MJHMP as the official hazard mitigation plan for the County and participating jurisdictions; and

(c) The County of Kern has gathered information and prepared the updated MJHMP in accordance with Federal Emergency Management Agency (FEMA) requirements at 44 CFR § 201.6; and

(d) Volume 1 of the updated MJHMP recognizes the threat that natural hazards pose to people and property Kern County-wide; and

(e) The County of Kern has reviewed Volume 1 of the updated MJHMP and affirms that the plan actions in Volume 1 should reduce the potential for harm to people and property from future hazard occurrences within the community; and

(f) The U. S. Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards; and

(g) The Disaster Mitigation Act made available mitigation grants to state and local governments; and

(h) An adopted 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

(i) The County of Kern fully participated in the FEMA-prescribed mitigation planning process to prepare this updated MJHMP; and

(j) The residents were afforded opportunities to comment and provide input in the updated MJHMP and the mitigation actions in the Plan; and

(k) The County of Kern, as a fully participating jurisdiction of the updated MJHMP, is an eligible sub-applicant to the State of California under FEMA's hazard mitigation grant program guidance; and

(l) The California Office of Emergency Services (Cal OES), and the FEMA Region IX officials have reviewed the updated MJHMP, and approved it contingent upon this official adoption by the participating governing body; and

(m) The County of Kern desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the updated MJHMP; and

(n) Adoption by the Board of Supervisors for the County of Kern demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this updated MJHMP; and

(o) Adoption of this plan helps to coordinate the responsible agencies to carry out their responsibilities under the updated MJHMP.

Section 2. IT IS RESOLVED by the Board of Supervisors of the County of Kern, State of California, as follows:

1. This Board finds the facts mentioned above to be true and further finds that this Board has jurisdiction to consider, approve, and adopt the subject of this

Resolution.

2. This Board does hereby adopt the updated Kern Multi-Jurisdiction Hazard Mitigation Plan Volume 1, as approved by FEMA and Cal OES, as the official mitigation plan for the County of Kern.

3. This Board continues to adopt the updated Kern Multi-Jurisdiction Hazard Mitigation Plan by reference into the safety element of their Kern County General Plan and Metropolitan Bakersfield General Plan to conform with AB 2140.

4. This Board authorizes the Director of Kern County Emergency Services to submit an approved and signed copy of 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.

5. The Clerk of the Board of Supervisors shall transmit copies of this to the following:

- (a) County Administrative Officer
- (b) Kern County Fire Chief and Director of Emergency Services
- (c) Kern County Office of Emergency Services
- (d) County Counsel
- (e) Cal OES Hazard Mitigation Planning Division, 3650 Schriever Avenue, Mather, CA 95655
- (f) FEMA Region IX Mitigation Division, 1111 Broadway, Suite 1200, Oakland, CA 94607

STATE OF CALIFORNIA
COUNTY OF KERN

I, Kathleen Krause, Clerk of the Board of Supervisors, do hereby certify the foregoing to be a full, true and correct copy of the original *Resolution 2021-020 approved by the Board on 2/19/21* on file in my office.

Witness my hand and seal of the Board of Supervisors.

This 14th day of February 20 21

KATHLEEN KRAUSE

Clerk of the Board of Supervisors

Seal

By: [Signature] Deputy

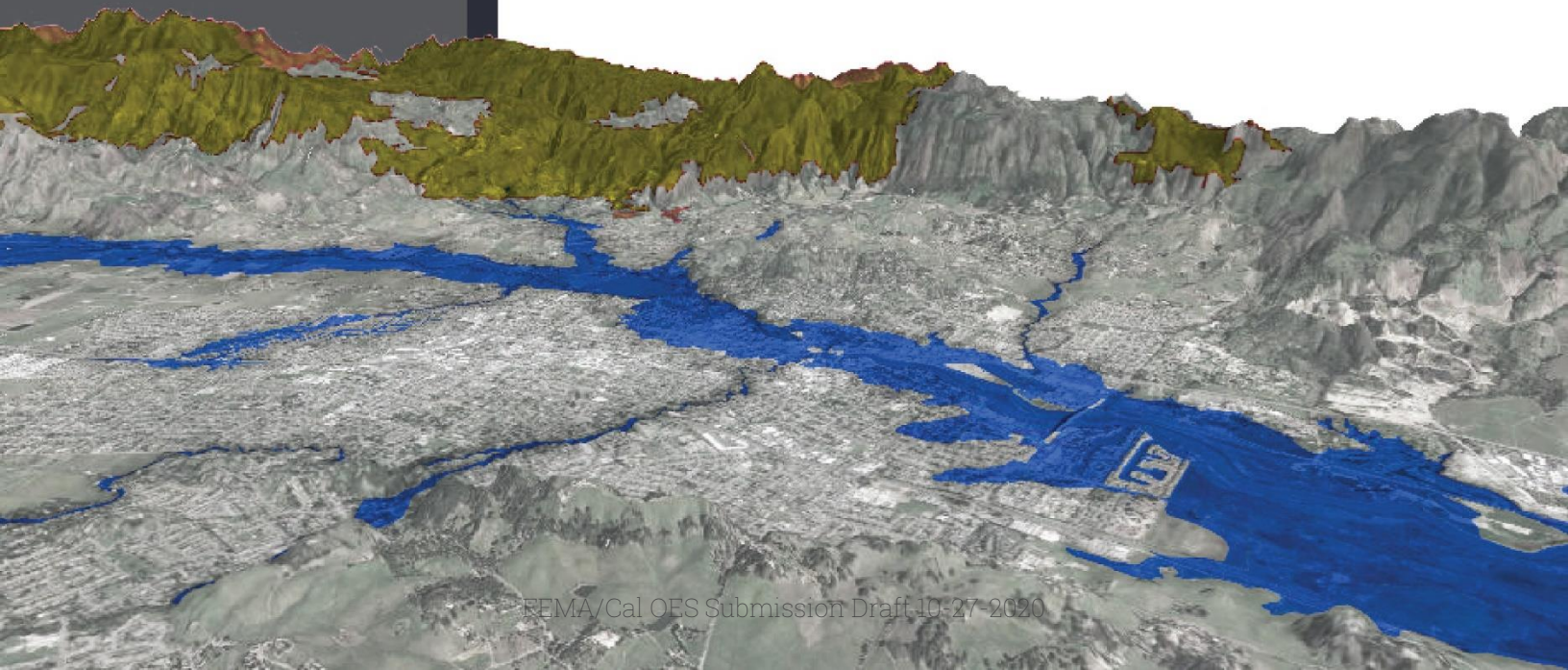
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COUNTY OF KERN

MULTI-JURISDICTION HAZARD MITIGATION PLAN

**KERN COUNTY FIRE DEPARTMENT
OFFICE OF EMERGENCY SERVICES**

2601 PANORAMA DR. BUILDING B
BAKERSFIELD, CA 93306





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Kern County

Multi-Jurisdiction Hazard Mitigation Plan

Volume 1

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Executive Summary

KERN COUNTY

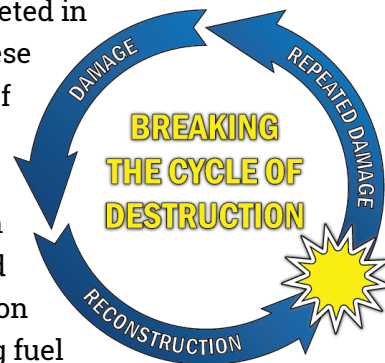
MULTI-JURISDICTION

HAZARD MITIGATION PLAN



Kern County prepared this Hazard Mitigation Plan to guide County and City Officials, Special District Managers, School District Administrators, and Water and Wastewater District Managers in protecting the people and property within the County from the effects of natural disasters and hazard events. This plan demonstrates Kern County’s commitment to reducing risk from natural hazards through mitigation and serves as a tool to direct County resources to achieve optimum results with available administrative, technical, and financial resources.

The term “**hazard mitigation**” refers to actions or strategies that can reduce or eliminate long-term risks caused by natural disasters. Mitigation activities can be developed, planned, and implemented before or after a disaster occurs. After disasters, repairs and reconstruction often are completed in such a way as to simply restore damaged property to pre-disaster conditions. These efforts may return property and infrastructure to “the norm”, but the replication of pre-disaster conditions may result in a repetitive cycle of damage and reconstruction. Hazard mitigation planning in Kern County can break this repetitive cycle by reducing vulnerability to hazards through smart construction and proper planning of future development and critical infrastructure. Hazard mitigation activities can be conducted through a wide variety of mitigation strategies, such as construction of regional flood control projects or implementing fuel reduction activities around buildings within high wildfire risk areas.



What is a hazard mitigation plan?

This Hazard Mitigation Plan provides an explanation of prevalent hazards within the County and how hazards may affect the County and participating cities and special districts differently based upon proximities to natural hazards. This plan also identifies risks to vulnerable assets, both people and property. Most importantly, the mitigation strategy presented in this plan responds to the identified vulnerabilities within each community and provides prescriptions or actions to achieve the greatest risk reduction based upon available resources. The County and participating jurisdictions intend to save lives, reduce injuries, reduce property damage, and protect natural resources for future generations through mitigation activities.

Why have a hazard mitigation plan?

The passage of the Disaster Mitigation Act in 2000 (DMA 2000) requires proactive pre-disaster planning as a condition of receiving certain federal financial assistance under the Robert T. Stafford Act. DMA 2000 encourages state and local authorities to work together on pre-disaster planning to assist local governments to accurately assess mitigation needs, resulting in faster allocation of funding and more cost-effective risk reduction projects under FEMA’s Hazard Mitigation Assistance program. The purpose of this Multi-jurisdiction Hazard Mitigation Plan (MJHMP) is twofold. First, it provides the County and participating jurisdictions continued access to grant funding from FEMA to conduct hazard mitigation activities for participating jurisdictions. Secondly, it provides resources for residents wishing to conduct



hazard mitigation efforts by identifying areas of extreme risk and providing financial and technical mitigation resources based upon current gaps.

Why is the plan updated so often?

As a DMA 2000 requirement, the plan must be updated every five years to remain in compliance with federal mitigation grant conditions. Federal regulations require hazard mitigation plans to include a plan for monitoring, evaluating, and updating the hazard mitigation plan. An update process provides an opportunity to reevaluate recommendations, monitor the impacts of actions that have been accomplished, and determine if there is a need to change the focus of mitigation strategies over time. Grant compliance is contingent on meeting the plan update requirements that are contained in the Code of Federal Regulations (CFRs). Jurisdictions that allow a plan to expire are not able to pursue funding under the Robert T. Stafford Act.



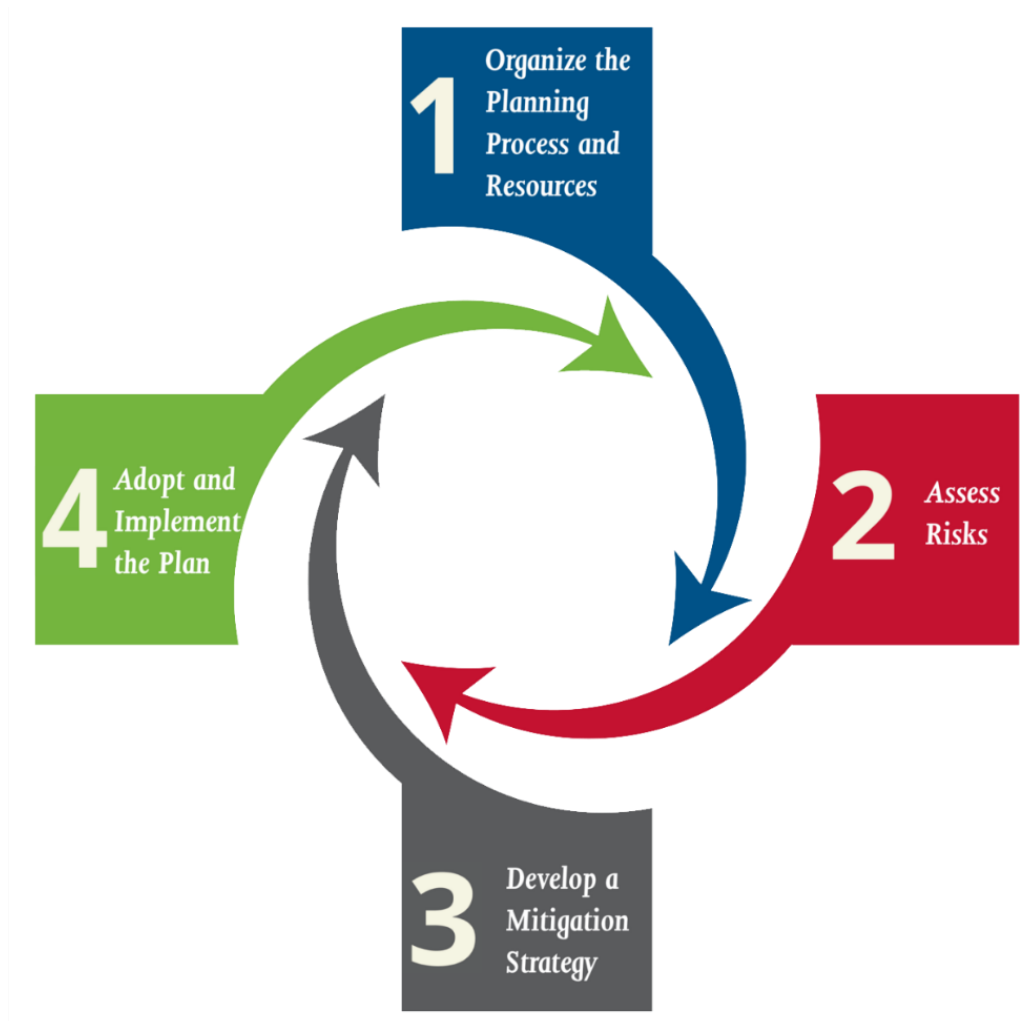
Participating Jurisdictions

The Kern County MJHMP has multiple participating jurisdictions and geographically covers the entire area within Kern County (hereinafter referred to as the “planning area”). A planning partnership was formed to develop and steer content in this Plan. This partnership consists of Kern County stakeholders and participating jurisdictions who have worked together to create the goals, objectives, mitigation strategies, and implementation methods to reduce risk. Any local government or non-profit agency with the ability to regulate building or infrastructure development or maintenance may participate in the planning process. However, to obtain FEMA approval, each of the local jurisdictions must meet all FEMA planning requirements outlined in federal regulations at 44 CFR § 201.6 *et seq.* A list of jurisdictions that have elected to participate in this MJHMP can be found in Table 2-1.



Plan Development and Update Methods

Hazard mitigation planning is the process through which hazards are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies identified. This plan documents the hazard mitigation planning process the County and participating jurisdictions used to increase natural hazard resiliency in the community. Kern County and all participating jurisdictions followed the recommended FEMA four-step process to develop this 2020 updated Plan. This update included a reorganization of planning partners to provide clear delineation of jurisdiction information, development of a new risk assessment, reevaluation of goals and objectives, development of new mitigation actions, new enhancements for implementing mitigation actions, updates to all sections of the 2014 plan, and a new website for stakeholder involvement and public information.





Risk Assessment

The risk assessment measures the potential loss of life, personal injury, economic injury, and property or infrastructure damage resulting from natural hazards in order to determine vulnerability. For this update, the risk assessment utilized new data and technologies that have become available since 2014. The County and participating jurisdictions used risk assessment information to rank risks and to gauge the potential impacts of each hazard of concern in the Operational Area. The risk assessment included:

- Hazard identification and profiling,
- Assessment of the impact of hazards on physical, social, and economic assets,
- Identification of particular areas of vulnerability,
- Additional impacts of each hazard due to climate change, and
- Estimates of the cost of potential damage.

The following natural hazard threats were identified and profiled as County priority hazards:

Severe Weather

SECTION 4.5.1



Flood

SECTION 4.5.2



Dam Failure

SECTION 4.5.3



Earthquake

SECTION 0



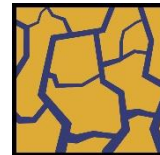
Wildfire

SECTION 4.5.5



Drought

SECTION 4.5.6



Slope Failure

SECTION 4.5.7



Soil Stability

SECTION 4.5.8



Participating jurisdictions also individually assessed risks applicable to their jurisdiction. Many participating jurisdictions identified fewer than the County-identified hazards. Those jurisdiction-specific profiles are included in Volume 2 of this MJHMP.



Hazard Exposure and Damage Estimation

In Kern County, earthquakes, flooding, slope failure, dam failure, and wildfire have known geographic extents and corresponding spatial information, which make exposure and damage estimation possible. In order to describe vulnerability for each hazard, it is important to understand the total population and total assets at risk. This provides the estimated damage and losses expected during a “worst case scenario” event for each hazard.

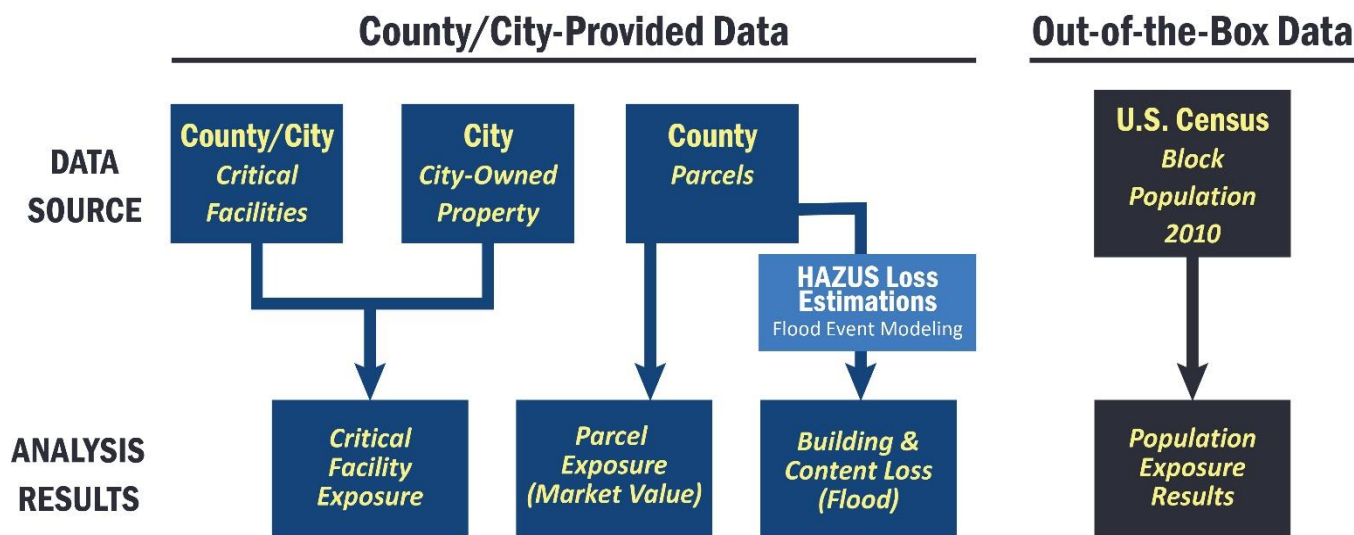


Figure ES 1 Risk Assessment Methodology Summary

Population and Asset Exposure

The total counts of parcels, people, facilities, assets and the sum of values within the planning area which could be exposed to a hazard event is referred to as the “exposure” in this plan. A natural hazards overlay was developed to reflect the combination of many known natural hazard spatial footprints. The spatial overlay method enables summarization of building values, parcel counts, population exposure, and critical facility exposure within a hazard’s geographic extents (see Figure ES 2 exposure example). This method has been used to evaluate exposure for earthquakes, landslides, flooding, dam inundation, and wildfire. For a more detailed explanation on Risk Assessment Methods, see Section 4.4 and Appendix A at A 1-2.



Figure ES 2 Exposure explanation graphic

Damage Assessments

FEMA’s Hazus software was used to conduct a detailed loss estimation for flood and earthquake. Hazus is a nationally-applicable, standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. Hazus uses Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disasters. For this planning effort, Hazus was used to generate damage estimations due to possible earthquakes and flooding. The estimated damage and losses provided by the Hazus Software is a “worst case scenario” event and provides the ability to understand possible widescale damage to buildings and facilities.

In the hypothetical map in Figure ES 3, even though both structures are exposed to flooding, it is predicted that the structure with a first floor height below the depth of flooding will receive significantly more damage than the structure with a first floor height above the expected water depth. For a more detailed explanation on Risk Assessment Methods, see Section 4.4 and Appendix A at A 1-2.

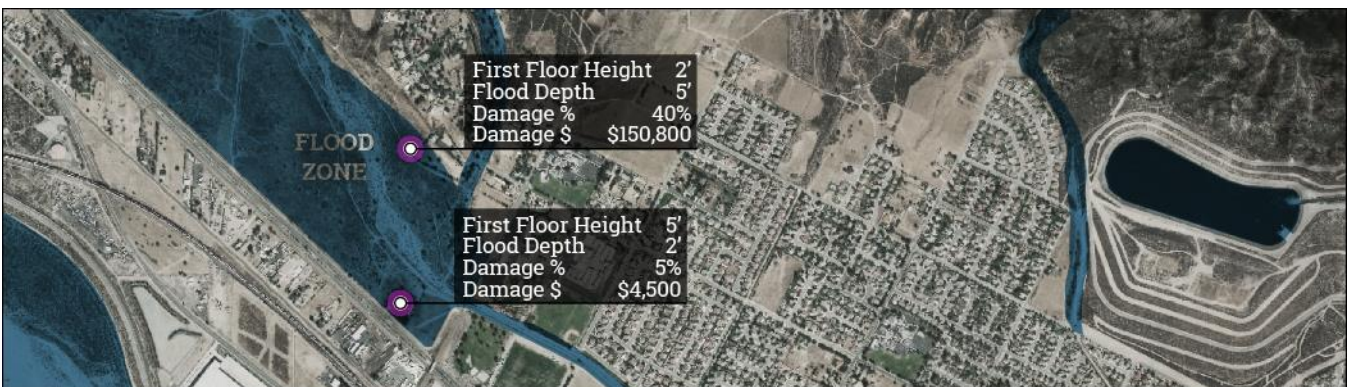


Figure ES 3 Hazus Damage Estimation Example



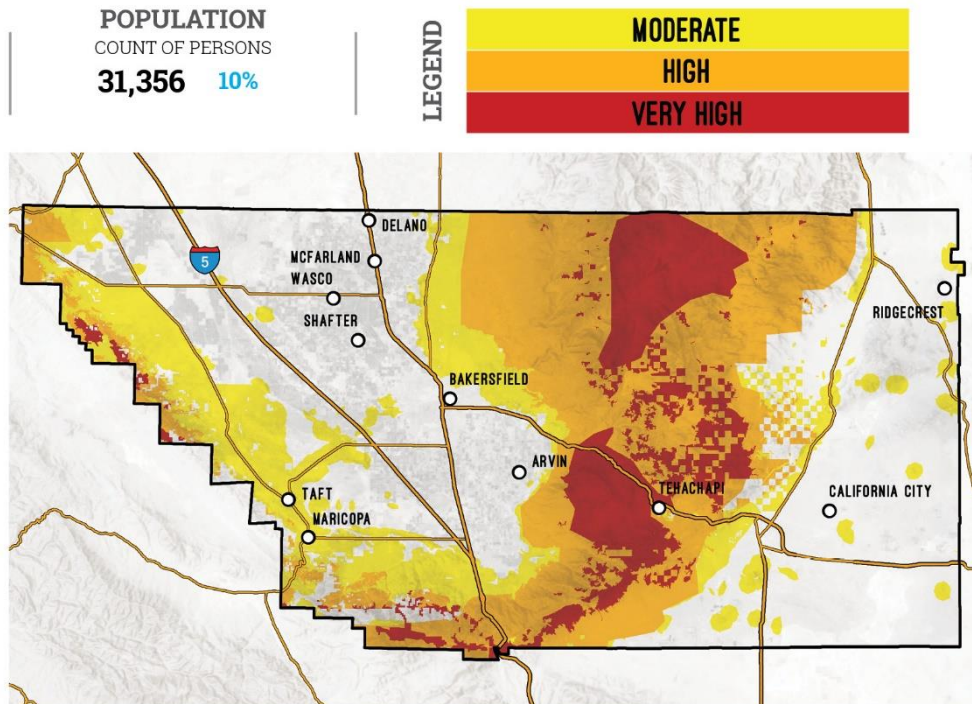
Summary of Vulnerable Assets: People, Property Value, and Infrastructure

Hazards with spatial boundaries can be evaluated to demonstrate the amount of population, critical infrastructure, and parcels within each hazard's footprint. At-risk populations, critical infrastructure, improved parcels, and loss results for each hazard category are provided in bar chart summary tables throughout this plan to evaluate the percentage of assets exposed to different types of hazards. The side-by-side comparison allows officials to evaluate the impacts of potential hazards to determine what hazards to direct energy and financial resources for mitigation activities. For detailed vulnerabilities assessment information, see the individual hazard-specific sections presented in Section 4.5. This Executive Summary provides map summaries for the profiled hazards in Figure ES 4 through Figure ES 7.



KERN COUNTY - WILDFIRE VULNERABILITY & EXPOSURE SNAPSHOT

PARCEL COUNT COUNT	23,615 26%
PARCEL VALUE SUM OF IMPROVEMENT	\$3,108,015,208 28%
SUM OF CONTENT	\$1,554,381,104 28%
CRITICAL INFRASTRUCTURE	
POINT COUNT	
Essential Facilities	18 37%
High Potential Loss	148 21%
Transportation & Lifeline	1,223 22%
LINEAR MILEAGE	
Transportation & Lifeline	3,074 20%
*Exposure summaries include high and very high LRA and SRA zones. Hazard data sources: Cal Fire, CPUC.	



KERN COUNTY - FEMA FLOOD ZONE VULNERABILITY & EXPOSURE SNAPSHOT

PARCEL COUNT COUNT	14,968 16%
PARCEL VALUE SUM OF IMPROVEMENT	\$1,497,380,907 14%
SUM OF CONTENT	\$748,831,453 14%
CRITICAL INFRASTRUCTURE	
POINT COUNT	
Essential Facilities	11 22%
High Potential Loss	139 19%
Transportation & Lifeline	1,104 20%
LINEAR MILEAGE	
Transportation & Lifeline	2,962 20%
*Exposure summaries include 100-year and 500-year flood zone areas. Hazard data sources: FEMA.	

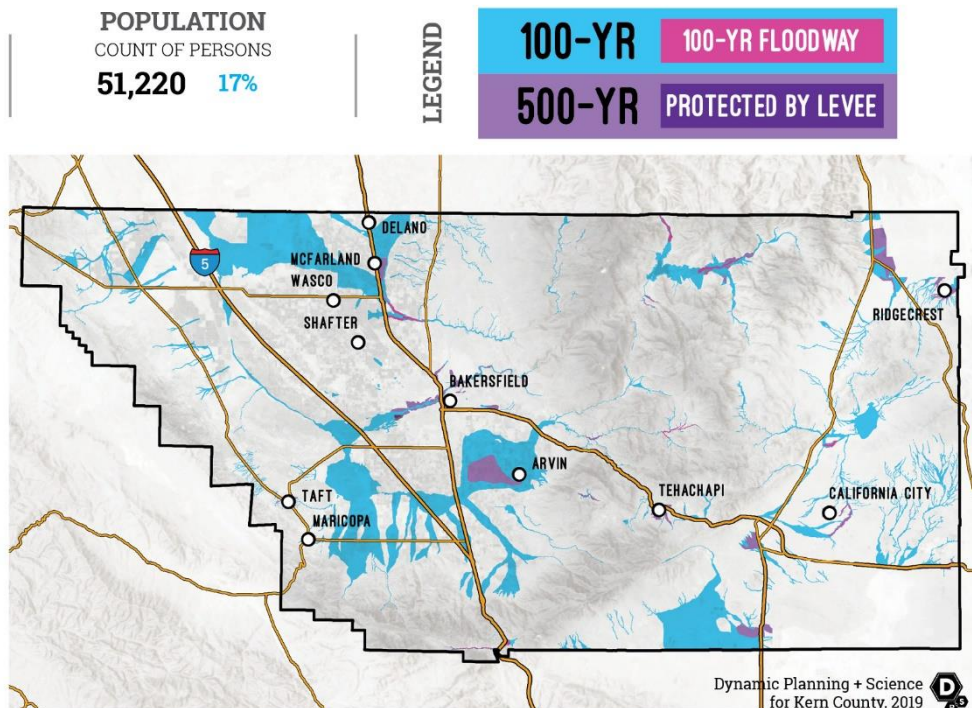


Figure ES 4 Wildfire and Flood Snapshots



KERN COUNTY - DAM INUNDATION VULNERABILITY & EXPOSURE SNAPSHOT

PARCEL COUNT
COUNT
24,411 27%

POPULATION
COUNT OF PERSONS
100,612 34%

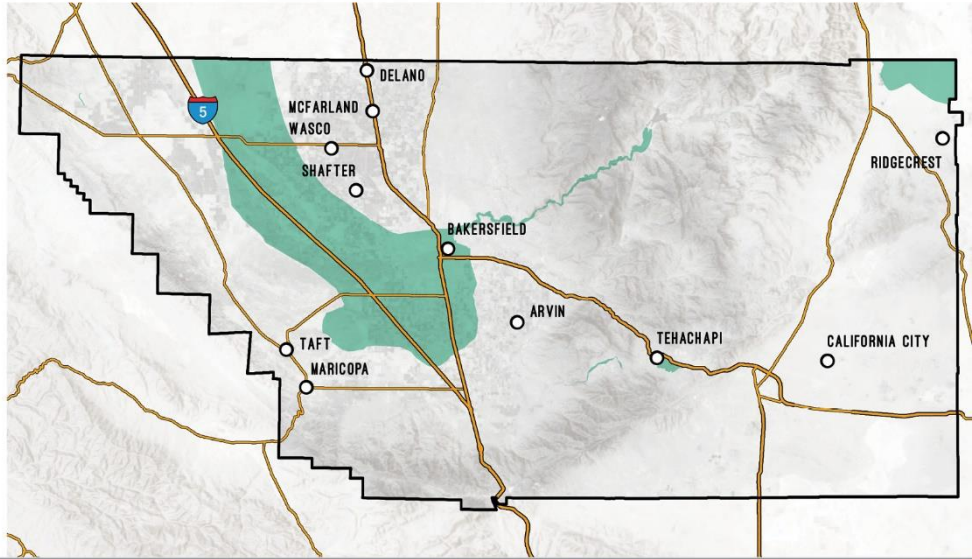
LEGEND

INUNDATION ZONE

PARCEL VALUE
SUM OF IMPROVEMENT
\$3,356,526,800 31%
SUM OF CONTENT
\$1,678,343,900 31%

CRITICAL INFRASTRUCTURE
POINT COUNT
Essential Facilities **10 20%**
High Potential Loss **207 29%**
Transportation & Lifeline **1,258 22%**
LINEAR MILEAGE
Transportation & Lifeline **2,605 17%**

*Exposure summaries include all dam inundation areas. Hazard data sources: Cal OES.



KERN COUNTY - EQ - S. SAN ANDREAS MOJAVE N. VULNERABILITY & EXPOSURE SNAPSHOT

PARCEL COUNT
COUNT
77,923 85%

POPULATION
COUNT OF PERSONS
254,106 85%

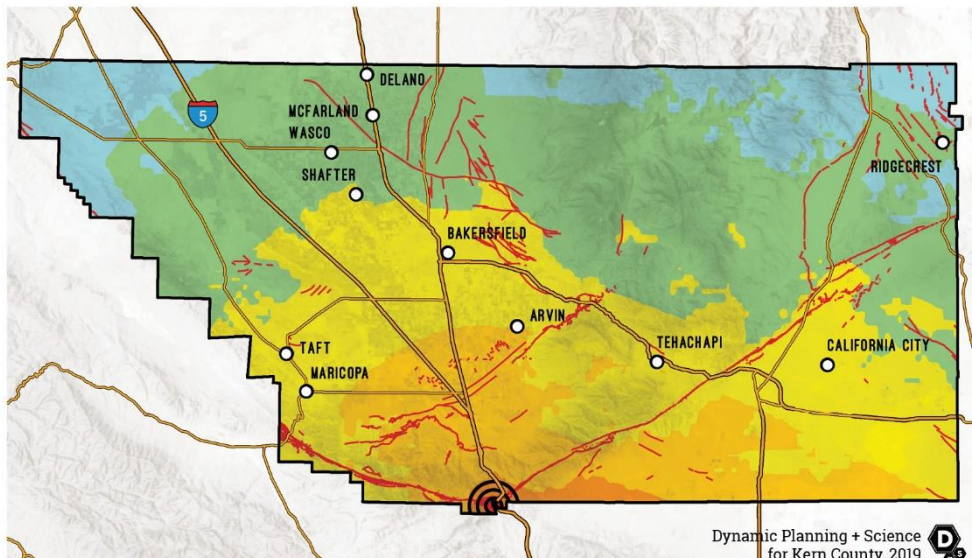
LEGEND



PARCEL VALUE
SUM OF IMPROVEMENT
\$9,672,907,618 89%
SUM OF CONTENT
\$4,837,003,809 89%

CRITICAL INFRASTRUCTURE
POINT COUNT
Essential Facilities **34 69%**
High Potential Loss **556 77%**
Transportation & Lifeline **3,868 68%**
LINEAR MILEAGE
Transportation & Lifeline **9,425 62%**

*Exposure summaries include strong, very strong, and severe MMI classes. Hazard data sources: USGS.



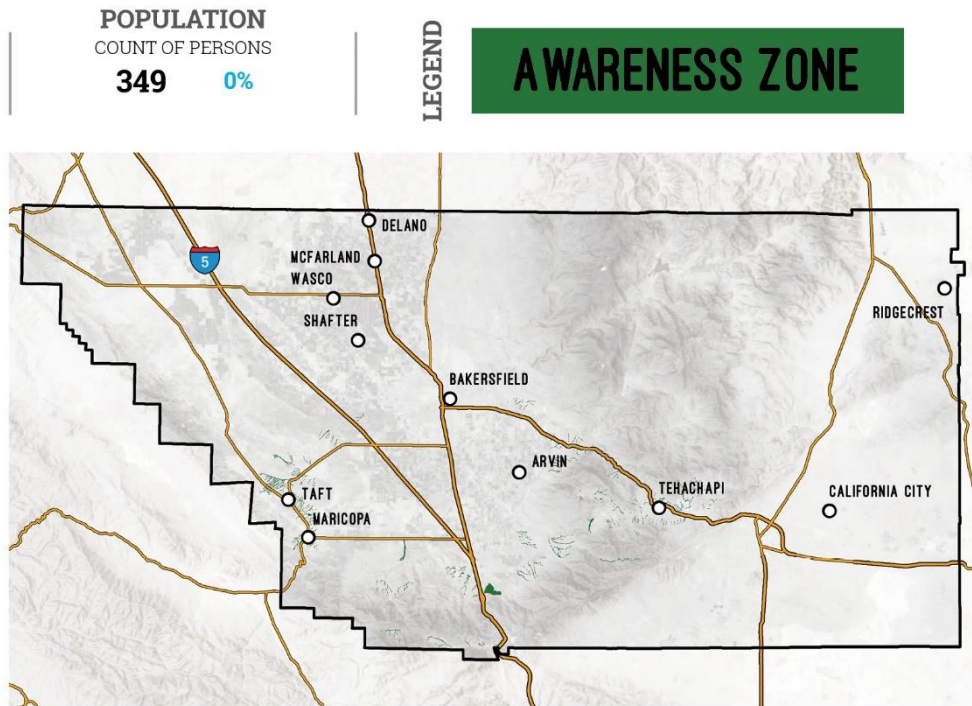
Dynamic Planning + Science
for Kern County, 2019

Figure ES 5 Dam Inundation and Earthquake Snapshot



KERN COUNTY - DWR AWARENESS ZONE VULNERABILITY & EXPOSURE SNAPSHOT

PARCEL COUNT COUNT	178	0%
PARCEL VALUE SUM OF IMPROVEMENT	\$28,464,953	0%
SUM OF CONTENT	\$14,233,976	0%
CRITICAL INFRASTRUCTURE		
POINT COUNT		
Essential Facilities	0	0%
High Potential Loss	0	0%
Transportation & Lifeline	8	0%
LINEAR MILEAGE		
Transportation & Lifeline	37	0%
*Exposure summaries include all awareness zones. Hazard data sources: DWR.		



KERN COUNTY - LANDSLIDE VULNERABILITY & EXPOSURE SNAPSHOT

PARCEL COUNT COUNT	1,942	2%
PARCEL VALUE SUM OF IMPROVEMENT	\$276,015,865	3%
SUM OF CONTENT	\$138,039,432	3%
CRITICAL INFRASTRUCTURE		
POINT COUNT		
Essential Facilities	0	0%
High Potential Loss	4	1%
Transportation & Lifeline	342	6%
LINEAR MILEAGE		
Transportation & Lifeline	331	2%
*Exposure summaries include high susceptibility only (class 9+). Hazard data sources: CGS.		

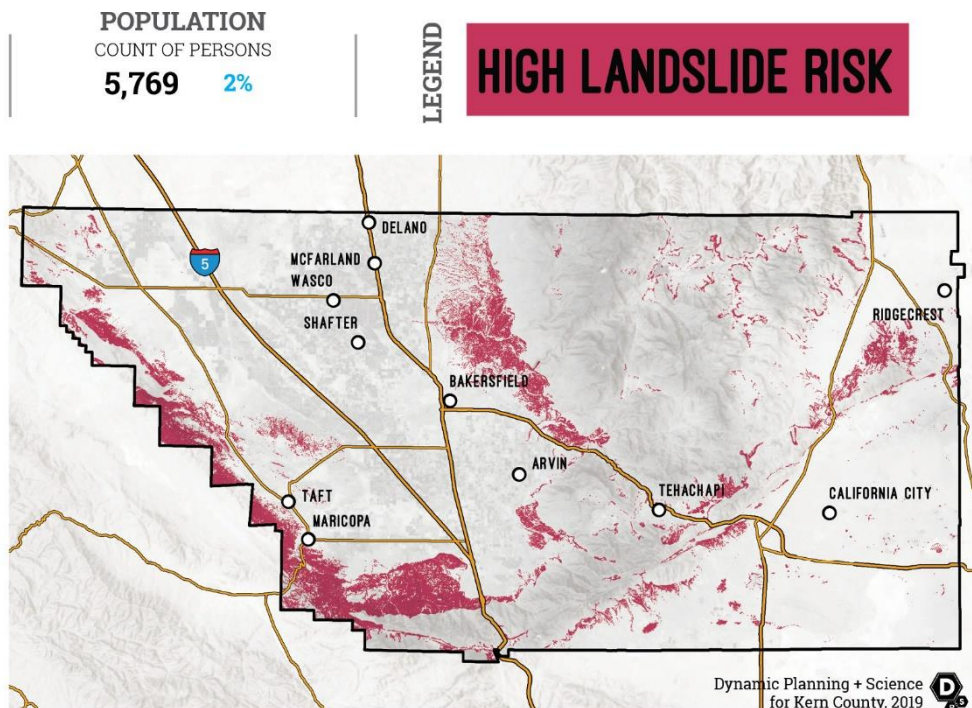


Figure ES 6 Awareness Zone and Landslide Snapshot



KERN COUNTY - SUBSIDENCE VULNERABILITY & EXPOSURE SNAPSHOT

PARCEL COUNT
COUNT
76,994 84%

PARCEL VALUE
SUM OF IMPROVEMENT
\$8,989,026,902 82%
SUM OF CONTENT
\$4,495,077,951 82%

CRITICAL INFRASTRUCTURE
POINT COUNT
Essential Facilities **35 71%**
High Potential Loss **632 88%**
Transportation & Lifeline **4,133 73%**
LINEAR MILEAGE
Transportation & Lifeline **10,707 71%**

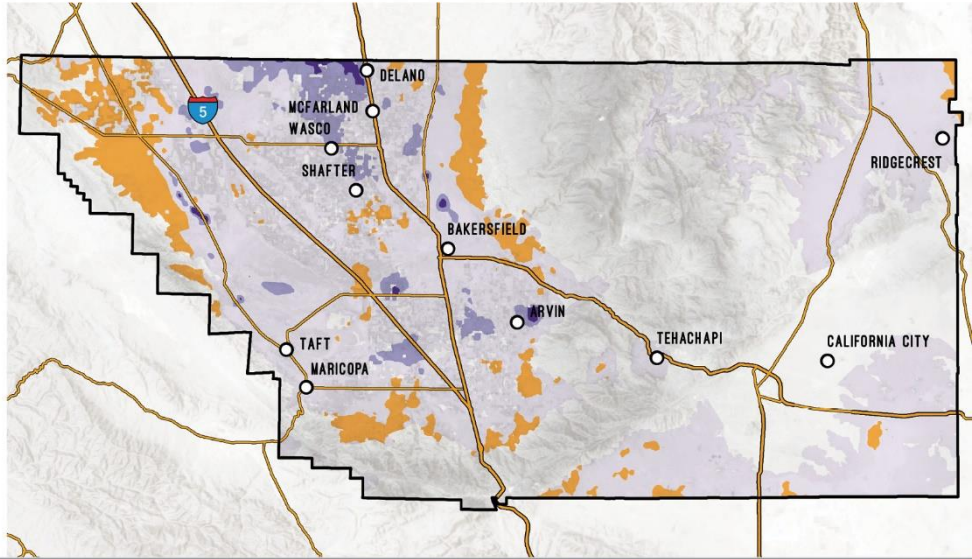
*Exposure summaries include all classes of earth movement. Hazard data sources: DWR.

POPULATION
COUNT OF PERSONS
265,101 88%

LEGEND

LOW LIFT
LOW SUBSIDENCE
MEDIUM SUBSIDENCE
HIGH SUBSIDENCE

↑ EARTH MOVEMENT



KERN COUNTY - EQ2 VULNERABILITY & EXPOSURE SNAPSHOT

PARCEL COUNT
COUNT
86,520 95%

PARCEL VALUE
SUM OF IMPROVEMENT
\$10,405,778,755 95%
SUM OF CONTENT
\$5,203,625,878 95%

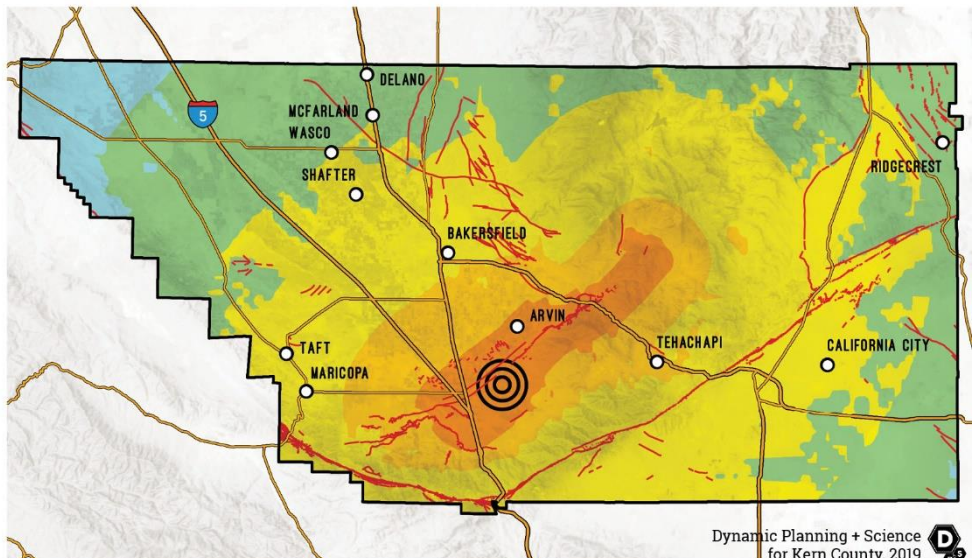
CRITICAL INFRASTRUCTURE
POINT COUNT
Essential Facilities **41 84%**
High Potential Loss **649 90%**
Transportation & Lifeline **4,480 79%**
LINEAR MILEAGE
Transportation & Lifeline **10,834 72%**

*Exposure summaries include strong, very strong, and severe MMI classes. Hazard data sources: USGS.

POPULATION
COUNT OF PERSONS
264,002 88%

LEGEND

III	IV	V	VI	VII	VIII	IX	X
WEAK MMI	LIGHT	MODERATE	STRONG	VERY STRONG	SEVERE	VIOLENT	EXTREME



Dynamic Planning + Science
for Kern County, 2019

Figure ES 7 Subsidence and Earthquake Snapshot



Mitigation Goals

The Steering Committee reviewed and updated the goals from the 2014 Kern County Hazard Mitigation Plan and confirmed a set of objectives. The following guiding principles aided the Steering Committee and planning partners in selecting actions contained in this plan Update:

Goal 1: Enable residents to mitigate the impacts of hazards and disasters.

Goal 2: Reduce hazard impacts to existing and future development and the natural environment.

Goal 3: Reduce hazard impacts to existing and future critical facilities, infrastructure, and high potential loss facilities.

Goal 4: Improve multi-jurisdiction coordination to reduce risk through mitigation planning and hazard analysis on a continual basis.

Mitigation Strategy

The mitigation strategies and activities designed to reduce or eliminate losses resulting from natural hazards are the centerpiece of the mitigation planning process. Through the mitigation actions, participating jurisdictions will become more resilient to disasters. Actions identified in this plan may or may not be geared toward grant funding under HMA. Rather, the focus was the initiatives' effectiveness in achieving the goals of the plan within each jurisdiction's capabilities.

Participating jurisdictions individually selected a range of appropriate mitigation actions to work toward achieving the MJHMP's goals, compiled in Volume 2 and the jurisdiction Annex HMPs. In addition, the Steering Committee and participating jurisdictions identified countywide actions benefiting the whole partnership, as listed in Volume 1. These initiatives also are summarized in the following tables.



County Wide Priority Mitigation Actions

Mitigation No.	Hazard Type	Year	Title/Description
ma-AH-KC-201	All Hazard	2005	Hazard Public Education
ma-AH-KC-104	All Hazard	2005	Remote Automated Weather Station System
ma-DF-KC-384	Dam Failure	2020	Design and implement County-wide warning system program, with all other HMP participating jurisdictions as secondary participants, to warn everyone within a dam inundation zone of impending dam failure
ma-DR-KC-290	Drought	2020	Develop a public education campaign to encourage water conservation during drought.
ma-DR-KC-291	Drought	2020	Install remote monitoring devices on well flow meters on County owned wells
ma-DR-KC-293	Drought	2020	Amend land use codes to incorporate regulations that encourage and incentive water savings for development
ma-DR-KC-294	Drought	2020	Replace existing turf grass and water intensive landscaping with drought resistant landscaping
ma-DR-KC-384	Drought	2020	Expand Willow Springs Water Bank to reduce drought and increase water supply flexibility and sustainability
ma-EQ-KC-297	Earthquake	2020	Encourage privately owned critical facilities (e.g. churches, hotels, other gathering facilities) to evaluate the ability of the buildings to withstand earthquakes and to address any deficiencies identified.
ma-AH-KC-111	Earthquake	2005	Mobile Home Foundation Earthquake Retrofitting
ma-EQ-KC-102	Earthquake	2005	Formation of Kern County Unreinforced Masonry Task Force
ma-EQ-KC-305	Earthquake	2020	Participate in seismic studies and needed seismic retrofits on County bridges that are located in high risk areas for earthquake scenarios included in this HMP
ma-EQ-KC-306	Earthquake	2020	Evaluate soil liquefaction potential around County assets in areas with shallow groundwater
ma-EQ-KC-307	Earthquake	2020	Install seismic gas shut-off valves on County buildings to prevent the flow of gas into buildings during a seismic event
ma-EQ-KC-295	Earthquake	2020	Retrofit / Harden County-owned critical facilities and buildings and their ability to withstand earthquakes.
ma-EQ-KC-296	Earthquake	2020	Retrofit non-compliant suspended ceilings in County buildings. This includes Non-Structural Suspended Gypsum Dry-Wall & Cement Plaster Ceilings built 1950-1974.
ma-EW-KC-301	Extreme Weather	2020	Outreach and Education to developers before and during the development process about best management practices to mitigate the effects of the urban heat island effect and stormwater runoff resulting from increased impervious surface



ma-EW-KC-435	Extreme Weather	2020	Develop outreach to educate the public, via County communication channels, on preparedness for driving in winter weather including preparing your vehicle, driving techniques, and what to do if caught in a winter weather event while driving.
ma-FL-KC-202	Flood	2005	Kern Lake CRMP Master Plan Mitigation Projects
ma-FL-KC-283	Flood	2020	Adopt higher regulatory standards (including but not limited to freeboard, comp storage, lower substantial damage thresholds, setback and fill restrictions) as means to reduce future flood risk and support a no-adverse-impact (NAI) philosophy to floodplain management
ma-FL-KC-284	Flood	2020	Routinely inspect storm water channels for vegetation build up or encroachment, trash and debris, silt and gravel build up, and erosion or bank failure
ma-FL-KC-285	Flood	2020	Elevate and retrofit bridges and culverts to allow proper stormwater / 100-YR flows
ma-AH-KC-153	Flood	2005	Caliente Creek Habitat Mitigation Project
ma-AH-KC-158	Flood	2005	Cuddy Creek Restoration Project
ma-FL-KC-110	Flood	2005	Flood Mitigation Plan
ma-FL-KC-99	Flood	2014	Streambed Mitigation in Kern River South Fork at Sierra Hwy (north of SR 178)
ma-FL-KC-70	Flood	2014	Continue to Implement Sound Floodplain Management Practices through Participation in the National Flood Insurance Program
ma-FL-KC-97	Flood	2014	Lake Isabella Blvd Box Culvert at Erskine Creek (near Elizabeth Norris Rd)
ma-FL-KC-82	Flood	2014	Bridge on Famoso Road at Poso Creek (approx 1/3 mile east of State Hwy 99)
ma-FL-KC-98	Flood	2014	Construct a Box Culvert across Redrock Randsburg Road at Redrock Canyon Wash (just east of Hwy 14)
ma-FL-KC-302	Flood	2020	Kern Storm Water Resource Plan Mitigation Projects
ma-FL-KC-303	Flood	2020	Kern County Flood Hazard Mitigation Plan - Projects
ma-FL-KC-304	Flood	2020	County of Kern Caliente Creek - Conceptual Plan for Mitigation
ma-SF-KC-292	Slope Failure	2020	Establish a priority list of slope failure locations and implement slope stabilization projects in the highest risk areas.
ma-AH-KC-245	Soil Stability	2005	Lebec Landfill and Transfer Station Drainage Improvements and Erosion Control
ma-AH-KC-63	Soil Stability	2014	Kern Valley Landfill and Transfer Station Drainage Improvements and Erosion Control
ma-SS-KC-299	Soil Stability	2020	Implement wind breaks to prevent wind erosion leading to buildup of soil on County roads and bridges. Wind break erosion mitigation examples include solid fences, porous fences, straw bales, soil surface modification, berms, and landscaping
ma-SS-KC-300	Soil Stability	2020	Conduct subsidence investigations on County bridges located in high subsidence areas
ma-SH-KC-298	Soil Stability	2020	Outreach and educational programming to property owners and agricultural growers about wind erosion and mitigation techniques such as introducing cover crops, eliminating tillage, and avoiding over grazing
ma-AH-KC-179	Wildfire	2005	Hazard Tree Removal, County Park Lands



ma-WF-KC-231	Wildfire	2005	Roadside Disc Breaks
ma-WF-KC-183	Wildfire	2005	Defensible Space, Public Education
ma-WF-KC-184	Wildfire	2005	Education, Fire Department Personnel
ma-WF-KC-180	Wildfire	2005	Greater Tehachapi Area Community Wildfire Protection Plan (was Hazardous Wildland Fuels Mitigation, Greater Tehachapi Area)
ma-WF-KC-181	Wildfire	2005	Mount Pinos Community Wildfire Protection Plan (was Hazardous Wildland Fuels Mitigation, Frazier Mtn Area)
ma-WF-KC-182	Wildfire	2005	Kern River Valley Community Wildfire Protection Plan (formerly Hazardous Wildland Fuels Mitigation, Kern River Valley)
ma-WF-KC-286	Wildfire	2020	Retrofit care facilities (adult care, child care, schools) with fire-resistant materials and or create defensible space around structures.
ma-WF-KC-287	Wildfire	2020	The Alta Sierra CWPP details mitigation needed to protect 7 structure protection groups throughout the WUI in Alta Sierra Community.
ma-WF-KC-288	Wildfire	2020	Myers Canyon CWPP Mitigation Projects
ma-WF-KC-289	Wildfire	2020	Make high visibility address markers available to all residents within the WUI

Mitigation Action Implementation

Despite County efforts, no amount of planning or mitigation can prevent disasters from occurring or eliminate the risk and impacts of such events. Hazard events will continue to occur, and the County and participating jurisdictions will take actions to reduce the risks these hazards pose to life, property, and the economy. While this MJHMP identifies opportunities for reasonable mitigation actions, each individual has a responsibility to be aware of the potential hazards where they live and to minimize their own household’s vulnerability.

The County’s ability to carry out mitigation is limited to those facilities over which it has authority. The County does not have direct authority over schools, water and sanitation districts, private gas, electric and communication utilities, state and federal highways and facilities, private hospitals, or neighboring cities and tribes. The County will focus on actions within its authority to do while seeking to cooperatively work with other entities to address mutual areas of vulnerability and interdependence.

Full implementation of the Plan’s recommendations will take time and resources. The measure of the Plan’s success will be the coordination and pooling of resources within the participating jurisdictions and maintaining these successes over time. Teaming together to seek financial assistance at the state and federal level will be a priority to initiate projects that are dependent on alternative funding sources. This plan was built upon the effective leadership of a multi-disciplined steering committee and a process that relied heavily on public input and support. The plan will succeed for the same reasons.



Adoption Records (To be included)

To comply with DMA 2000, the County Board of Supervisors officially adopt this Kern County Multi-Jurisdiction Hazard Mitigation Plan Volume 1 and Volume 2 upon plan approval from Cal OES and FEMA. The adoption of the MJHMP in its entirety recognizes the County's commitment to reducing the impacts of natural hazards within the Cities and County. See below record of Adoption.



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Volume 1

KERN COUNTY

MULTI-JURISDICTION

HAZARD MITIGATION PLAN



Section 1. Introduction

1.1 Purpose

Kern County and many other participating jurisdictions prepared this Multi-Jurisdiction Hazard Mitigation Plan (MJHMP), originally approved by the Federal Emergency Management Agency (FEMA) in 2006. The plan in its current form reflects a comprehensive update in 2019-2020. The purpose of this plan is 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 commitment of each participating jurisdiction 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 ensure Kern County and participating jurisdictions' continued eligibility for certain federal disaster assistance, specifically the FEMA Hazard Mitigation Assistance (HMA) grants, including the Hazard Mitigation Grant Program (HMGP), Building Resilient Infrastructure and Communities (BRIC), and Flood Mitigation Assistance Program (FMA). The plan is also important for maintaining and improving the standing of the County in the National Flood Insurance Program's Community Rating System (CRS) which provides for lower flood insurance premiums to the residents in the unincorporated areas.

The **Master Goal/Mission Statement of the Kern County Multi-Jurisdiction Hazard Mitigation Plan** is "to develop sustainable communities to preserve life, protect property, the environment, and the economy from natural hazards."

1.2 Background and Scope

Each year in the United States, natural 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 incurred by insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be reduced 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 demonstrates 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. (National Institute of Building Sciences, 2017)



1.3 Participating Jurisdictions

The Kern County Hazard Mitigation Plan is a multi-jurisdiction plan that geographically covers the entire area within Kern County's jurisdictional boundaries (hereinafter referred to as the "planning area"). A planning partnership was formed to develop and steer content in this plan. This partnership consists of Kern County and local government planning partners who worked together to create the goals, objectives, mitigation strategies, and implementation methods to reduce natural hazard risk within the planning area. Any jurisdiction or organization may participate in the planning process. However, to obtain Federal Emergency Management Agency (FEMA) approval, each local jurisdiction must meet all requirements of hazard mitigation planning outlined in 44 C.F.R. § 201.6. Participating jurisdictions are listed in Table 2-1 and are shown in Figure 1-1.

1.4 Why Update This Plan?

Hazard mitigation is a way to reduce or alleviate the loss of life, personal injury, and property damage that can result from a disaster through long and short-term strategies. It involves strategies such as planning, policy changes, programs, projects, and other activities that can mitigate the impacts of hazards. The responsibility for hazard mitigation lies with many, including private property owners, business and industry, and local, state and federal government.

The Federal Disaster Mitigation Act of 2000 (DMA 2000) required state and local governments to develop hazard mitigation plans as a condition of federal disaster grant assistance. (Pub. L. No. 106-390; 42 U.S.C. § 5121 *et seq.*) Prior to 2000, federal disaster funding focused on disaster relief and recovery, with limited funding for hazard mitigation planning. DMA 2000 increased the emphasis on planning for disasters before they occur.

DMA 2000 encourages state and local authorities to work together on pre-disaster planning and promotes sustainability. Sustainable hazard mitigation includes the sound management of natural resources and the recognition that hazards and mitigation must be understood in the broadest possible social and economic context. The enhanced planning network called for by DMA 2000 helps local governments articulate accurate mitigation needs, resulting in faster allocation of funding and more cost-effective risk reduction projects.

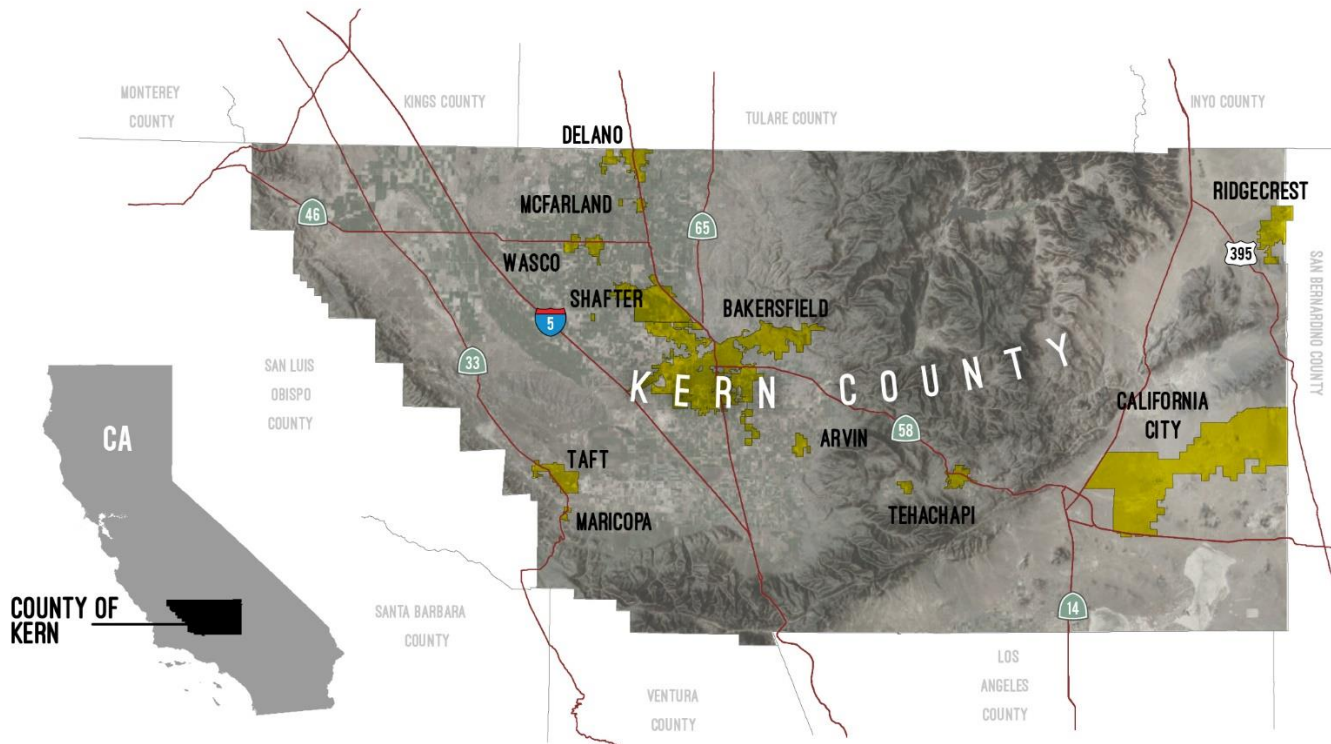


Figure 1-1: Participating Jurisdictions Map

1.4.1 Purposes for Planning

This Hazard Mitigation Plan identifies resources, information, and strategies for reducing risk from natural hazards. Kern County and the local jurisdictions that participated as planning partners (collectively “the planning partners”) initiated this planning effort in part because:

- the Kern County area has significant exposure to numerous natural hazards that have caused millions of dollars in past damage;
- the planning partners want to be proactive in preparing for the probable impacts of natural hazards; and
- limited local resources make it difficult to implement proactive risk-reduction measures. Federal and State financial assistance is paramount to successful hazard mitigation in the area.

Elements and strategies in the plan were selected because they best meet the needs of the planning partners and their citizens. The plan was developed to meet the following objectives:

- Meet or exceed requirements of the DMA 2000 and the 2015 California legislation requiring the incorporation of climate adaptation strategies into hazard mitigation planning (SB 379).
- Enable all planning partners to continue using 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 Kern 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.
- Coordinate existing plans and programs so that high-priority initiatives and projects to mitigate possible disaster impacts are funded and implemented.

1.5 Who Will Benefit from This Plan?

One benefit of multi-jurisdiction planning is the ability to pool resources and eliminate redundant activities within a planning area with fairly uniform risk exposure and vulnerabilities. FEMA encourages multi-jurisdiction planning under its guidance for the DMA 2000. The plan will help guide and coordinate mitigation activities throughout Kern County.

All citizens and businesses of Kern County are the ultimate beneficiaries of this MJHMP. The plan reduces risk for those who live in, work in, and visit the County. It provides a viable planning framework for all foreseeable natural hazards that may impact the County. County stakeholder participation helped ensure that plan 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.

1.6 How to Use This Plan

This plan has been set up in two volumes to separate jurisdiction-specific elements (Volume 2) from those that apply to the whole planning area (Volume 1):

- **Volume 1**—Volume 1 includes all federally-required elements of a hazard mitigation plan that apply to the entire planning area. This includes the description of the planning process, public involvement strategy, goals and objectives, countywide hazard risk assessment, countywide mitigation initiatives, and a plan maintenance strategy. Vol. 1 includes the following appendices:
 - Appendix A—Annex Methodology
 - Appendix B—Planning Process Documentation
- **Volume 2**—Volume 2 includes a crosswalk that directs readers to all federally-required, jurisdiction-specific elements for each participating jurisdiction, which are in turn available as standalone Annex HMPs. Vol. 2 describes the categorization of jurisdictions into municipalities, special districts, school districts, and water and wastewater districts. All planning partners have adopted Volume 1 in its entirety and each partner's jurisdiction-specific Annex HMP.



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Section 2. What’s New

This section of the plan includes background information on the 2014 MJHMP and this MJHMP Update. The 2014 Mitigation Actions were reviewed and have been changed, updated, and revised to reflect new priorities in this MJHMP. Only the information and data still valid from the 2014 Plan was carried forward as applicable into this MJHMP update. The sections below describe the planning process for this update.

2.1 Participating Jurisdictions in the 2014 HMP vs MJHMP Update

In September of 2014, the County met all approval requirements from the DMA and officially adopted an update to the 2006 HMP. Eligibility status of the planning partnership was monitored by the Kern County Point of Contact (POC) over the five-year update process. A partner was deemed to be meeting participation requirements based on:

- Progress reports being submitted annually by the specified time frames,
- Partners notifying the POC of changes in designated points of contact,
- Partners supporting the Steering Committee by attending designated meetings or responding to needs identified by the Committee, and
- Partners continuing to be supportive as specified in the planning partner expectations package provided to them at the beginning of the process.

Table 2-1 tracks 2014 and 2020 Participating Jurisdictions.

Table 2-1: Participating Jurisdiction Tracker

Jurisdiction Name	2014 Participating Jurisdiction	2020 Participating Jurisdiction
Airport Districts		
Indian Wells Valley Airport District	Y	N
Mojave Air and Space Port	Y	Y
Community Service Districts		
Arvin CSD	Y	Y
Bear Valley CSD	Y	Y
East Niles CSD	Y	Y
Golden Hills CSD	Y	Y
Rosamond CSD	Y	Y
Stallion Springs CSD	Y	Y
Mosquito Abatement Districts		
South Fork Mosquito Abatement District	Y	N



Jurisdiction Name	2014 Participating Jurisdiction	2020 Participating Jurisdiction
Municipalities		
City of Arvin	Y	Y
City of Bakersfield	Y	Y
City of California City	Y	Y
City of Delano	Y	Y
City of Maricopa	Y	Y
City of McFarland	Y	N**
City of Ridgecrest	Y	Y
City of Shafter	Y	Y
City of Taft	Y	Y
City of Tehachapi	Y	Y
City of Wasco	Y	Y
Recreation and Park Districts		
Buttonwillow RPD	Y	N*
North of River RPD	Y	Y
Shafter RPD	Y	Y
Tehachapi Valley RPD	Y	Y
Wasco RPD	Y	N
West Side RPD	Y	Y
School Districts		
Bakersfield City School District	Y	Y
Buttonwillow Union School District	Y	Y
Delano Joint Union High School District	Y	N*
Edison Elementary School District	Y	N*
Elk Hills School District	Y	N*
Fairfax School District	Y	N*
Kern Community College District	Y	Y
Kern High School District	Y	Y
Kernville Union School District	Y	N*
Lost Hills Union School District	Y	Y
Mojave Unified School District	Y	Y
Panama-Buena Vista School District	Y	N
Pond Union School District	Y	N*
Richland School District	Y	Y
Sierra Sands Unified School District	Y	Y
Taft City School District	Y	Y



Jurisdiction Name	2014 Participating Jurisdiction	2020 Participating Jurisdiction
Tehachapi Unified School District	Y	Y
Vineland School District	Y	Y
Sanitation Districts		
Ford City-Taft Heights Sanitation District	Y	Y
Kern Sanitation Authority	Y	Y
North of the River Sanitary District	Y	Y
Water Districts		
Arvin-Edison Water Storage District	Y	Y
Berrenda Mesa Water District	Y	Y
Buena Vista Water Storage District	Y	N
Buttonwillow County Water District	Y	Y
Cawelo Water District	Y	Y
Greenfield County Water District	Y	Y
Kern County Water Agency	Y	Y
Kern Delta Water District	Y	Y
Kern-Tulare Water District	Y	Y
Lost Hills Water District	Y	Y
North of the River Municipal Water District	Y	Y
Semitropic Water Storage District	Y	Y
Tehachapi-Cummings County Water District	Y	Y
West Kern Water District	Y	Y
Wheeler Ridge-Maricopa Water Storage District	Y	Y

* Indicates a jurisdiction that did not participate in the HMP formulation process, although never formally withdrew participation.

** The City of McFarland has its own active Hazard Mitigation Plan that explores vulnerabilities and mitigation separate from this MJHMP.

2.2 Mitigation Actions

During this MJHMP update process, each of the 2014 County-wide mitigation actions were examined for relevancy and the potential for future implementation and then evaluated for potential follow-up. Some mitigation actions developed during the 2014 HMP effort are an inherent part of the HMP update process or were not detailed enough for implementation at a local jurisdiction level, and thus were not included in this update. The County has made significant changes to other 2014 Mitigation Actions because of the updated risk assessment and implementation strategy, to include more detail, or to update based on current mitigation practices.



Table 2-2 provides a record of cancelled County-wide Mitigation Actions and an explanation for why the mitigation action was cancelled. Ongoing or pending mitigations actions from previous HMPs are included within the Mitigation Action Plan in Table 5-6. Completed previous Mitigation Actions for the County are detailed in Table 2-3.

Table 2-2. Cancelled Mitigation Actions from 2014

Mitigation No.	Hazard Type	Status	Year	Primary Agency	Title/Description	Responsible Party	Reason Cancelled
ma-AH-KC-64	All Hazard	Cancelled	2014	County of Kern	Mosquito Vector Control in Kern County for Communities without Mosquito Control Districts	Kern County Department of Public Health	Some progress has been made over the years; marked as deleted in 2014.
ma-FL-KC-62	Flood	Cancelled	2014	County of Kern	Bridge on Redrock Randsburg Road at Redrock Canyon Wash	Kern County Roads Department	This project has been replaced with an alternative project to construct a box culvert.

2.3 New Analysis and Risk Assessment Methodology

The County strengthened this plan by using new research methods and information systems. Geographic Information Systems (GIS) mapping provided the County with the tools to develop more comprehensive data sets than those in the 2014 MJHMP.

This MJHMP focuses on natural hazards. New MJHMP mitigation actions focus on four different classifications, including:

- Local Plans and Regulations – intended to reduce the County’s vulnerability to future hazard events through the implementation of codes and regulations.
- Structure and Infrastructure Projects – intended to protect existing structures by retrofitting, relocating, or modifying the structure to withstand a hazard event.
- Natural Systems – to reduce the effects of hazards on the natural resources within a region by preserving and/or restoring natural areas along with their mitigation functions.
- Public Information and Awareness – to advise residents, potential buyers, and visitors about hazards, potentially hazardous areas, and mitigation techniques.



2.4 Successful Mitigation Activities

The 2014 Kern County HMP guiding principles, goals, objectives, and mitigation actions have been implemented through various on-going projects, plans and programs. With respect to the mitigation actions and strategies developed in 2014, Kern County has made improvements toward reducing natural hazard risks to life and property within the County. Significant risk reduction efforts have been made for floodplain management, flood damage prevention, and fire hazard abatement. Table 2-3 summarizes the completed mitigation actions since 2014. These and many other successful policies, programs, and projects are summarized below.

Table 2-3. Completed Mitigation Actions Since 2014 MJHMP

Mitigation No.	Hazard Type	Status	Year	Primary Agency	Title/Description	Responsible Party
ma-AH-KC-39	Soil Stability	Completed	2014	County of Kern	Bena Landfill Drainage Improvements and Erosion Control	County of Kern Waste Management Department
ma-FL-KC-100	Flood	Completed	2014	County of Kern	Replace Tehachapi Blvd Bridge at Cache Creek with Reinforced Concrete Box Culvert	Kern County Roads Department
ma-FL-KC-69	Flood	Completed	2014	County of Kern	Bena Road Bridge Replacements at Caliente Creek and Walker Basin Creek	Kern County Roads Department
ma-FL-KC-94	Flood	Completed	2014	County of Kern	Emergency Bridge on Pasadena Lane (across Borel Canal)	Kern County Roads Department
ma-FL-KC-95	Flood	Completed	2014	County of Kern	Cuddy Creek Streambed Restoration at Frazier Mtn Park Rd Bridge	Kern County Roads Department
ma-WF-KC-3	Wildfire	Completed	2014	County of Kern	Fire Safe Council Development	Kern County FD
ma-HM-KC-109	Hazmat	Completed	2005	County of Kern	Pesticide Accident Response Gap Alleviation	Kern County Office of Emergency Services



Figure 2-1: Caliente Creek Feasibility Study Area

Photo: AECOM (Patch, May 2019)

Caliente Creek Flood Mitigation Study

Kern County Public Works published the Caliente Creek Habitat Mitigation and Groundwater Recharge Feasibility Study (Feasibility Study) in June 2017, and a counterpart, the Caliente Creek Conceptual Plan in May 2019, as initial steps in flood mitigation for Caliente Creek. The Feasibility Study includes two alternative scenarios for floodplain management. In the first scenario, 267 acres would remain in farming production while the remaining 233 acres would be restored to native vegetation. In the second scenario the entire 500-acre floodplain would be restored to native vegetation with no farming. The Caliente Creek Conceptual Plan includes permitting

requirements and estimated costs for each alternative scenario.

Backup Emergency Generators Installed in the City of Bakersfield

The City of Bakersfield received funding from FEMA's Hazard Mitigation Grant Program (HMGP) to purchase and install emergency backup generators at Beach Park Storm Lift Station and Pistol Range Storm Lift Station. During rain events, storm runoff drains to the two pump stations, where it is pumped over levees into the river channel. Installing two new backup generators will aid in ensuring that the lift stations remain functional during any storms which might impair access to power, vital to flood protection for the City. The City utilized (HMGP) funds for 75% of the associated costs, matched by local funding.

Removal of Wildfire Prone Dead and Dying Trees throughout Kern County

The combined effects of drought and insect infestation have caused massive tree die-offs both regionally and in Kern County in recent years. Approximately 150 million trees have died from the California drought, which began in 2011. (Smithsonian Magazine, 2019) These trees pose a fire hazard to public facilities owned and operated by the County. The Kern County Fire Department conducted a series of tree removal projects during 2019. Two projects on Sawmill Road and Poso Creek involved the selection and removal of 2,223 dead or dying trees to reduce wildfire hazard in those areas. The County also completed removal projects for Tehachapi Mountain Park, Rancheria Road, Breckenridge Road, the Piute Mountains, Icehouse Road, and Old State Road.



The County has also taken administrative steps to mitigate the fire risk of tree die-offs. The County established a Kern County Tree Mortality Task Force which was assembled in order to create a response plan for removing dead and dying hazard trees in addition to serving as a forum for information sharing between local, state, federal, private, and non-profit agencies. One of the principal goals of the Task Force is to collaborate with local, private, and public partners to identify and remove these trees. The Task Force meets on a monthly basis. It has so far been associated with a number of ongoing efforts to remove fire prone trees around Kern County. These include securing state responsibility area fire prevention fund grants, and working with Cal Trans, private landowners, and utility companies to remove trees. (Kern County Fire Department, n.d.)



Figure 2-2: U.S. Forest Service Worker Removing Branches from Dead Tree

Photo: U.S. Forest Service (Patch, April 2016)

Kern County Fire Department's Maintenance of Fire Roads and Fuel Breaks

Kern County Fire Department Road Crews have maintained more than 1,000 miles of fire roads and fuel breaks between 2019 and 2020. Maintaining routes for firefighting is an indispensable mitigation measure to prepare for and lessen the risk of wildland fires on both public and private lands. Maintaining defensible space around key structures or infrastructure is also one of the most cost-effective ways of protecting property from highly combustible material such as grass, brush, and timber.

Walker Basin Creek, Caliente Creek, and Tehachapi Boulevard Bridge Replacements

Two bridges were constructed in 1933 to cross Walker Basin Creek and Caliente Creek. The original construction of these bridges used wood pile and frame with concrete decking. The wooden supports of the construction were severely damaged from flooding activity in 2011, which effectively undermined the supporting framework of the construction. County Engineers inspected the bridge and determined that it was not practical to retrofit or rehabilitate the bridges. They also determined that the bridges were no longer safe for motorists and could collapse under heavy weight. After deciding on an emergency replacement, the County selected a protected box culvert conveyance design. Additionally, the roadway surroundings were modified to provide extensive erosion mitigation in order to protect the roadway and downstream properties from any damage resulting from the culvert capacity being exceeded.



The Tehachapi bridge replacement resulted from the need to construct an emergency replacement bridge due to the Piute Fire which burned the structural supports of the bridge on July 17, 2012. A new bridge was constructed in 2012 which featured a design of triple box culverts.

Cuddy Creek Bridge and Channel Protection

The Cuddy Creek bridge project consisted of placing concreted-rock channel protection downstream from the bridge in order to prevent further degradation to the bridge, to prevent the channel from an immediate danger of being washed out from potential flooding, and to



Figure 2-3: Bena Bridges During Construction

Photo: Kern County California (Patch, October 2012)

provide for the general safety of travelers using the bridge. Construction of the project began in October of 2008 and it was completed on November of the same year. There were an additional number of protective measures that were taken during and after construction. These included a Water Diversion Plan, biological monitoring, and post-construction surveys. The County was careful to protect fish and wildlife resources in and around Cuddy Creek. Vehicle access corridors and staging areas were marked with highly visible flags to ensure that environmentally sensitive areas were not disturbed. Excess construction materials were also removed from the project site in order to restore the channel bed and banks to their condition prior to construction.

County-Wide Community Wildfire Protection Plan Update In-Development

Since the 2014 HMP, the County took proactive role in developing Community Wildfire Protection Plans (CWPPs) for the Mount Pinos, Greater Tehachapi, and Kern River Valley areas. The purpose of CWPPs is to reduce wildfire risk through a collaborative process of planning, prioritizing, and implementing hazardous fuels reduction projects. CWPPs are community plans and thus require the involvement of various stakeholders from throughout the County. These were in addition to the development of Fire Safe Councils. Fire Safe Councils are grassroots community-based organizations which share the objective of making California's communities less vulnerable to catastrophic wildfire.



The County is currently developing its first county-wide CWPP which encompasses over two million acres and could potentially affect over 70,000 habitable structures. The work is being done by a consultant and is being funded by a Calfire Greenhouse Gas Reduction Fund (GGRF) grant for \$93,333. The CWPP will be completed by September 2021.

The CWPP will be broken into three geographic regions:

- The Kern River Valley area, which includes the communities of Kernville, Lake Isabella, Bodfish, Alta Sierra, and Glenville.
- The Frazier Park area, which includes the communities of Pine Mt. Club, Pinion Pines, and Lake of the Woods.
- The greater Tehachapi area, which includes the communities of Keene, Hart Flat, and Bear Valley Springs.

Along with providing important regional wildfire data, it is hoped that involving community members in the CWPP planning process will bring out a new group of potential fire planning leaders.

2.5 Incorporation into other Planning Mechanisms

Over the past 5 years, the 2014 HMP was incorporated into other planning mechanisms as a demonstration of progress in local hazard mitigation effort. This newly-updated HMP will be referenced in the 2020-2021 Kern County Emergency Operations Plan and the 2021 County-Wide CWPP. This update also will be incorporated into planning documents such as the County Flood Mitigation Plan, Groundwater Management Plan, Groundwater Sustainability Plan, General Plan, Wildfire Protection Plan and the Kern County Integrated Regional Water Management (IRWM) Plan in the future.



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Section 3. Planning Process

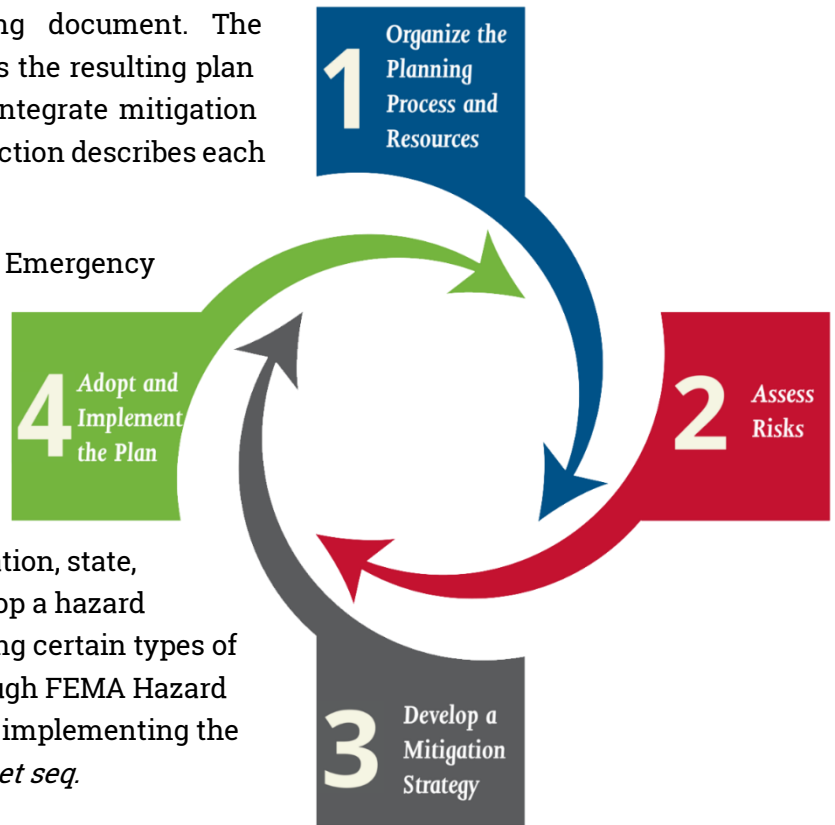
This section describes each stage of the planning process used to develop the MJHMP. The planning process provides a framework for document development and follows the FEMA recommended steps as enumerated in federal regulation and outlined herein. This MJHMP is a community-driven, living document. The planning process itself is as important as the resulting plan because it encourages communities to integrate mitigation with day-to-day decision making. This section describes each stage of the planning process.

The Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by the Disaster Mitigation Act of 2000 (DMA 2000, 42 U.S.C. § 5165), is intended to “reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters.” Under this legislation, state, tribal, and local governments must develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance through FEMA Hazard Mitigation Assistance. FEMA regulations implementing the DMA 2000 are located at 44 C.F.R. § 201.6 *et seq.*

FEMA prescribes four major planning steps:

- **Step 1: Organize Resources**
- **Step 2: Assess Risk**
- **Step 3: Develop a Mitigation Strategy**
- **Step 4: Adopt and Implement the plan**

Each jurisdiction that participated in the MJHMP independently followed the FEMA four step process. Figure 3-1 provides a detailed, phased breakdown of the planning process that each participating jurisdiction completed. These four steps are integrated with a ten step planning process which FEMA’s Community Rating System uses to establish floodplain management credit in addition to Flood Mitigation Assistance programs.



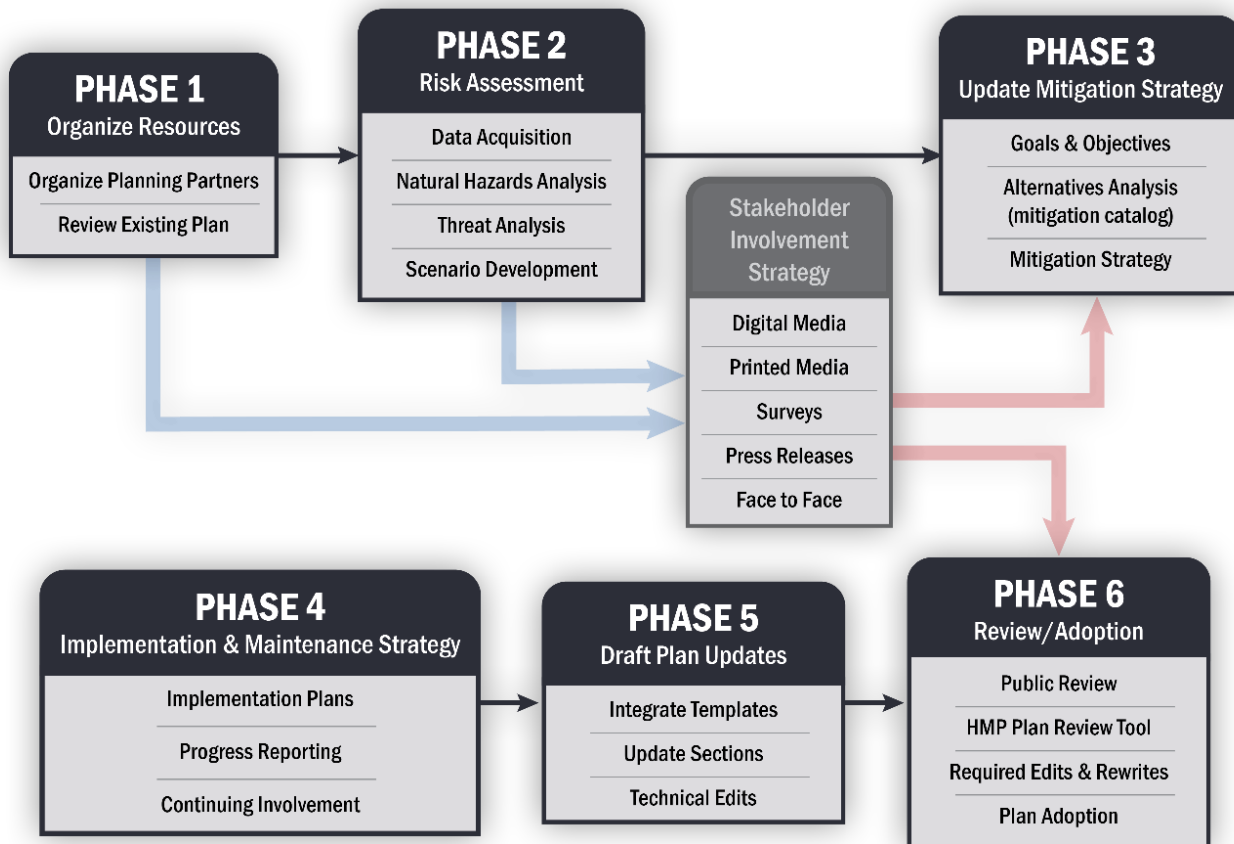


Figure 3-1: Kern County MHJHMP Planning Process

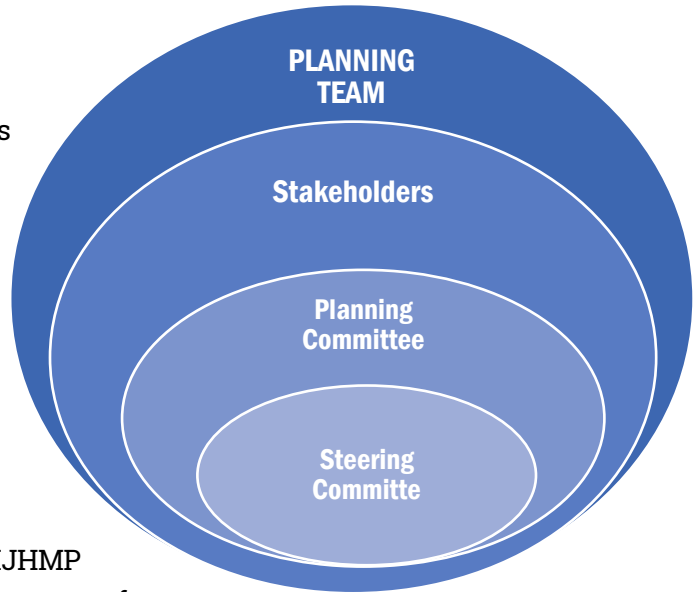


STEP 1: Organize Resources

The first step of the MJHMP planning process was organizing resources, consisting of developing the planning team and reviewing relevant existing documents.

Building the Planning Team

The Planning Team was comprised of participants from all participating jurisdictions who worked together to develop the MJHMP. The Planning Team consisted of a Steering Committee, Planning Committee, a broader group of residents and regional stakeholders, and an HMP consultant used for plan development and facilitation.



Steering Committee

The Steering Committee was at the core of the MJHMP planning process and was integral to ensuring the success of the planning process, its implementation, and future maintenance.

Members of the Steering Committee, listed in Table 3-1 below, represented each participating jurisdiction and were also a part of the MJHMP Planning Committee, discussed below and in the individual annexes in Volume 2.

Table 3-1: MJHMP Steering Committee

Name	Title	Department
County of Kern		
Alexa Kolosky	Planner III	Public Works Department
Andrew Freeborn	Public Information Officer	Fire Department
Brad Aragon	Loss Prevention Specialist	Kern County Counsel/Risk Management
Brandon Smith	Battalion Chief	Fire Department
Chris Huot	Assistant City Manager	City of Bakersfield
David Witt	Fire Chief/Director of Emergency Services	Fire Department
Dennis McNamara	Division Chief	Planning and Natural Resources Department
Greg Van Mullem	Systems Analyst II	Assessor-Recorder
Jeff Fariss	EMS Program Manager	Public Health Services Department



Name	Title	Department
Jeffrey Utter	GIS Manager	Information and Technology Services
Jon Lifquist	Assessor-Recorder	Assessor-Recorder
Jose De Leon	GIS Specialist	Fire Department
Kevin Hamilton	Floodplain Manager	Public Works Department
Lorelei Oviatt	Director	Planning and Natural Resources Department
Megan Person	Director of Countywide Communications	Board of Trade/KGOV
Michael Dillenbeck	Public Works Manager	Public Works Department
Nik Turner	GIS Specialist	Public Works Department
Robert Voyles	Public Works Operations Manager	City of Bakersfield
Wendy Benson	Administrative Coordinator	Fire Department
Zachary Wells	Battalion Chief	Fire Department

Planning Committee

The MJHMP Planning Committee consisted of multiple key decisionmakers with specific expertise to contribute to the planning process from each participating jurisdiction. The Planning Committee served as liaisons to the greater community. Each Planning Committee member was responsible for communicating the direction and status of the planning effort to respective departments and constituents of each jurisdiction and were expected to represent the perspectives of the participating jurisdiction to the Committee.

The Planning Committee was involved in various planning processes, including:

- Structured coordination and meetings
- Collection of valuable local information and other requested data
- Decision making on plan process and content
- Development of mitigation actions
- Review and comment on plan drafts
- Coordination of the public input process

All Planning Committee members did not necessarily attend stakeholder group meetings. Some participated by reviewing draft documents, assisting in individual jurisdictional vulnerability assessments, with public outreach, or at other stages of the process. Table 3-2 provides a list of the Planning Committee Members. Documentation of Planning Committee invitations are provided in Appendix B.



Table 3-2: MJHMP Planning Committee

Name	Title	Department
County of Kern		
Adrianna Kessler	Senior Human Resources Manager	Department of Human Services
Alexa Kolosky	Planner II	Public Works Department
Andrew Freeborn	Public Information Officer	Fire Department
Brandon Smith	Battalion Chief	Fire Department
Brian Marsh	County Director/Farm Advisor	Farm and Home Advisor
Carl Brewer	Senior CAO Manager, Construction Services	County Administrative Office/General Services Division
Carlos Rojas	Planner III	Planning and Natural Resources Department
Darin Heard	Deputy Agricultural Commissioner/Sealer	Agricultural and Measurement Standards Department
David Witt	Interim Fire Chief/Director of Emergency Services	Fire Department
Dennis McNamara	Division Chief	Planning and Natural Resources Department
Ed Greynolds		Department of Agriculture
Greg Van Mullem	Systems Analyst II	Assessor-Recorder
Jared Bradford	Planner I	Planning and Natural Resources Department
Jeff Fariss	EMS Program Manager	Public Health Services Department
Jeffrey Utter	GIS Manager	Information and Technology Services
Jeremy Oliver	Program Director	Aging & Adult Services Department
John George	Supervising Planner	Planning and Natural Resources Department
Jose De Leon	GIS Specialist	Fire Department
Kaler Ayala	Fiscal and Policy Analyst III	County Administrative Office
Kevin Hamilton	Floodplain Manager	Public Works Department
Kevin Kimmel		Sheriff's Department
Kimberly Fleming, B.S., M.P.A.	Special Projects Manager	County Administrative Office/General Services Division
Mark Lewis	Business Manager	Library
Michael Dillenbeck	Waste Management Supervisor	Public Works Department
Michael Mata	Assistant Probation Division Director	Probation Department
Nick Cullen	Director	Animal Services Department
Nik Turner	GIS Specialist	Public Works Department
Shane Denton	Supervising Park Ranger	Kern County Administrative Office/General Services Division
Steve Williams	Lieutenant	Sheriff's Department



Name	Title	Department
Zachary Wells	Battalion Chief	Fire Department
Zack Bittle	Sergeant	Sheriff's Department
City of Arvin		
Cecilia Vela	City Clerk	City of Arvin
Christine Viterelli	Grant Writer	City of Arvin
Jerry Breckinridge	City Manager	City of Arvin
Olan Armstrong	Lieutenant	Arvin Police Department
Pawan Gill	Director of HR and Administrative Services	City of Arvin
City of Bakersfield		
Brianna Carrier	Administrative Analyst III	City Manager's Office
Chris Huot	Assistant City Manager	City of Bakersfield
John Frando	Deputy Fire Chief	Bakersfield Fire
Kevin Albertson	Fire Marshal/Training Officer	Bakersfield Fire Department
Robert Voyles	Operations Manager	City of Bakersfield Public Works Department
Stuart Patteson, P.E.	Assistant Public Works Director	City of Bakersfield Public Works Department
William Ballard	Deputy Fire Chief	Bakersfield Fire Department
City of California City		
Anna Linn	Acting City Manager	City of California City
David Orr	Firefighter/Paramedic	California City Fire Department
Jeremy Kosick	Fire Chief / Fire Marshal	California City Fire Department
Riuss Jensma	Administrator/EOC Coordinator	California City Fire Department
City of Delano		
Joe Rojas	Associate Engineer/Water Coordinator	City of Delano
Pattie Castellanos	Department Assistant	City of Delano Engineering Department
Roman Dowling, P.E.	City Engineer / Public Works Director	City of Delano Public Works Department
City of Maricopa		
Eric Ziegler	City Administrator	City of Maricopa
Laura Robison	Deputy City Clerk	City of Maricopa
City of McFarland		
Alexander Lee	City Planner	City of McFarland
Claudia Ceja	City Clerk	City of McFarland
Diana Garcia	Grant Administrator	City of McFarland
Maria Lara, M.A.	Community Development Director	City of McFarland Community Development Department



Name	Title	Department
City of Ridgecrest		
Bard Lower	Public Works Director	City of Ridgecrest Public Works Department
Heather Spurlock	Administrative Secretary	City of Ridgecrest Planning Department
Joshua Villa	Code Enforcement Officer	Ridgecrest Police Department
Ronald Strand	City Manager	City of Ridgecrest
City of Shafter		
Diana Burnett	Captain	Shafter Police Department
Jeff Bell	Captain	Shafter Police Department
Kevin Zimmermann	Chief	Shafter Police Department
Suzanne Forrest	Senior Planner	City of Shafter Planning Department
Wayne Clausen	Planning Director	City of Shafter Planning Department
City of Taft		
Craig Jones	City Manager	City of Taft
Damon McMinn	Chief	Taft Police Department
Lonn Boyer	Director of Human Resources/Assistant City Manager	City of Taft
Mark Staples	Director of Planning and Development Services	Planning and Development Services
Michelle Kincaid	Administrative Assistant to the City Manager	City of Taft
City of Tehachapi		
Ashley Whitmore	Administrative Manager/Deputy City Clerk	City of Tehachapi
Corey Costelloe	Assistant to the City Manager	City of Tehachapi
Greg Garrett	City Manager	City of Tehachapi
Kent Kroeger	Chief	Tehachapi Police Department
Key Budge	Community Relations Specialist	City of Tehachapi
City of Wasco		
Biridiana Bishop	Public Works Director	City of Wasco Public Works Department
Daniel Ortiz-Hernandez	City Manager	City of Wasco
Jeff Tackett	Water Superintendent	City of Wasco
Keri Cobb	Senior Planner	City of Wasco
Maria Martinez	Executive Assistant	City of Wasco
Wayne Jackson	Facilities Supervisor	City of Wasco
Bakersfield City School District		
Kristabel Garcia-Diaz	Office Manager	Bakersfield City School District
Marcos Rodriguez	Director, Facilities	Bakersfield City School District



Name	Title	Department
Buttonwillow Union School District		
Dana Baugh	Administrative Assistant	Buttonwillow Union School District
Steven Santillan	Lead Bus Driver/Custodian	Buttonwillow Union School District
Stuart Packard	Superintendent	Buttonwillow Union School District
Delano Joint Union High School District		
Adrian Maduena	Chief Financial Officer	Delano Joint Union High School District
Matt Carter	Director of MOT	Delano Joint Union High School District
Norma Gomez	Facilities Technician	Delano Joint Union High School District
Edison School District		
Todd Noble	MOT Director	Edison School District
Elk Hills School District		
Lenetta Cloud	Administrative Assistant to the Superintendent	Elk Hills School District
Ricardo Esquivel	Interim Superintendent	Elk Hills School District
Fairfax School District		
Michael Coleman	District Superintendent	Fairfax School District
Kern Community College District		
Christopher Counts	Director, Public Safety	Bakersfield College
Joseph Grubbs	Executive Director, Risk Assessment and Management	Kern Community College District
Sheila Shearer	Coordinator, Risk Management and Safety	Kern Community College District
Kern High School District		
Benny Wofford	Emergency Preparedness & Safety Manager	Kern High School District
Brian Mendiburu	Director of Student Behavior & Supports	Kern High School District
Jenny Hannah	Director of Facilities	Kern High School District
Kenny Seals, Ed.D.	Director of Business Administration	Kern High School District
Patrick Blake	Emergency Preparedness & Safety Administrator	Kern High School District
Dr. Kenny Seals	Director of Business Administration	Kern High School District
Ed Komin	Chief of Police	Kern High School District
Kernville Union School District		
Alex Brundage	M and O Manager	Woodrow Wallace Elementary School
Jennifer Bartlett	Secretary	Woodrow Wallace Elementary School
Nikolle Evans	Director of Maintenance and Operations	Kernville Union School District



Name	Title	Department
Lost Hills Union School District		
Harrison Favereaux	Chief Administrative Officer	Lost Hills Union School District
Jackie Villa		Lost Hills Union School District
Mojave Unified School District		
Aaron Haughton, Ed.D.	Superintendent	Mojave Unified School District
Cassie Hogan	Supervisor of Accounting & Categorical Programs	Mojave Unified School District
Keith Gainey	Assistant Superintendent - Business Services	Mojave Unified School District
Paula Dickerson	Administrative Assistant to the Superintendent	Mojave Unified School District
Panama-Buena Vista Union School District		
Glenn Imke	Assistant Superintendent of Business Services	Panama-Buena Vista Union School District
Kay Lackey	HSRM Coordinator	Panama-Buena Vista Union School District
Kevin Silberberg, Ed.D.	Superintendent	Panama-Buena Vista Union School District
Sandie Taylor	Administrative Secretary	Panama-Buena Vista Union School District
Pond Union School District		
Alex Lopez	Superintendent	Pond Union School District
Humberto Vargas	Director of Transportation	Pond Union School District
Kim Howard	Administrative Assistant	Pond Union School District
Richland School District		
Martin Rodriguez	Chief Business Officer	Richland School District
Yuriana Torres	Facilities Planning & Operations Secretary	Richland School District
Sierra Sands Unified School District		
Bryan Auld	Assistant Superintendent, Human Resources	Sierra Sands Unified School District
Carol Brewster	Human Resource Technician, Human Resources	Sierra Sands Unified School District
Dave Ostash	Superintendent	Sierra Sands Unified School District
Diane Naslund	Administrative Secretary to the Superintendent	Sierra Sands Unified School District
Taft City School District		
Janice Dillingham	Executive Assistant	Taft City School District
Tommy Aguilera	MOT Director	Taft City School District
Tehachapi Unified School District		
Julianna Schill	Secretary to the Business Services Chief Administrator	Tehachapi Unified School District



Name	Title	Department
Kelly Patterson	Secretary to the Director of Maintenance and Operations	Tehachapi Unified School District
Kirk Gilbert	Director of Maintenance and Operations	Tehachapi Unified School District
Hojat Entezari	Business Services Chief Administrator	Tehachapi Unified School District
Stacey Larson-Everson	Superintendent	Tehachapi Unified School District
Vineland School District		
Anabel Rubio	Administrative Assistant/Human Resources	Vineland School District
Cindy Castro	Superintendent	Vineland School District
Ivan Mendieta	Supervisor, MOT	Vineland School District
Special Districts		
Bear Valley CSD		
Kristy McEwen	Secretary of the Board	Bear Valley Community Services District
Tim Melanson	Chief of Police	Bear Valley Community Services District
William Malinen	General Manager	Bear Valley Community Services District
Buttonwillow RPD		
Megan Lucas	Office Manager/Program Director	Buttonwillow Recreation and Park District
East Niles CSD		
Larry White	Senior Treatment Operator	East Niles Community Services District
Timothy Ruiz, P.E.	General Manager	East Niles Community Services District
Tony Johnson	Superintendent	East Niles Community Services District
Indian Wells Valley Airport District		
Demi Mace	Assistant Manager	Indian Wells Valley Airport District
Scott Seymour	Manager	Indian Wells Valley Airport District
Mojave Air and Space Port		
Brandon Welton	Deputy Fire Chief	Mojave Air and Space Port
Floyd VanWey	Facilities Manager	Mojave Air and Space Port
Joe Hughes	Fire Chief Assistant	Mojave Air and Space Port
John Himes	Director of Operations	Mojave Air and Space Port
North of the River RPD		
Joe West	CTSA Transportation Supervisor	North of the River Recreation and Park District
Monya Jameson	General Manager	North of the River Recreation and Park District
Paul Anderson	Superintendent of Parks	North of the River Recreation and Park District



Name	Title	Department
Rosamond CSD		
Brach Smith	Director of Public Works	Rosamond Community Services District
John Houghton	Assistant General Manager/Superintendent	Rosamond Community Services District
Lizette Guerrero	Director of Administration/Board Secretary	Rosamond Community Services District
Shafter RPD		
Armando Gonzalez		Shafter Recreation and Park District
Phillip Jimenez	District Manager	Shafter Recreation and Park District
South Fork MAD		
Genel Hodges	Clerk of the Board of Trustees	South Fork Mosquito Abatement District
Paul Coburn	Manager/Technician	South Fork Mosquito Abatement District
Stallion Springs CSD		
Brad Burris		Stallion Springs Community Services District
David Aranda	General Manager	Stallion Springs Community Services District
Ed Gordon	President, Board of Directors	Stallion Springs Community Services District
Tehachapi Valley RPD		
Carrie Champlin	Business Manager/Clerk of the Board	Tehachapi Valley Recreation and Parks District
Corey Torres	Interim District Manager	Tehachapi Valley Recreation and Park District
Wasco RPD		
Vickie Hight	District Manager	Wasco Recreation and Parks District
West Side RPD		
Brad White	Maintenance Supervisor	West Side Recreation and Park District
Christy Cloud	Business Services Supervisor	West Side Recreation and Park District
Terra O'Neill	Administrative Assistant	West Side Recreation and Park District
Arvin CSD		
Alexis Gaona	Chief Operator	Arvin Community Services District
Raul Barraza, Jr.	General Manager	Arvin Community Services District
Arvin-Edison Water Storage District		
Chris Krauter	General Superintendent	Arvin-Edison Water Storage District
Fernando Ceja	Engineering Technician	Arvin-Edison Water Storage District



Name	Title	Department
Jeevan Muhar	Engineer-Manager	Arvin-Edison Water Storage District
Mark Dawson, P.E.	Engineer	Arvin-Edison Water Storage District
Micah Clark	Engineering Technician	Arvin-Edison Water Storage District
Sherry Jauch	Executive Secretary	Arvin-Edison Water Storage District
Berrenda Mesa Water District		
Kris Lawrence	Regulatory Coordinator	Berrenda Mesa Water District / Lost Hills Water District
Phillip Nixon	Co-Manager	Berrenda Mesa Water District
Steve Bottoms	Operations and Maintenance Superintendent	Berrenda Mesa Water District
Buena Vista Water Storage District		
Angie Thompson	Executive Assistant	Buena Vista Water Storage District
Tim Ashlock	Engineer-Manager	Buena Vista Water Storage District
Buttonwillow County Water District		
Regina Houchin	Board Secretary	Buttonwillow County Water District
Cawelo Water District		
David Ansolabehere	General Manager	Cawelo Water District
Ford City-Taft Heights Sanitation District		
Adrian Nava	Engineer III-C	Ford City-Taft Heights Sanitation District
Jason Nordine	Wastewater Specialist II	Ford City-Taft Heights Sanitation District
Kyle Perez	Engineer II	Ford City-Taft Heights Sanitation District and Kern Sanitation Authority
Leslie Edwards	Engineer III-C	Ford City-Taft Heights Sanitation District and Kern Sanitation Authority
Rositza Lopez	Administrative Coordinator	Ford City-Taft Heights Sanitation District
Golden Hills CSD		
Debbie Lee	Administrative Assistant	Golden Hills Community Services District
Susan Wells	General Manager	Golden Hills Community Services District
Greenfield County Water District		
Mel Johnson	General Manager	Greenfield County Water District
Nick Cooper	Operations Manager	Greenfield County Water District
Windy Rojas	Office Manager	Greenfield County Water District
Kern County Water Agency		
Monica Tennant	Water Resources Planner	Kern County Water Agency



Name	Title	Department
Kern Delta Water District		
Jana Marquez	Groundwater Manager	Kern Delta Water District
Steven Teglia	General Manager	Kern Delta Water District
Kern Sanitation Authority		
Adrian Nava	Engineer III-C	Kern Sanitation Authority
Jason Nordine	Wastewater Specialist II	Kern Sanitation Authority
Leslie Edwards	Engineer III-C	Ford City-Taft Heights Sanitation District and Kern Sanitation Authority
Rositza Lopez	Administrative Coordinator	Kern Sanitation Authority
Kern-Tulare Water District		
Skye Grass	Resources Manager	Kern-Tulare Water District
Steven Dalke	General Manager	Kern-Tulare Water District
Vanessa Yap	Staff Engineer	Kern-Tulare Water District
Lost Hills Water District		
Kris Lawrence	Regulatory Coordinator	Berrenda Mesa Water District/Lost Hills Water District
North of River Sanitary District No. 1		
Megan Lee	Office Administrator	North of River Sanitary District No. 1
Patrick Ostly	District Manager	North of River Sanitary District No. 1
North of the River Municipal Water District		
Carol Havens	Office Manager / Controller	North of the River Municipal Water District
Doug Nunneley	General Manager/Secretary-Treasurer	North of the River Municipal Water District
Ryan Nunneley		North of the River Municipal Water District
Semitropic Water Storage District		
Isela Medina	Staff Engineer, Water Resources	Semitropic Water Storage District
John Luna	Engineering Technician	Semitropic Water Storage District
Marsha Payne	Executive Secretary	Semitropic Water Storage District
Tehachapi-Cummings County Water District		
Cat Adams	Executive Assistant and Board Secretary	Tehachapi-Cummings County Water District
Curtis Hilliker	Operations Assistant	Tehachapi-Cummings County Water District
Tom Neisler	General Manager	Tehachapi-Cummings County Water District
Troy DePriest	Operations Manager	Tehachapi-Cummings County Water District



Name	Title	Department
West Kern Water District		
Andrea Crabb	Technical Analyst	West Kern Water District
Deann Crabtree	General Manager	West Kern Water District
Greg Hammett	General Manager	West Kern Water District
Tami Sivils	Human Resource Administrator	West Kern Water District
Wheeler Ridge-Maricopa Water Storage District		
Eric McDaris	Contract Administrator	Wheeler Ridge-Maricopa Water Storage District
Thomas Suggs, P.E., P.G., H.G.	Staff Engineer	Wheeler Ridge-Maricopa Water Storage District
Stakeholders		
Aaron Bock	Chief Planner	Tulare County RMA - Planning
Amanda Verhaege	Emergency Services Coordinator	Kings County Fire Department
Amy Rocha	District Conservationist	Natural Resources Conservation Service
Andrew Lockman	Emergency Services Manager	Tulare County Office of Emergency Services
		Antelope Valley Conservancy
Ariana Joven	Executive Director	Kern County Farm Bureau
Ben Raymond	Regional Planner	Kern Council of Governments
Bernice Romo	Assistant Team Manager, Sand Canyon	Greater Tehachapi Valley CERT
Bob Belcher	Assistant Coordinator	Bakersfield CERT
Brad Aragon	Loss Prevention Specialist	Kern County Counsel/Risk Management
Brandon Bates	Acting Area Conservationist, New Mexico - South Area	Natural Resources Conservation Service
Brenda Dawson	Coordinator	Indian Wells Valley CERT
Brian Hockett	District Manager	North West Kern Resource Conservation District
Brian Thoburn	Governmental Relations Manager	Southern California Edison
Brian Uhl	Emergency Services Manager	Santa Barbara County Office of Emergency Management
Cal Rossi	Government Relations Manager	Southern California Edison
Cathreen Richards	Director	Inyo County Planning Department
Chris Hickernell	General Superintendent	Friant Water Authority
Christian Buenrostro	Mechanical Engineer, Operations Division, South-Central California Area Office	U. S. Bureau of Reclamation
Colt Esenwein	Director	County of San Luis Obispo Public Works Department
David Brinsfield	CenCal ADFMO	Bureau of Land Management
David Burt	Assistant Coordinator	Stallion Springs CERT



Name	Title	Department
David Davis	Emergency Services Officer	San Bernardino County Office of Emergency Services
David Reiner	Assistant Coordinator	Mountain Communities CERT
David Romo	Team Manager, Sand Canyon	Greater Tehachapi Valley CERT
David Shaw	Coordinator / Team Manager, Golden Hills/Tehachapi	Greater Tehachapi Valley CERT
Dayne Yancey		Pine Mountain Club CERT
Dean Ott	Assistant Coordinator	Kern River Valley CERT
Douglas DeFitch	Chief Operating Officer	Friant Water Authority
Dylan Van Dyne	Project Manager	U. S. Army Corps of Engineers
Ed Gordon	President, Board of Directors	Stallion Springs Community Services District
Ed Rieth		Pine Mountain Club POA
Emily Montanez	Senior Program Manager, Chief Executive Office	Los Angeles County Office of Emergency Management
Emmanuel Gonzalez Hinojosa	Soil Conservationist	Natural Resources Conservation Service
Frank Trotta	Superintendent, Kern River Valley	California Water Service Company
Gary Crowell	Interim Chief	Stallion Springs Police Department
Gary Darcy	Coordinator	Rosamond CERT
Geoff Fulks	District Manager, Bakersfield District	California Water Service Company
Gerald Simon	VP, Chief Safety, Sec & EPO	California Water Service Company
Gina Darcy	Assistant Coordinator	Rosamond CERT
Greg Gatzka	Community Development Director	Kings County Community Development Agency
Helen Chavez	Assistant Director	Los Angeles County Office of Emergency Management
Hunter Merritt	Water Resources Planner, Public Involvement Specialist	U.S. Army Corps of Engineers, Sacramento District
J. D. Saucedo	Emergency Manager	Santa Barbara County Office of Emergency Management
James Nelson	Team Manager, Bear Valley Springs	Greater Tehachapi Valley CERT
Jeannie Taylor	Kern County CERT Coordinator	Kern County Fire Department
Jeannine Giuffre	President	Tehachapi Resource Conservation District
Jeffrey Kestly	Senior Public Safety Specialist	PG&E
Jim Mason	Coordinator	Mountain Communities CERT
Joe Guzzardi	Emergency Services Manager	San Luis Obispo County Office of Emergency Services
Jon Yasin	Local Manager, Kern River Valley District	California Water Service Company
Jose Pena	Superintendent	California Water Service Company
Justin Gagnon		Los Padres National Forest



Name	Title	Department
Karin Shulman	General Manager	Pine Mountain Club POA
Kathy Gibson	Emergency Manager	Ventura County Office of Emergency Services
Katie Allen	Marketing and Communications	PG&E
Kelley Williams	Emergency Services Manager	County of Inyo
		Kern River Valley Heritage Foundation
Kim Lary	District Conservationist	Natural Resources Conservation Service
Kristen Doud	Government Relations Representative, Corporate Affairs	PG&E
Leif Mathiesen	Bakersfield Zone Fire Management Officer	Bureau of Land Management
Lynn Greer	Outreach Program Specialist / Public Involvement	U. S. Army Corps of Engineers
Marty Pepito	Superintendent	California Water Service Company
Matt Gutierrez	Risk Manager	Risk Management Division
Michael Dyer	Technical Specialist	Santa Barbara County Office of Emergency Management
Michael Heimer	Regional Planner III	Kern Council of Governments
Michael Washam	Associate Director	Tulare County Resource Management Agency
Mike Martinez	Assistant DFMO Suppression	United States Forest Service
Miles Wagner	Emergency Services Officer	San Bernardino County OES
Monica Williams	Hazard Mitigation Grants Specialist	Governor's Office of Emergency Services
Nancy Gooch	Administrative Assistant	Eastern Kern County Resource Conservation District
Nick Lesourd	Natural Disaster Program Manager	EOC
Pat Wood	Senior Civil Engineer	Los Angeles County Public Works Department
Peggy Hoyt-Voelker		Pine Mountain Club POA
Phillip Dixon	District Conservationist	Natural Resources Conservation Service
Phyllis Throckmorton		Pine Mountain Club POA
Rafael Molina		California Water Service Company
Reed Schenke	Director	Tulare County Resource Management Agency
Rob Dixon	Team Manager, Old West Ranch	Greater Tehachapi Valley CERT
Ross Miller	Chief Engineer	Tulare County Resource Management Agency
Sally Thoun	Team Manager, Alpine Forest	Greater Tehachapi Valley CERT
Sandy Young	Coordinator	Stallion Springs CERT



Name	Title	Department
Sarah Rose	Assistant Team Manager, Golden Hills/Tehachapi	Greater Tehachapi Valley CERT
Scott Milner	Emergency Services Coordinator	San Luis Obispo County Office of Emergency Services
Sergio Vargas	Deputy Director, Watershed Planning & Permits Division	Ventura County Watershed Protection District
Seth Mitchell	District Fire Management Officer (Detailed)	United States Forest Service
Shane Santos	Assistant District Fire Manager	United States Forest Service
Stephanie Stephens	Hazard Mitigation Grants Specialist	Governor's Office of Emergency Services
Steve Doe, Ph.D., P.E.	Chief, Special Investigations Branch, South Central Region Office	California Department of Water Resources
Steven Larson	Chief, Pre-Disaster and Flood Mitigation Division	Governor's Office of Emergency Services
Terri Mejorado	Emergency Services Coordinator	Governor's Office of Emergency Services
Terry Butler	Assistant Coordinator	Pine Mountain Club CERT
Thomas Klein	Coordinator	Kern River Valley CERT
Thomas Yancey	Coordinator	Pine Mountain Club CERT
Wendy Wang	Water Resources Engineer, Central Valley Flood Planning Office	California Department of Water Resources

The County enlisted Dynamic Planning + Science (DP+S or Planning Consultant Team) due to its expertise in assisting public sector entities with developing hazard mitigation plans. DP+S staff facilitated the planning process, collected, and analyzed data, produced meeting materials, and produced drafts of the MJHMP for review. The MJHMP Consultant Team, as shown in Table 3-3, consisted of a variety of hazard mitigation and certified urban planning professionals.

Table 3-3: MJHMP Update Consultant Team

HMP Update Project Team	HMP Update Project Team Role
Ethan Mobley, AICP	Project Manager / Hazard Mitigation Planner
Brian Greer	GIS Specialist/Spatial Analyst
Torie Jarvis	Assistant Project Manager
Ty Johnson	Hazard Mitigation Planner
Daniel Spivak	Hazard Mitigation Planner
Alex Krebs	GIS Associate



Planning Committee Meetings

The Planning Committee met throughout the development of the updated MJHMP. Table 3-4 charts those meetings, including date, type, and topics discussed. Meeting documentation, including agendas, hazard maps, PowerPoint presentations, minutes, sign-in sheets, and other relevant handouts, are provided in Appendix B.

Table 3-4: Meeting Summary

Date	Meeting Type	Topics
April 12th, 2019	Planning Committee Kickoff Meeting	<ul style="list-style-type: none"> ▪ <i>Welcome and Introductions</i> ▪ <i>Statement of Work Review</i> ▪ <i>Expectations from Participating Jurisdictions</i> ▪ <i>DMA 2000 Requirements</i> ▪ <i>Project Schedule</i> ▪ <i>Data Calls/Data Review</i> ▪ <i>Next Steps</i>
May 23rd, 2019	Planning Committee Meeting #1	<ul style="list-style-type: none"> ▪ <i>Welcome and Introductions</i> ▪ <i>Mitigation Planning Defined</i> ▪ <i>Expectations from Participating Jurisdictions</i> ▪ <i>Planning Process Review</i> ▪ <i>Project Schedule</i> ▪ <i>Website Review</i> ▪ <i>FEMA Hazard Mitigation Program</i> ▪ <i>2012 Mitigation plan Review</i> ▪ <i>What has Changed?</i> ▪ <i>Outreach</i> ▪ <i>Next Steps</i>
July 18th, 2019	Planning Committee Meeting #2	<ul style="list-style-type: none"> ▪ <i>Welcome and Introductions</i> ▪ <i>Meeting #1 Recap</i> ▪ <i>Planning Team Development</i> ▪ <i>Risk Assessment Data Review</i> ▪ <i>RAMP Tool Review</i> ▪ <i>RAMP Tool Exercises</i> ▪ <i>Next Steps</i>
September 19th, 2019	Planning Committee Meeting #3	<ul style="list-style-type: none"> ▪ <i>Welcome and Introductions</i> ▪ <i>Planning Process Recap</i> ▪ <i>Pinpointing Your Vulnerabilities</i> ▪ <i>Developing a Nexus to HMA Funding</i> ▪ <i>Closeout</i>
November 14th, 2019	Planning Committee Meeting #4	<ul style="list-style-type: none"> ▪ <i>Welcome and Introductions</i> ▪ <i>Planning Process Recap</i> ▪ <i>Mitigation Alternatives</i> ▪ <i>Hazard Areas of Concern</i> ▪ <i>Goals & Objectives Review (previous plan)</i> ▪ <i>Updating the Mitigation Strategy</i>



Public Involvement and Outreach

Public involvement is an important and requisite component of any HMP update. The public outreach strategy for this update maximized public involvement throughout the planning process and utilized websites, local media, and community face-to-face efforts.

As required by FEMA, the general public was given an opportunity to be involved in the planning process while developing the HMP Update through surveys, a project website, and public review periods. Each is described below.



Surveys

An 8-question community survey was distributed via the County Nixle Account and website, Facebook page, and e-mail blasts. A total of 1,173 survey responses were collected, including 4 Spanish-speaking survey responses. The results of the survey were used to ensure that the priorities of the County and participating jurisdictions match those of the residents/community members. For example, community members were asked if they believe their property was at risk from a natural hazard disaster; 77.9% said “yes.” An example result is displayed in Figure 3-2, while full survey results are discussed in Section 5.5.1.2. The full survey results can be found in Appendix B.

Did you consider the risks of naturally occurring hazards when you chose your home?

1,169 responses

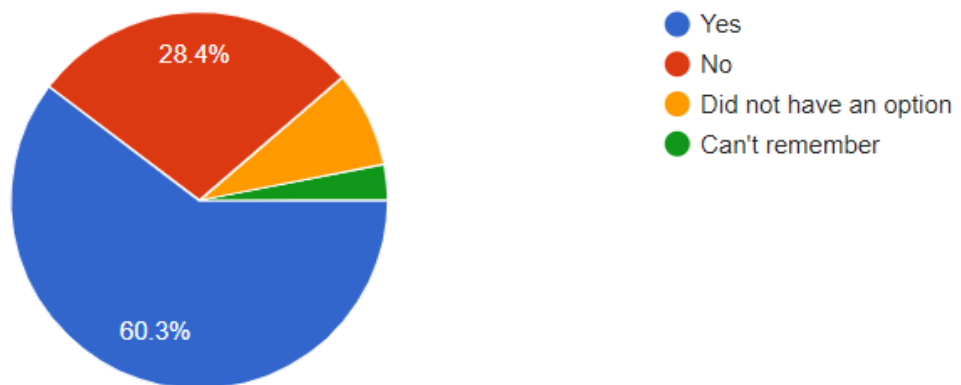


Figure 3-2 Snapshot of community survey results from English-speaking survey. Results are captured fully in Appendix B.



HMP Update Website

For this MJHMP, a project portal at <http://mitigatehazards.com/county-of-kern/> served and will continue to serve as a centralized project information and file-sharing platform. This website provides a tool for project management, collaborative content, and one-stop-shop for mitigation planning resources.

In addition to internal coordination, the project portal played a critical role in public involvement throughout the planning process and documenting public involvement

MITIGATE HAZARDS



including the community survey, meetings, and working sessions. Resources such as the Risk Assessment Mapping Platform (RAMP) and links to all meeting summaries are available to the public via the website. Project participants and stakeholders used the website as a project resource for the duration of the planning process and will continue to have access during the 5-year update cycle and beyond.

Public Review of Draft HMP

The public reviewed the draft HMP during July of 2020. The County and several other jurisdictions announced the available public draft via their websites, and the drafts were available at <http://mitigatehazards.com/county-of-kern/>. The public was able to provide comment via a collaborative PDF, an online submission form, or an email. The notice and response to comments received are available in Appendix B.

STEP 2: Assess the Risk

In accordance with FEMA requirements, the Planning Committee identified and prioritized the natural hazards affecting both Kern County as a whole and each participating jurisdiction individually. It also assessed the vulnerability from those identified hazards. Results from this risk assessment aided subsequent identification of appropriate mitigation actions. While the process is described below, the substance of this risk assessment is detailed in Section 4.

Identify/Profile Hazards

Based on a review of past hazard events, existing plans, reports, and other technical studies, data, and information, the Planning Committee determined if regional hazards could affect the planning area. The Planning Committee completed screening and prioritization processes to determine priority hazards to be assessed. A risk assessment finalized the prioritization process by ranking hazards according to the impact and threat to the County in Vol. 1 and to each participating jurisdiction in Annex HMPs.

Assess Vulnerabilities

Assessing vulnerabilities exposes the unique characteristics of individual hazards and begins the process of narrowing down which areas within Kern County are vulnerable to specific hazard events. The vulnerability assessment included field visits and a GIS overlaying method for examining such



vulnerabilities more in depth. Participating jurisdictions completed this exercise both singly and jointly with the County, and the identified hazards varied widely depending on the geographic make-up of, priorities of, and services provided by the participating jurisdiction. Using these methods, participating jurisdictions estimated vulnerable populations, infrastructure, and potential losses from hazards.

Updated content for each hazard profile for the County, including vulnerability, is provided in Section 4.5. Participating jurisdictions are profiled individually in Volume 2 of this plan as Annex HMPs.

Web Based Risk Assessment Mapping and Analysis

The web based and interactive Risk Assessment Mapping Platform (RAMP), accessed via the project website at www.mitigatehazards.com, allows interactive discovery of robust risk, vulnerability, and exposure data developed especially for Kern County. RAMP is a mapping platform built specifically for mitigation planning. It displays County facilities and buildings overlaid with natural hazards layers to bring interactivity and individual discovery to the GIS analysis performed for the MJHMP. Figure 3-3 shows the location of RAMP on the project website.

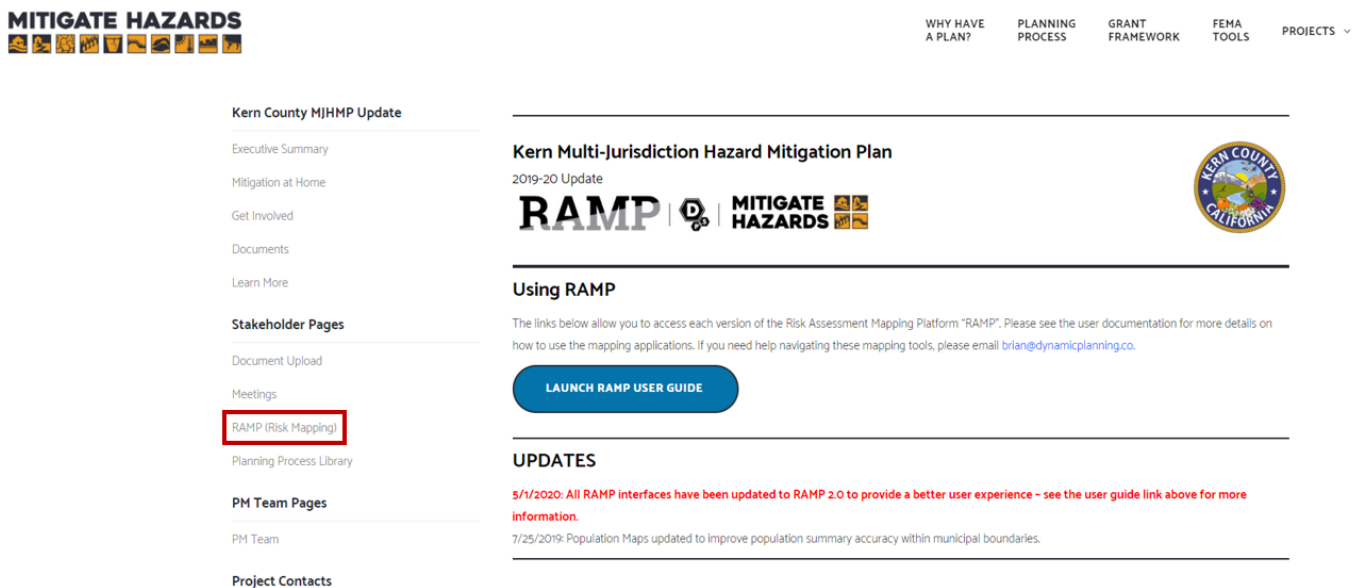


Figure 3-3: RAMP Facilities Map Access at mitigatehazards.com

The Planning Team used RAMP in meetings and as needed to understand vulnerabilities to the County and participating jurisdiction facilities. Users interactively filter facilities and buildings by natural hazard zones and/or construction characteristics.

RAMP's robust data filtering and summation calculations allow the user to understand and visualize vulnerabilities at the facility level with detailed information on the number of structures exposed to various natural hazards. RAMP enables Kern County to pinpoint vulnerabilities and reinforces problem statements in the mitigation strategy. Figure 3-4 demonstrates the RAMP web-based interface.

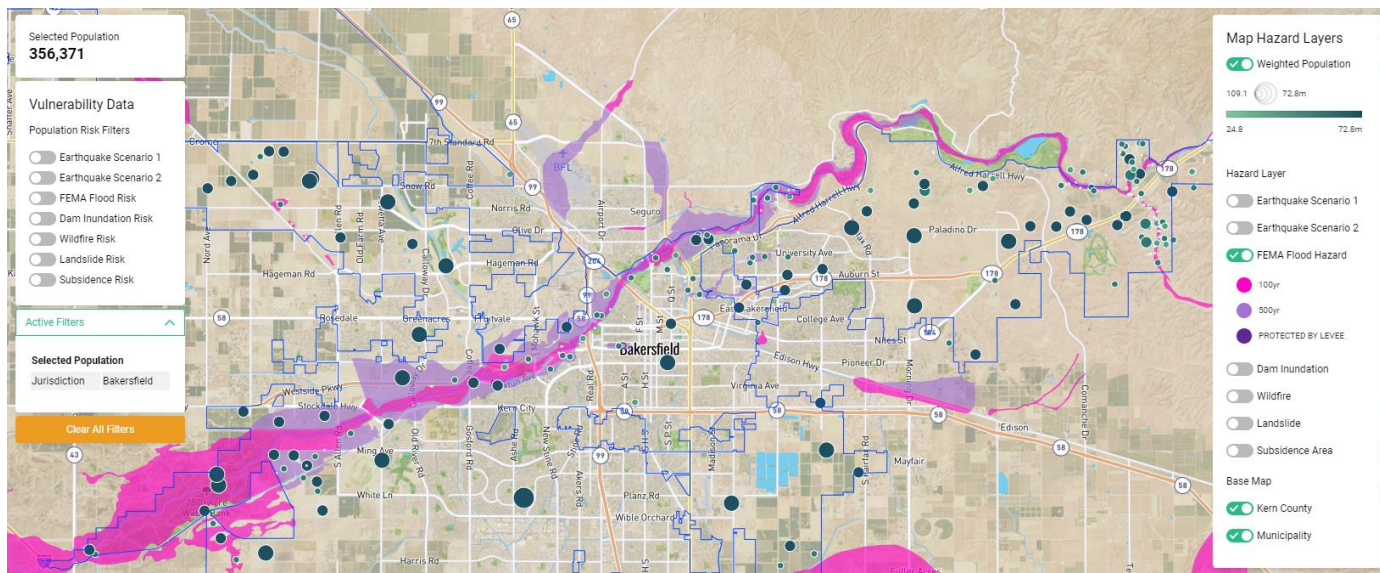


Figure 3-4: RAMP showing the population of Bakersfield overlaid with FEMA Flood Hazard

STEP 3: Develop a Mitigation Strategy

The MJHMP was prepared in accordance with requirements from DMA 2000 and the California Office of Planning and Research (OPR) and FEMA’s HMP guidance. This document provides an explicit strategy and blueprint for reducing potential losses identified in the risk assessment based on existing authorities, policies, programs and resources, and participating jurisdictions’ abilities to expand on and improve these existing tools. MJHMP development included identifying goals, assessing existing capabilities, reviewing the 2013 HMP goals, and identifying new mitigation actions. The process is described below; the substance of the mitigation strategy is detailed in Section 5 for the County and within Annex HMPs for other participating jurisdictions.

Identify Goals

The Planning Committee reviewed the 2014 HMP goals and determined their current validity, consistent with FEMA requirements. The goals and objectives were updated to meet the current hazard environments and to be consistent with the changing policies and goals of participating organizations. The Goals and Objectives are presented in Section 5.3.4.1.

Develop Capabilities Assessment

A capabilities assessment is a comprehensive review of participating jurisdictions’ capabilities and tools to implement the mitigation actions in the MJHMP. The Planning Committee identified technical, financial, and administrative capabilities to implement mitigation actions, as detailed in Section 5.3 and in Annex HMPs.



Identify Hazard Problem Statements

The Planning Committee developed mitigation actions, as both planning activities and projects, to address problems that could originate from hazards identified in the risk assessment, in line with identified capability of each jurisdiction. Mitigation actions were created first by developing problem statements for prioritized hazards. As a rule of thumb, each hazard problem statement should be mitigated with a combination of short-term and long-range planning activities, either through operational and or physical projects. Hazard Problem Statements are located at the conclusion of each hazard profile in table format and are also uploaded in an interactive web-based Mitigation Action Support Tool (MAST), described below. Hazard problem statements for the County and other participating jurisdictions are categorized as impact-related, victim-related, or threat-related, as described in Figure 3-5.



IMPACT

- Casualties
- Property Damage
- Business Interruption
- Financial Loss
- Environmental Contamination



VICTIM

- School Children in Hazard High Hazard Areas
- Care Facilities in High Hazard Area
- Vulnerable Population Exposed to hazards



THREAT

- Increased Fuels due to drought
- Hotter, drier climates
- More Intense Storms
- Impervious surfaces = greater runoff
- Increases of Invasive Species

Figure 3-5. Categories of issues addressed in problem statements

Identify Mitigation Actions

As part of the MJHMP planning process, the Planning Committee reviewed and analyzed the status of the mitigation actions identified in the 2014 HMP. The Consultant Team and Planning Committee then worked together to identify and develop new mitigation actions with implementation elements. The Planning Committee prioritized and further detailed the implementation strategies during Planning Committee Meeting #3. Additional detail on these mitigation actions is provided in Section 5.3.

Mitigation Action Support Tool (MAST)

Hazard problem statements and mitigation activities are presented and will be updated through a web interface application developed specifically for participating jurisdictions, truly creating a living document



that can continue to be a valuable resource into the future. The Mitigation Action Support Tool (MAST) is accessible through www.mitigatehazards.com

MAST is a web-based interactive tool that enables multiple users to search, view, enter, and update mitigation actions, ideas or projects, and other information. MAST provides participating jurisdictions and plan reviewers (California Office of Emergency Services (Cal OES) and FEMA) access to valuable mitigation information that can be leveraged by future planning or other risk reduction efforts within the County. Participating jurisdictions can update the status of their mitigation projects throughout the planning lifecycle, and this web-based tool will improve participating jurisdiction’s ability to apply for FEMA’s Hazard Mitigation Assistance (HMA) grant programs including initial grant application processes through Cal OES.

County Planning Processes Library

Kern County assessed hazards, explored hazard vulnerability, developed mitigation strategies, and followed the planning process as described in this section. Table 3-5 provides planning library links for Kern County to each individual vulnerability task that was completed throughout the planning process.

Table 3-5 Kern County Links to HMP Resources

Jurisdiction	Planning Library Links
Kern County	Risk Assessment – View Maps / Download maps Hazard Prioritization – View Risk Matrix Areas of Concern – View Problem Statements Capability Assessments – View Capability Assessment

Multi-Jurisdiction Planning Process

Multi-jurisdiction hazard mitigation planning offers many benefits, such as increased coordination and efficiency in planning and implementation efforts. At the same time, each jurisdiction has specific hazards and specific mitigation actions that must be addressed individually. The MJHMP balances the benefits of a comprehensive, coordinated approach to hazard mitigation with the specific realities of individual participating jurisdictions. Multi-jurisdiction plans are contemplated under FEMA regulations at 44 C.F.R. § 201.6(4).

Volume 2 of this MJHMP documents each jurisdiction’s HMP resources. Each participating jurisdiction individually assessed hazards, explored hazard vulnerability, developed mitigation strategies, and followed the same planning process as Kern County to create the annexes. Volume 2 provides links to each participating jurisdiction’s stand-alone annex and its vulnerability assessment tasks completed. This ensures each jurisdiction can quickly and easily access its annex, making it a more usable document than a large, unwieldy combined document.



STEP 4: Adopt and Implement the Plan

Once the risk assessment and mitigation strategy were completed, information, data, and associated narratives were compiled into the MJHMP. Section 2 provides detailed information on new and updated elements of the MJHMP.

Plan Review and Revision

Once the *Draft* MJHMP Update was completed, a public and government review period was established for official review and revision. Public comments were accepted, reviewed, and incorporated into this update. Applicable comments from the public have been received and addressed prior to the “*authorization to submit*” to FEMA and Cal OES. Notice of the public comment period is included in Appendix B.

Plan Adoption and Submittal

This plan has been submitted and approved by FEMA and adopted by the County. Copies of the resolutions are provided in forward of this document. ***NOTE: adoption proceedings will be completed after approval by Cal OES and FEMA.***

Implement, Evaluate, and Revise the Plan

The true worth of any mitigation plan is its implementation and success under FEMA’s grant programs. This MJHMP has been assembled to reduce the risk of natural hazards, and also to meet the requirements of the DMA 2000 and maintain eligibility under FEMA’s Hazard Mitigation Assistance (HMA) grant programs.

FEMA administers three programs that provide funding for local agencies with approved mitigation plans:

- **Hazard Mitigation Grant Program (HMGP)**, which assists in implementing long-term hazard mitigation planning and projects following a Presidential major disaster declaration.
- **Building Resilient Infrastructure and Communities (BRIC)**, which provides funds for hazard mitigation planning and projects on an annual basis.
- **Flood Mitigation Assistance (FMA)**, which provides funds for planning and projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP) on an annual basis.

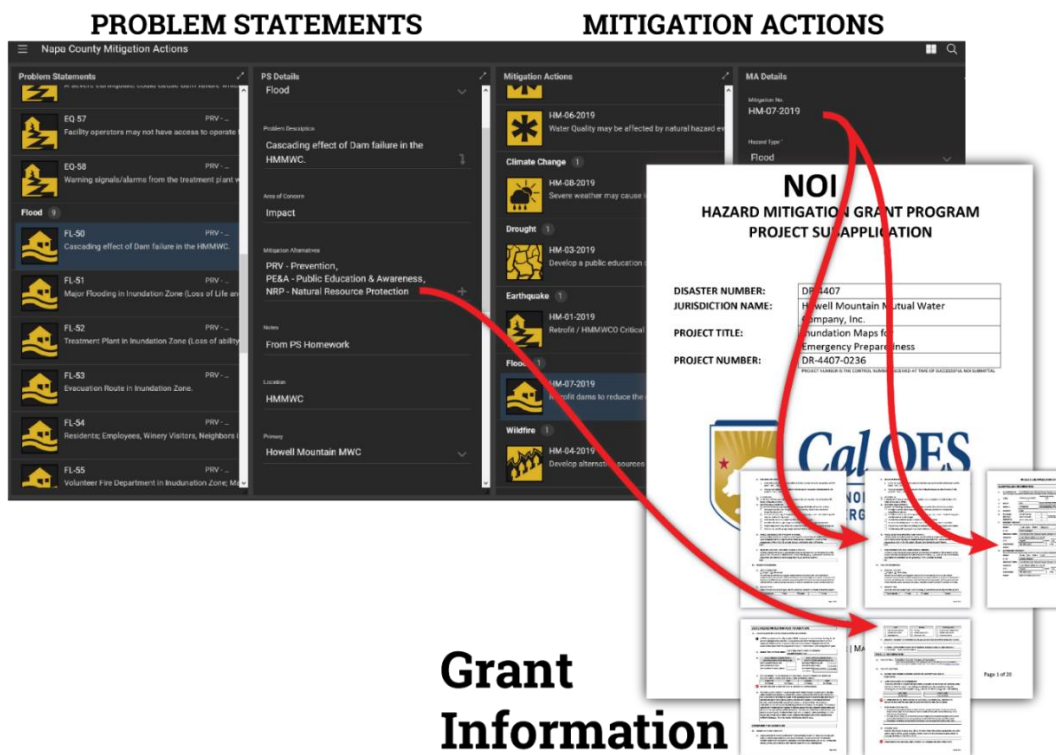
For more information about FEMA HMA, visit: <https://www.fema.gov/hazard-mitigation-assistance>.



Plan Maintenance

The County will update and monitor this plan in accordance with all FEMA requirements in order maintain eligibility for FEMA HMA. Evaluation and revision procedures for this plan are detailed in Section 6.

Section 6 includes the measures Kern County and participating jurisdictions will take to ensure the MJHMP's continuous long-term implementation, including MJHMP monitoring, reporting, evaluation, maintenance, and updating. Most of this implementation and maintenance will be done through MAST. Figure 3-6 demonstrates how MAST information will translate into Cal OES NOIs and grant sub application requests. Section 6 also contains specifics on integrating mitigation with day-to-day decision making.



Grant Information

Figure 3-6 MAST elements and Cal OES Grant Applications



Section 4. Risk Assessment

The risk assessment measures the potential impact to life, property, and the economy resulting from natural hazards. The intent of the Risk Assessment is to identify the qualitative and quantitative vulnerabilities of a community to the greatest extent possible given available data. The risk assessment increases understanding of natural hazard impacts to the community and provides a foundation to develop and prioritize mitigation actions. In turn, mitigation actions reduce damage from natural disasters through increased preparedness and focus resources to areas of greatest vulnerability.

This risk assessment section evaluates potential loss from a hazard event by assessing the vulnerability of buildings, infrastructure, and people. It identifies the characteristics and potential consequences of hazards, explores how much of the County could be affected by a hazard, and assesses the impact on County assets. The risk assessment approach consists of three (3) components:

- **HAZARD IDENTIFICATION AND SCREENING**
Identification and screening of hazards (Section 4.1)
- **HAZARD PRIORITIZATION**
Identifying “priority hazards” for each participating jurisdiction to be profiled in more detail (Section 4.2)
- **VULNERABILITY ASSESSMENT**
Determination of potential losses or impacts to buildings, infrastructure and population
This section contains HAZARD PROFILES for individual priority hazards (Section 4.5)

4.1 Hazard Identification and Screening

Per FEMA Guidance, the first step in developing the Risk Assessment is identifying the hazards. This step includes two parts. First, the MJHMP Planning Team considered and screened a broad set of hazards presented in relevant local, regional, and statewide hazard planning documents. The crosswalk of documents reviewed and the results of screening the relevant hazards to be reviewed are outlined in Section 4.1.1. Second, the MJHMP considered past hazard events in Kern County to help prioritize hazards to be evaluated in this document, as outlined in Section 0.



4.1.1 Hazard Screening

The County’s MJHMP Planning Team first reviewed previously-prepared hazard mitigation plans and other relevant documents to determine the realm of natural hazards that have the potential to affect the County and the nearby region. Table 4-1 provides a crosswalk of hazards identified in the 2014 Kern County MJHMP, 2009 Kern County General Plan, and the 2018 California State Hazard Mitigation Plan. Eighteen different hazards were identified based on a thorough document review. The crosswalk was used to develop a preliminary hazards list, providing a framework for MJHMP Planning Team members to evaluate which hazards were truly relevant to participating jurisdictions and which ones were not. For example, volcanoes were considered to have no relevance to the County, while earthquake, flood, dam failure, landslide, and wildfire were indicated in every hazard document.

Table 4-1: Document Review Crosswalk

Hazards	2014 Kern County MJHMP	2009 Kern County General Plan	2018 California State HMP
Agricultural Pests			■
Climate Change	■		■
Dam Failure	■	■	■
Drought	■		■
Earthquake	■	■	■
Flood	■	■	■
Insect Hazards	■		
Landslide	■	■	■
Levee Failure	■		■
Manmade Hazards		■	■
Pandemic Disease	■		■
Sea Level Rise			■
Severe Weather	■		■
Soil Hazards	■	■	
Terrorism & Tech Hazards			■
Tsunami			■
Volcano	■		■
Wildfire	■	■	■

The crosswalk provided the basis for prioritizing hazards to be profiled, displayed in Table 4-2. The prioritized hazards have detailed hazard profiles in Section 4.5, the Vulnerability Assessment.



Table 4-2. Hazard prioritization

Hazard Type	Explanation
Climate Change	High priority county-wide, profiled as part of Flood, Wildfire, and Severe Weather hazard.
Dam failure	High priority county-wide, profiled hazard.
Drought	High priority county-wide, profiled hazard
Dust Storms	High priority county-wide; profiled as part of Severe Weather
Earthquake/ Geologic Hazards	High priority county-wide, profiled hazard
Extreme Heat	Profiled as part of Severe Weather hazard
Extreme Cold	Extreme cold is rare in Kern County and not profiled in this plan
Flood	High priority county-wide, profiled hazard
Hail	Hail events are rare in Kern County and not profiled in this plan
Fog	While fog events do occur within Kern County, they are rare and are not considered a priority
Hazardous Material	While hazardous materials can release and impact the County, there are better avenues to address this hazard outside this plan.
High Winds/ Straight Line Winds	High priority county-wide, profiled as part of Severe Weather
Insect Hazards	While insects including Africanized honeybee and pine bark beetle exist in Kern County, this was not considered a priority and pests are not profiled in this plan
Levee Failure	High priority county-wide, profiled as part of Dam Failure
Lightning	Lightning was not identified as a priority for this plan.
Pandemic Disease	While pandemic disease can impact the County, there are better avenues to address this hazard outside this plan. <i>See Note after table for additional info.</i>
Radon	This hazard was not identified as a priority
Severe Thunderstorm	Severe thunderstorms are rare in Kern County and not profiled in this plan.
Slope Failure	High priority county-wide, profiled hazard
Soil Hazards	High priority county-wide, profiled hazard
Terrorism/Human Caused Threats	While terrorism is certainly a threat to the County and participating jurisdictions, it is best addressed in other plans as this HMP does not address human caused threats.
Tornado	Impacts to the County from tornados are extremely unlikely, if any.
Volcanic Activity	Due to distance from volcanoes and the limited chance of an eruption, this hazard was not identified as a priority.
Wildfire	High priority county-wide, profiled hazard
Winter Storm / Freeze Events	Profiled as part of Severe Weather hazard



Note regarding pandemic: The County's pandemic planning efforts go back to at least 2006, when a working group prepared a pandemic influenza continuity of operations report that was presented to the Kern Operational Area Emergency Council. At the time, the Emergency Council approved moving forward with the working group's recommendations. Several months later, the report was distributed to the managers of the incorporated cities so they could work on their own pandemic response planning.

The region has continued to move forward implementing recommendations, including the Kern County Board of Supervisors approving labor relations guidelines that would be activated in the event of a pandemic disaster or other disaster that affected employees' availability at their worksites. The guidelines were put into practice during the COVID-19 pandemic in Spring 2020.

In 2012, the need to plan continuity of operations from a perspective broader than solely pandemic influenza was identified. Subsequently, pandemic influenza continuity of operations planning evolved into all-hazards continuity of operations planning.

All-hazards continuity of operations planning continued as an in-County effort until late 2012, when efforts began to hire a consultant to review the County-produced documents, identify inconsistencies, and deliver a Countywide Continuity of Operations Plan (COOP). In 2014, the Board of Supervisors hired a consultant.

COOP development continues. Staff from the responsible County department continues to work with departments to reconcile any conflicting information included in the COOP, such as multiple departments that inadvertently plan to use the same continuity facility. The COOP will eventually be integrated into the overall County EOP, which is in the process of being updated.



4.1.2 Past Major Hazard Events

One important consideration in identifying and prioritizing hazards is past major hazard events, especially those that triggered federal or state disaster declarations. The MJHMP Planning Team reviewed and considered past major hazard events in Kern County as part of the screening and identification process. During this Plan update process, the Planning Team concluded its review of past major hazard events and identified the hazards that would be profiled in the updated MJHMP in July 2019, approximately six months before the COVID-19 pandemic began.

Most available information on major past hazard events comes from federal or state disaster declarations. These declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Additional federal or state disaster funding (or both) is generally available in response to a disaster declaration. State funding assistance is provided when a local government’s capacity to respond to the disaster is exceeded. 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.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and the Small Business Administration (SBA). FEMA also issues emergency declarations, which are more limited in scope and do not include the long-term federal recovery programs that accompany major disaster declarations. Quantity and types of damage are the determining factors.

Kern County has received 32 federal disaster declarations¹ since 1953, some of which were statewide, including:



9 Wildfires



2 Earthquakes



11 Severe Weather



1 Drought



5 Floods

Severe weather and flooding events are most likely to occur in the winter months, with twenty-five of the 54 federally-declared disasters occurring in January and February. Wildfires have typically occurred in the late summer and fall, with 170 wildfire declarations from July through October. Table 4-3 lists federal disaster declarations in Kern County since 1995.

¹ Officially, 33 disasters have been declared, as California was declared as part of Hurricane Katrina evacuation; however, no disaster occurred in California.



Table 4-3: Disaster Declarations in Kern County 1995- present

Year	Date Declared	Incident Description	Disaster Number
2019	07/19	Earthquake	EM-3415
2017	03/17	Severe Winter Storms, Flooding, & Mudslides	DR-4305
2016	08/16	California Cedar Fire	FM-5150
2016	06/16	California Erskine Fire	FM-5131
2011	09/11	California Canyon Fire	FM-2961
2011	09/11	California Comanche Fire Complex	FM-2971
2011	09/11	California Keene Fire Complex	FM-2970
2011	01/11	Winter Storms, Flooding, & Debris & Mudflow	DR-1952
2010	07/10	California Bull Fire	FM-2849
2010	09/10	California Canyon Fire	FM-2858
2010	08/10	California Post Fire	FM-2852
2010	07/10	California West Fire	FM-2850
2008	06/08	California Wildfires	EM-3287
2007	03/07	Severe Freeze	DR-1689
2005	09/05	Hurricane Katrina Evacuation	EM-3248
2005	02/05	Severe Storms, Flooding, Debris Flow, & Mudslides	DR-1577
2005	04/05	Severe Storms, Flooding, Landslides, & Mud/Debris Flow	DR-1585
2003	06/03	California Sawmill Fire	FM-2473
2003	06/03	California Tejon Fire	FM-2474
2002	07/02	California Deer Fire	FSA-2450
1999	02/99	Severe Storms, Tornadoes, High Winds, and Flooding	DR1267
1998	02/98	Severe Winter Storms and Flooding	DR-1203
1995	03/95	Severe Winter Storms, Flooding, Landslides, Mud Flows	DR-1046
1995	01/95	Severe Winter Storms, Flooding, Landslides, Mud Flows	DR-1044

Source: FEMA Disaster Database via <http://mitigatehazards.com/hazard-mapping/>, accessed 03/04/2020.

Drought declarations may also occur through the United States Department of Agriculture (USDA), as agricultural areas such as Kern County can be particularly impacted from drought. A USDA disaster declaration certifies that the affected county has suffered at least a 30-percent loss in one or more crop or livestock areas and provides affected producers with access to low-interest loans and other programs to help mitigate the impact of the drought. Importantly, all counties neighboring those receiving disaster declarations are eligible for the same assistance. Since 1995, Kern County qualified for USDA drought assistance in 2006 and 2009.



It is important to be aware that hazard events occurring outside County boundaries also directly and indirectly impact Kern County. For instance, dam failures and wildfires may occur outside Kern County but affect watersheds that drain into the County and result in flooding and other impacts related to watershed health. Power supply also could be interrupted by hazards outside of the County.

4.2 Hazard Prioritization

The Planning Committee's hazard prioritization process combines historical data, local knowledge, and consensus opinions to produce a matrix that illustrates whether each profiled hazard is an extreme, high, or medium priority. The criteria below were used to evaluate hazards and identify the highest risk hazard in Kern County. The results of the prioritization process for Kern County are shown in Figure 4-1.

Each participating jurisdiction also completed the hazard prioritization process specifically for the jurisdiction, and this important initial stage informed the rest of the planning process for each jurisdiction. Individual prioritization matrices are available in Volume 2 of this MJHMP.

The following questions and guidance shaped the ranking on the matrices:

Probability

What is the likelihood of a hazard event occurring in a given year?

- **Unlikely-** less than 1% annual probability or occurs rarely in the region or community
- **Possible-** 1%-10% annual probability or could occur. Uncommon in the region or community
- **Likely-** 10%- 100% annual probability or recurrent. Not frequent in the region or community
- **Highly likely-** 100% annual probability or occurs frequently in the region or community

Impact

In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?

- **Minor-** very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of critical facilities.
- **Limited-** minor injuries only. 10%-25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.
- **Critical-** multiple deaths or injuries possible. 25%-50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one week.
- **Catastrophic-** high number of deaths or injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.



Risk Assessment Matrix Definitions

PROBABILITY RATING

The likelihood of a hazard event occurring within a time period?

PROBABILITY	Highly Likely	Highly likely - 100% annual probability. Or Likely to occur every year in your lifetime.
	Likely	Likely - between 10 & 100% annual probability. Or will occur several times in your lifetime.
	Possible	Possible - between 1 & 10% annual probability. Or Likely to occur some time in your lifetime.
	Unlikely	Unlikely - less than 1% annual probability. Or unlikely but possible to occur in your lifetime.

IMPACT RATING

In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs? The impact could be in terms of one hazard event (flooding from a culvert failure) or a large-scale event (multiple rivers flooding) in the same jurisdictional boundary.

IMPACT			
Minor	Limited	Critical	Catastrophic

- Minor** - very few injuries, if any. Only minor property damage & minimal disruption on quality of life. Temporary shutdown of critical facilities.
- Limited** - minor injuries only. Approx. 10% or less of property in disaster footprint damaged or destroyed. Complete shutdown of critical facilities for more than one day.
- Critical** - multiple deaths/injuries possible. Between 25% and 50% of property in disaster footprint is damaged or destroyed. Complete shutdown of critical facilities for more than one week.
- Catastrophic** - high number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.

To concentrate resources, the jurisdictional planning team will focus on "High" and "Extreme" risk hazards. These hazards have the higher probability and greater impact as it relates to the jurisdictions planning area.

Hazard definitions are included in Vol. 1 of this plan. Some hazards are discussed as subset hazards— e.g., "Dam Failure" within the "Flood" hazard profile. If a hazard is not present on the risk matrix or are grey in color, the jurisdictional planning team felt the hazard had a minimal footprint within their planning area and was not ranked.

Hazard Information / Legend:

- Climate change may change the frequency, duration and intensity of hazards within each planning area. If applicable Climate Change impacts are described at the end of each section.
- Alluvial Fan deposits and issues in Kern County. This hazard is profiled and defined under "Slope Failure" in Vol. 1 of this plan.
- Soil Stability in Kern County includes Land Subsidence and Wind Erosion. Definitions for each are described in Vol. 1. of this plan.
- If hazard symbol is grey or not present, the jurisdictional planning team did not develop hazard vulnerability information related to the planning areas due to perceived probability and impact described above.

Kern County Risk Matrix

		IMPACT			
		Minor	Limited	Critical	Catastrophic
PROBABILITY	Highly Likely	Medium 	Extreme		
	Likely	Medium 	Extreme		
	Possible	Low	Medium	High	High
	Unlikely	Low	Low	Medium	

Figure 4-1 Prioritized Hazard Assessment Matrix for Kern County



4.3 Kern County Geographic and Demographic Profile

The geographic and demographic profile for Kern County and participating jurisdictions sets the stage for the vulnerability assessment. Paired with the vulnerability assessment, the regional profile can help guide jurisdictions' resources to key populations and geographic areas.

4.3.1 Geography

Kern County is located in southern California, at the southern end of California's San Joaquin Valley. Kern County is California's third-largest county in land area, and at 8,172 square miles, is larger than the land area of Massachusetts, New Jersey, or Hawaii. It is also larger than the areas of Delaware, Rhode Island, and Connecticut combined (California State Association of Counties, 2014). Elevations range from a low of 206' above sea level along the northern border of the county to a high of 8824' in southwest Kern County, just north of the summit of Mt. Pinos (the summit is in Ventura County). The County is bordered by Los Angeles and Ventura Counties on the south, San Bernardino County on the east, Inyo, Tulare and Kings Counties on the north, and San Luis Obispo and Santa Barbara Counties on the west.

Kern County is as diverse as it is large. Terrain varies dramatically within the County, from the fertile lowlands of the San Joaquin Valley, rugged mountain peaks of the southern Sierra Nevada and Tehachapi mountains, to the sweeping panoramas of the Mojave Desert. The County contains the San Joaquin Valley, the Mojave Desert, and interspersed mountain regions. The San Joaquin Valley floor comprises most of the western third of the County and is the population and agricultural center. Mountain ranges include the Sierra Nevada Range, the Tehachapi Range, Temblor Range, El Tejon Mountains, and Tecuya Ridge. The Mojave Desert covers roughly the eastern quarter of the County. Many of the hazards experienced throughout Kern County are more prevalent in one region or another. For example, the mountain region is more susceptible to wildfires while the valley region may be more impacted by drought.

Kern's main water sources are snowmelt from the Sierras that feed into the Kern River from other tributaries and groundwater resources of the San Joaquin Valley and Mojave Desert. The Lake Isabella Dam on the Kern River is the major surface water impoundment in the County. Another important man-made body of water is the Gov. Edmund Brown Aqueduct (also called the California Aqueduct), which carries up to 2 million gallons of water per minute south from the Sacramento River Delta, through Kern County, and into metropolitan Los Angeles. The single largest water user is the Kern County Water Agency, who receives as much as 1 million acre-feet per year for its member districts who hold agricultural and municipal and industrial water supply contracts with the Agency. The aqueduct is visible along portions of Interstate 5, as are powerful pumping stations that help carry its flow over the Tehachapi Mountains towards Los Angeles. (Water Education Foundation, 2020)

Figure 4-2 displays a geographic overview of Kern County.



Figure 4-2 Kern County Geographic Overview

4.3.2 Climate

Due to a highly varied geography, Kern County has a diverse range of climates, determined largely by elevation and precipitation. Temperatures are marked by extremes, with summertime highs topping 100 degrees in the San Joaquin Valley and Mojave Desert, while winter temperatures dip into the teens during snowfalls in the higher mountains. Generally, the County is classified as desert or semi-arid, with hot, dry summers and mild, humid winters. In most areas, 90 percent of the precipitation occurs between November and April. The Valley averages 3 to 7 inches of precipitation annually. The western side of the Tehachapi and Sierra Nevada Ranges receive as much as 40 inches of precipitation a year. The desert averages 3 to 6 inches of precipitation a year but is extremely variable. Snowfall is rare in the desert and valley regions but may range from 1 to 4 inches. (Kern County Flood Insurance Study, 2008)

4.3.3 Demographics and Vulnerable Populations

Population information directly relates to the impact of hazards and to other community needs such as housing, industry, stores, public facilities and services, and transportation. Knowledge of the composition of the population, how it has changed, and how it may change in the future helps with future decision making. The United States Census Bureau estimated Kern County's population to be 896,764 in 2018, an estimated 7% increase since 2010. (United States Census Bureau, 2018) This is in contrast to an estimated 6% population increase in California in the same period. (*Id.*)



Importantly, demographics help identify which populations may be particularly vulnerable to hazard events. Some populations are at greater risk because of age, resources, physical abilities, or other factors. Vulnerability in the face of a hazard event is not a fixed characteristic; the same person may be at risk for some hazards but not at risk for others. For example, a low-income family without a car may be at risk for a wildfire or flood if a quick evaluation is necessary but prepared in the event of an earthquake. Some individuals are highly and permanently vulnerable to many hazards, such as the frail elderly; people living with chronic sensory, mobility, or cognitive impairments; and individuals dependent upon assistive devices or complex medical regimens in order to survive. (National Center for Disaster Preparedness, 2020) Vulnerable populations also may be living in hazard-prone areas, compounding their risk.

In the context of all-hazards preparedness and response planning, **at-risk individuals** (often used interchangeably with “**vulnerable populations**”) are defined federally as “children, pregnant women, senior citizens, and other individuals who have access or functional needs in the event of a public health emergency.” (42 U.S.C. § 2802(b)(4)(B)(2019)) Examples of these populations may include, but are not limited to, individuals with disabilities, individuals who live in institutional settings, individuals from diverse cultures, individuals who have limited English proficiency or are non-English speaking, individuals who are transportation-disadvantaged, individuals experiencing homelessness, individuals who have chronic medical disorders, and individuals who have pharmacological dependency.

Natural resource managers may be able to reduce vulnerability of certain populations by increasing the adaptive capacity of affected communities. Examples include cost-sharing to reduce fuels, stabilize structures, or implement flood-reducing measures or educational programs offered in English and Spanish and targeted to specific populations. Specifically planning for vulnerable populations in hazard mitigation can help prioritize resources where they will be the most effective.

This section explores the various demographic and economic circumstances surrounding common vulnerable populations.



4.3.3.1 Income & Housing

Income or wealth is one of the most important factors in natural hazard vulnerability. First, lower income populations are less able to afford housing and other infrastructure that can withstand extreme events. The poor typically occupy more poorly-built and inadequately-maintained housing. For example, mobile or modular homes are more susceptible to damage in earthquakes and floods than other types of housing. In urban areas, the poor often live in older houses and apartment complexes which are more likely to be made of un-reinforced masonry, a building type that is particularly susceptible to damage during earthquakes.

Second, low income populations are less able to purchase resources needed for disaster response. In the United States, individual households are expected to use private resources to prepare for, respond to, and recover from disasters, to a large extent. This means that households living in poverty and minorities are disadvantaged when confronting hazards. The more affluent are able to relocate to safer areas or rebuild following a hazard event. Moreover, individuals who do not own cars or who cannot afford gas for their cars will likely decide not to evacuate. (Krause & Reeves, 2017)

Furthermore, residents below the poverty level are less likely to have insurance to compensate for losses incurred from natural disasters. This means that residents below the poverty level have a great deal to lose during an event and are the least prepared to deal with potential losses. Hurricane events such as Harvey, Irma, and Katrina demonstrate that low-income and minority communities are more vulnerable to hazard events, and they struggle to recover the most. (Id.)

Figure 4-3 shows the median household income distribution for Kern County. The “median” is the value that divides the distribution of household income into two equal parts (e.g., the middle). The median household income in Kern County in 2015 (in 2015 dollars) was estimated to be \$55,775, compared to \$56,516 across the U.S. (United States Census Bureau, 2015)



4.3.3.2 Age

Children and the elderly may be more vulnerable during an extreme hazard event.

Specific planning attention for the elderly is an important consideration, especially given the current aging of the American population. Elderly vulnerability can vary significantly based on health, age, and economic security. However, as a group, the elderly more often lack the physical and economic resources necessary for response to hazard events and are more likely to suffer health-related consequences that make recovery slower. They are more likely to be vision, hearing, or mobility impaired and more likely to experience mental impairment or dementia.

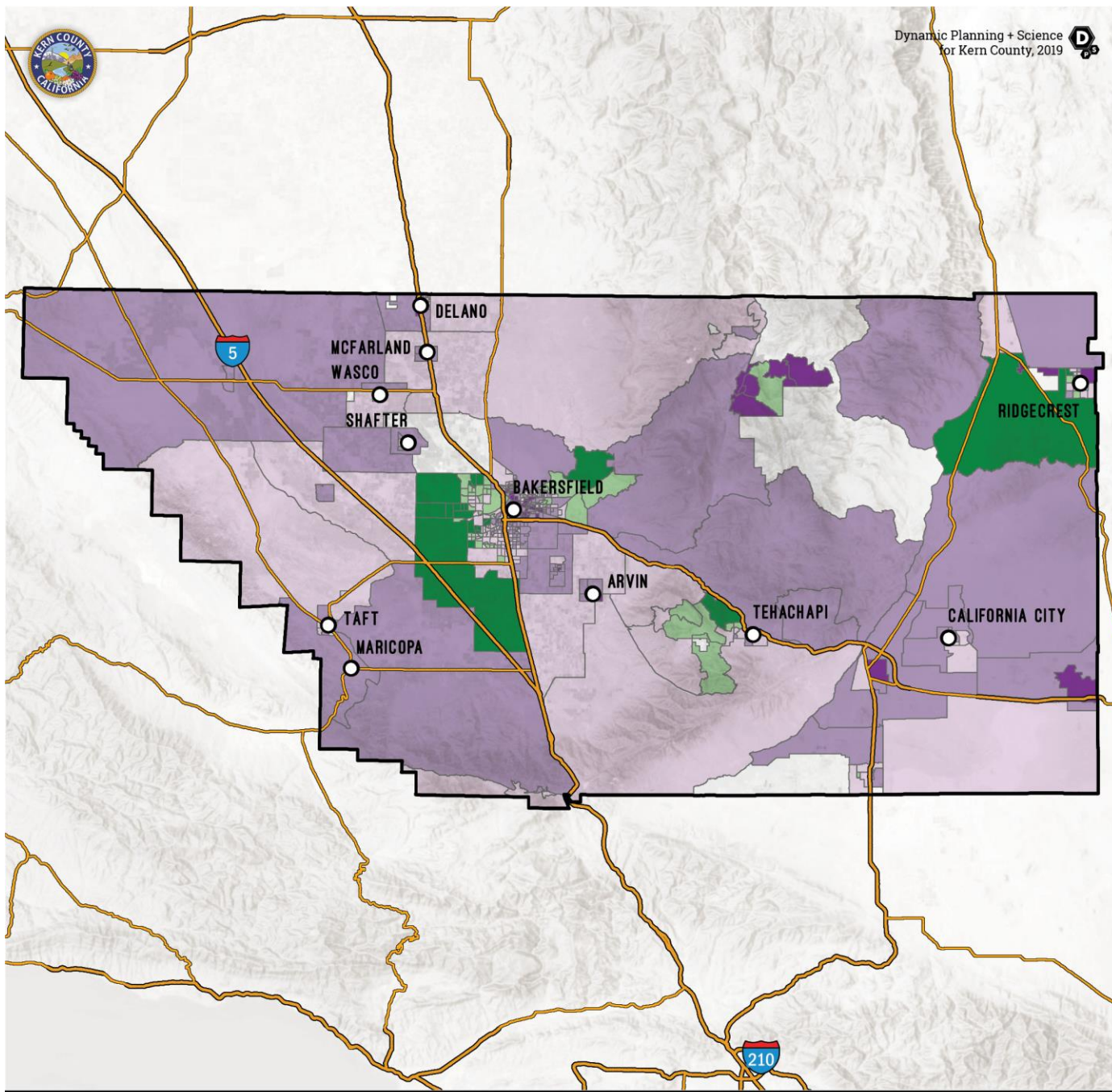
Additionally, elderly persons are more likely to live in assisted-living facilities where emergency preparedness occurs at the discretion of facility operators. These facilities are typically identified as "critical facilities" by emergency managers because they require extra notice to implement evacuation. Elderly residents living in their own homes may have more difficulty evacuating their homes and could be stranded in dangerous situations.

Lower-income elderly populations are less likely to have access to medical care due to financial hardship and are more likely to need special medical attention which may not be readily available during natural disasters.

In many cases, both children and the elderly depend on others to care for them during day-to-day life. Very young children and the elderly may be vulnerable to injury or sickness; this vulnerability can be worsened during a natural disaster because they may not understand the measures that need to be taken to protect themselves from hazards. They also may be weaker and less able to survive a hazard event.

Finally, both children and the elderly have fewer financial resources and are frequently dependent on others for survival. For these populations to remain resilient before and after a natural hazard event, it may be necessary to assist residents with resources provided by the County, Cities, State and Federal emergency management agencies and organizations.

Based on the 2015 American Community Survey, 14% of Kern County's population is 65 or older. The overall age distribution for Kern County is illustrated in Figure 4-4 for population under 18 and Figure 4-5 for population over 65. Figure 4-5 shows that the highest concentrations of people over the age of 65 are east of Arvin. (United States Census Bureau, 2015)



MEDIAN HOUSEHOLD INCOME DISTRIBUTION KERN COUNTY

*Data sources: US Census, ACS.

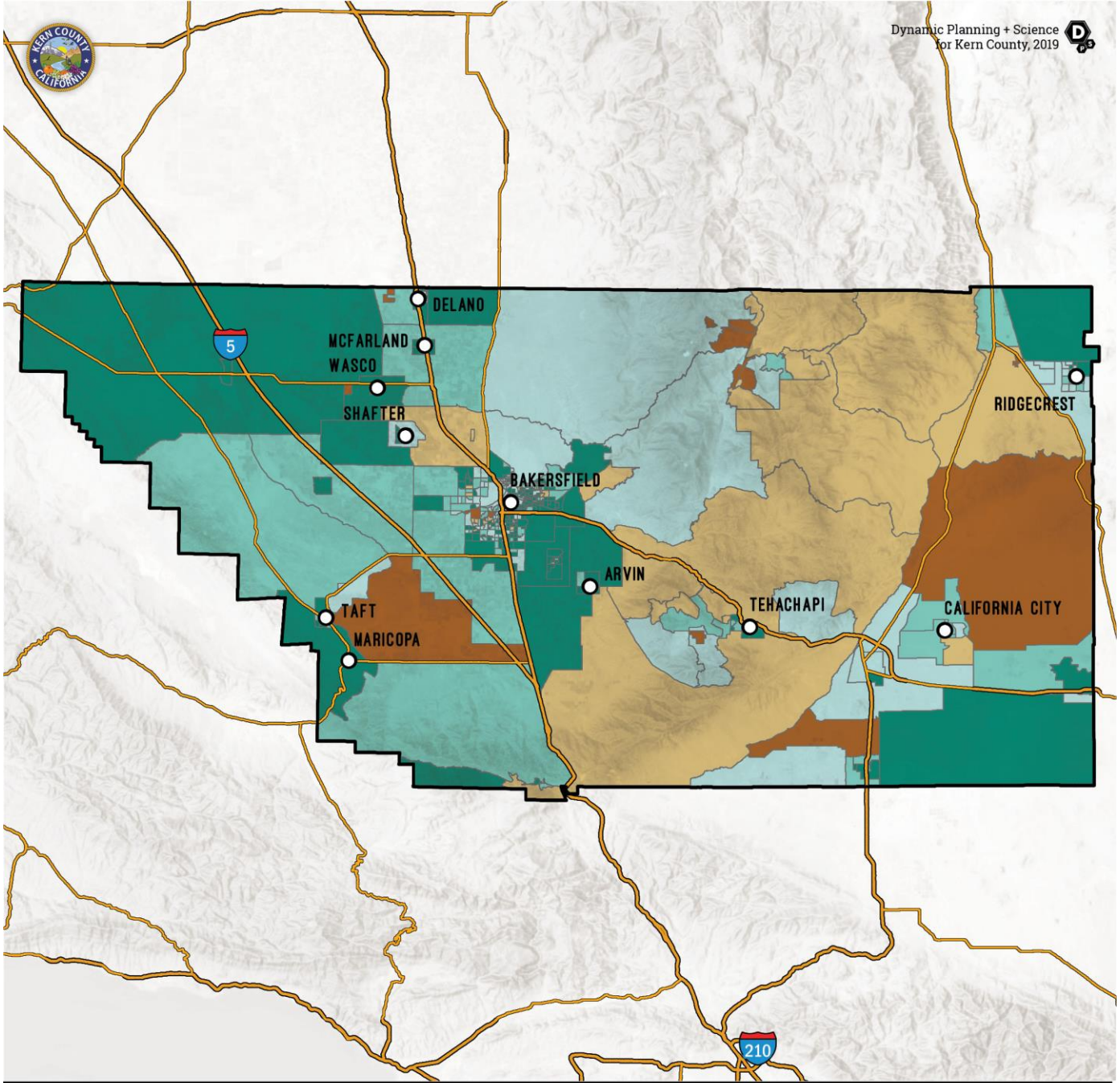
MAP LEGEND



Figure 4-3: Median Household Income Distribution



Dynamic Planning + Science
for Kern County, 2019



POPULATION UNDER AGE 18 KERN COUNTY

*Data sources: Census ACS 2015 5-year estimates, percentage of total population, quantile classification from countywide sampling.

MAP LEGEND

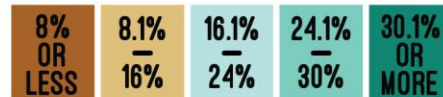
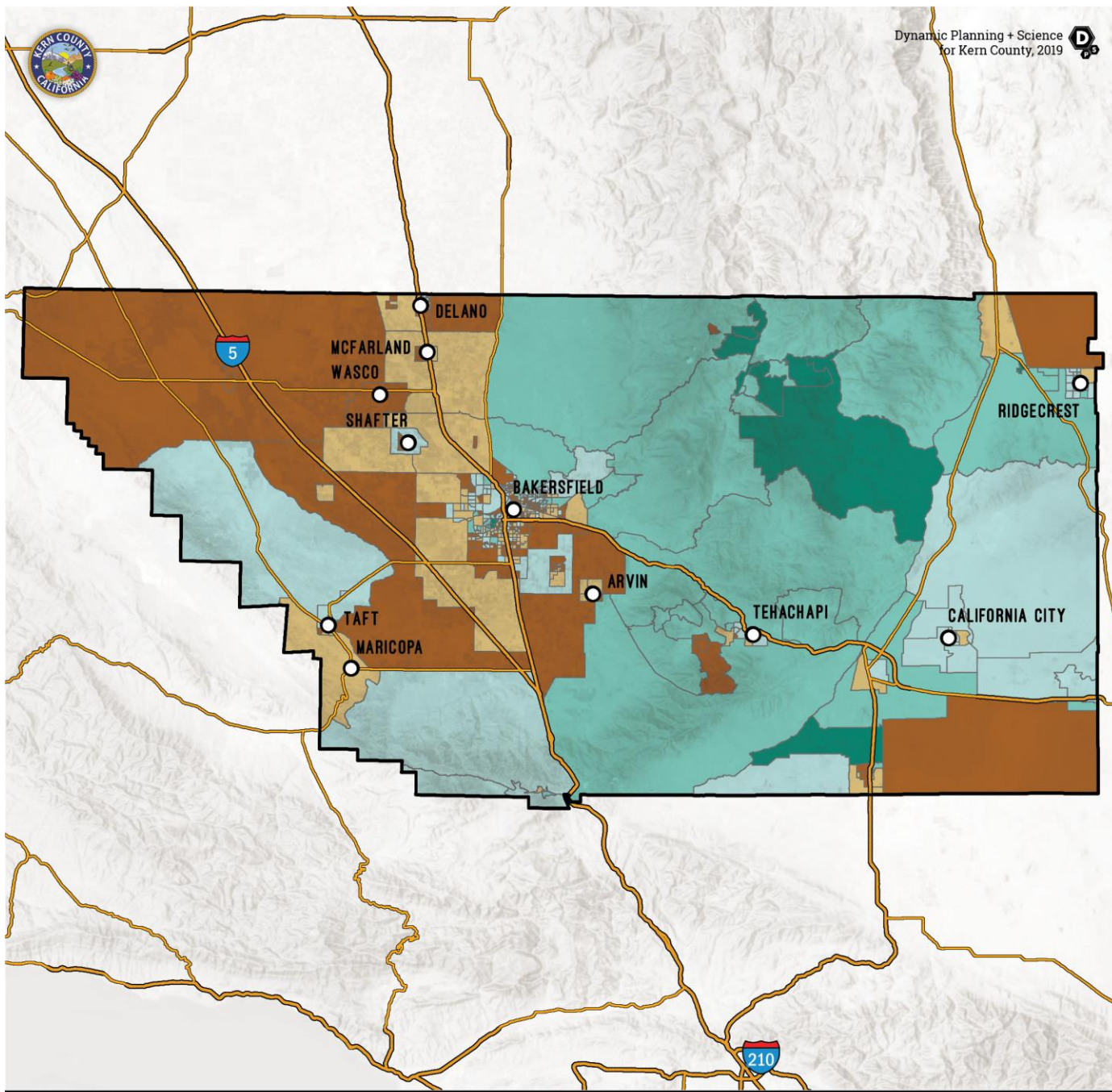


Figure 4-4: Population Under Age 18



Dynamic Planning + Science
 for Kern County, 2019



**POPULATION AGE 65 AND OVER
 KERN COUNTY**

*Data sources: Census ACS 2015 5-year estimates, percentage of total population, quantile classification from countywide sampling.

MAP LEGEND

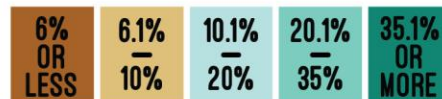


Figure 4-5: Population Over Age 65



4.3.3.3 Race, Ethnicity and Language

Non-English or limited-English speakers may have difficulty understanding emergency information as a result of language and literacy barriers. Non-white communities in fire-prone areas appear from research to be less able to adapt to a wildfire event. (Levin, Phil; Davies, Ian, 2019) Another study found that communities of color lose up to \$29,000 on average in personal wealth following events like hurricanes and wildfires. (Mandel, How Natural Disasters Widen the Wealth Gap Between Minority and White Communities, 2018) Since higher proportions of ethnic minorities live below the poverty line than the majority white population, poverty can compound vulnerability. Farm workers may be particularly vulnerable during a hazard event, especially those non-English speaking and those living in temporary worker housing. (California Employment Development Department, 2019) . (U.S. Dep't of Ag, 2017)

According to the 2017 American Community Survey estimates, Kern County is predominately white, at 75.1% of the total population. The largest minority population is Hispanic or Latino, at 52% of the total county population. This percentage includes other applicable race categories. See Figure 4-6 for the racial distribution within Kern County and a source note explaining the percentage estimates.

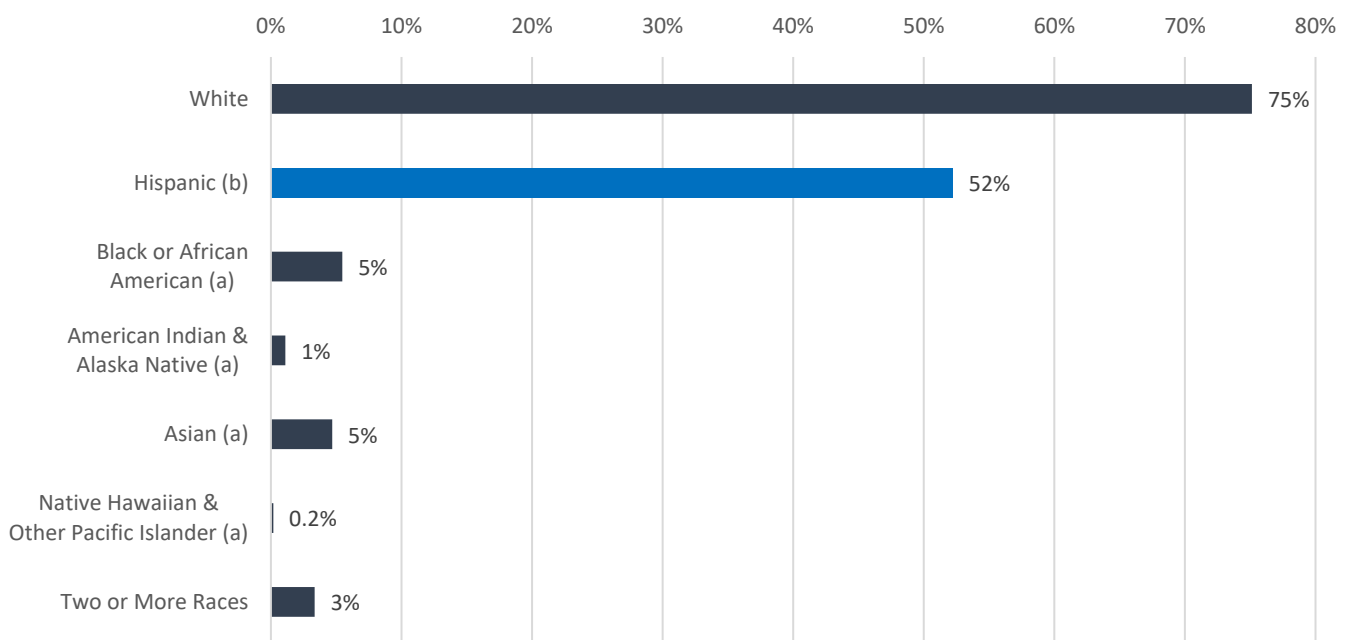


Figure 4-6: Kern County Race Distribution in 2017

Source: 2017 American Community Survey

Note: Hispanics may be of any race, so are included in applicable race categories. This has the effect of influencing total population percentage. (a) Includes persons reporting only one race. (b) Hispanics may be of any race, so also are included in applicable race categories



4.3.3.4 At-risk Individuals with Access and Functional Needs

Another vulnerable population is individuals with access and functional needs that may interfere with their ability to access or receive medical care before, during, or after a disaster or emergency. Irrespective of specific diagnosis, status, or label, the term “access and functional needs” refers to a broad set of cross-cutting access and function-based needs, generally distinguished into **access-based** or **function-based** needs according to the following:

- **Access-based needs** require that resources are accessible to all individuals, such as social services, accommodations, information, transportation, and medications to maintain health.
- **Function-based needs** refer to restrictions or limitations an individual may have that requires assistance before, during, and after a disaster or public health emergency.

At-risk individuals may have additional needs that must be considered in planning for, responding to, and recovering from a disaster or emergency. A recommended approach for integrating the access and functional needs of these individuals is to consider elements based on the CMIST (defined below) Framework:

- **Communication** – Individuals who may have limitations that interfere with the receipt of and response to information require information be provided in an appropriate and accessible format. This can include individuals who are deaf or hard of hearing, individuals who speak American Sign Language, individuals who have limited or no English proficiency, individuals who are blind or have low vision, and individuals who have cognitive or physiological limitations.
- **Maintaining Health** – Individuals who may require Personal Assistance Services (or personal care assistance) in maintaining their activities of daily living such as eating, dressing, grooming, transferring, and toileting.
Independence – Includes individuals who function independently if they have their assistive devices, such as consumable medical supplies (diapers, formula, bandages, ostomy supplies, etc.), durable medical equipment (wheelchairs, walkers, scooters, etc.), and/or service animals.
- **Services and Support** – Includes support for individuals with behavioral health needs, those who have psychiatric conditions (such as dementia, Alzheimer's disease, Schizophrenia, severe mental illness), pregnant women, nursing mothers, infants, and children.
- **Transportation** – Includes individuals with transportation needs because of age, disability, temporary injury, poverty, addiction, legal restriction, or those who do not have access to a vehicle. This requires coordination to ensure access to mass transit and accessible vehicles such as para-transit. (Services, 2016)

While most individuals with access and functional needs do not have acute medical needs requiring the support of trained medical professionals, many will require assistance to maintain health and minimize preventable medical conditions. These individuals may require more time and assistance during an evacuation. It is estimated that over 38% of people over age 65 have some form of disability, as shown in



Table 4-4. (United States Census Bureau, 2018) These numbers warrant special attention from planners and emergency managers.

Table 4-4: Disability Status of Non-Institutionalized Population in Kern County in 2017

Age	Persons with a Disability	Percent of Age Group
Under 18 years	9,279	4
18 to 64 years	52,065	10
Age 65 years and over	34,097	40

Source: 2017 American Community Survey

4.3.4 Economy

Agriculture has been Kern County's number one industry for many years. Kern County ranks in the top four California counties in agricultural production. Kern County became the leading county with an agricultural production value of \$7.19 billion in 2016. (California Department of Food and Agriculture, 2017) Leading export commodities include almonds, apples, carrots, cotton, garlic, grapes, onions, oranges, pistachios, plums, and roses. These commodities are exported to over 85 foreign countries. The Pacific Rim, including China, Hong Kong, Japan, Republic of Korea, Australia, Canada, India, Vietnam, and the Philippines, receive most of the exported commodities. (2017 Kern County Agricultural Crop Report, 2017)

Kern County had the most farm workers in California in 2016, totaling 150,300, defined by an individual having at least one farm job. In Kern County, the number of farmworkers rose 25% in 2015. (University of California, 2019) The leading sectors of farm employment in Kern County include farm labor contractors (97,900), tree nut farming (11,800), grape vineyards (11,300), other vegetables and melon farming (3,100), and other non-citrus fruit farming (3,000).

A high percentage of farmworkers in Kern County are estimated to be migrant workers. Some of these farm workers may not have proper documentation to be working in the U.S. and may be more hesitant to seek aid or ask questions to properly prepare for a hazard event because of their immigration status. Farmworkers in Kern County are paid an average wage significantly below the national average. In 2014, the average annual wage in the Kern County food system was \$24,182, compared to \$43,737 for all industries. (Sustainable Agriculture Research and Education Program, 2017)

Kern ranks as the largest oil-producing county in the state, with most of the 30,000 working oil wells studding the hills along the western edge of the County. In the desert to the east, the military plays an important role as the home to Edwards Air Force Base and the China Lake Naval Weapons Center. Edwards Air Force Base ranks among the best-known military installations in the country, being the site of many space shuttle landings, and the place where Air Force test pilots push the limits of aircraft under development.

The population centers of Kern County generally correlate with the economic bases for the regions.



Bakersfield, the county seat, is home to over one-third of the County's residents and has seen continued economic growth. Ridgecrest, Tehachapi, and Mojave in the east are aligned with military installations that provide employment. Eastern Kern County is known as a space industry employer. Rosamond provides reasonably priced homes to Los Angeles commuters. Taft and other smaller communities in the southern area of Kern are contiguous to large petroleum fields that have been in operation since the early 1900's. Lamont, Arvin, Delano, Shafter, and Lost Hills provide services and homes to the workers who labor in the fields of the large farms and ranches in the county.

The Kern economy can fluctuate more than other counties because of the cyclical nature of the agricultural, military support, and petroleum industries that comprise the largest segments of the Kern economy. Kern County, CA, had the largest percentage decrease in GDP (-0.7 percent). The mining, quarrying, and oil and gas extraction industry (primarily oil and gas extraction) was the leading contributor to the decrease. (United States Bureau of Economic Analysis, 2018) 2017 unemployment in the County was at 11%. (US Census Bureau, 2017) According to the Bureau of Labor Statistics, in Dec 2019 there were 357,700 jobs in all industries in Kern County. Table 4-5 shows the number of jobs by sector in the County of the top ten occupations in 2018. The top sectors farming, fishing, and forestry related, office and administrative support occupations related, and sales and related occupations.

Table 4-5: Top 10 Jobs by Occupation in Kern County¹ in May 2018

Occupation	Percent of total employment (in %)	Mean hourly wage (in \$)
Farming, Fishing, and Forestry	13.3	11.77
Office and Administrative Support Occupations	11.7	18.43
Sales and Related Occupations	8.1	17.96
Food Preparation and Serving Related	7.8	12.95
Education, Training, and Library Occupations	7.5	31.65
Transportation and Material Moving	7.0	18.69
Construction and Extraction	5.4	25.72
Healthcare Practitioners and Technical Occupations	4.8	40.66
Installation, Maintenance, and Repair	4.3	24.75
Production Occupations	3.8	18.84
Management Occupations	3.7	54.56

¹ The Bureau of Labor Statistics refers to Kern County as the "Bakersfield, California Metropolitan Statistical Area."

Source: Bureau of Labor Statistics, May 2018, https://www.bls.gov/regions/west/news-release/occupationalemploymentandwages_bakersfield.htm.

4.3.5 Past and Future Trends in Development

Kern County has long been on the forefront of planning for the preservation of agricultural lands and intends to remain leaders in planning for a sustainable future. Kern County has retained its prime agricultural lands in production, even while vast tracts of farmland in other parts of the state have been



urbanized. Looking to the future, there are a number of demographic and land use trends relating to housing, population, and employment issues.

Past development that most increased the risk of hazards in the County happened many decades and even more than a century ago. The County and other participating jurisdictions are well aware of areas of increased hazard risk through older development.

More recently, development in the last few decades has occurred with minimized hazard risk because of existing overlay of federal, state, and local regulation. First, the County and its municipal planning partners all adopt general plans (GPs) which serve as blueprints for establishing long-range development policies, as directed with California's General Planning Law. A GP provides a basis for private development proposals and public projects to remain consistent with existing city, regional and state policies. The GP is designed to help the County and participating jurisdictions address issues related to land use, circulation (traffic), housing, open space, conservation, noise, and safety. The Land Use portion of the plan helps guide the County and participating jurisdictions in determining the location of future development(s), to include possible future annexations for municipal jurisdictions. The Safety Element of the GP serves to decrease risk of impact from natural hazards through multiple required elements and subsection most importantly through the health and safety as required by the California State Law.

All planning partners reviewed their general plans under the capability assessments undertaken for this hazard mitigation plan. Deficiencies revealed by these reviews are identified as mitigation actions to decrease risks to move beyond past trends.

Moreover, while past development has occurred in hazard areas to some degree, increasing hazard risks, development standards and performance measures, often times incorporated into specific plans, policy plans, and master plans, are employed to reduce risk. These development standards are continually improving and will continue to strengthen into the future.

The total housing units forecast for Kern County includes occupied and vacant housing units. Current methodologies utilized for estimating housing trend predictions include projections based on jobs-to-housing ratios. These models indicate that the region's housing stock will increase by about 1.2 percent per year, but multifamily housing will grow faster, by about 2.3 percent per year, compared to 0.9 percent per year for single family housing. Population forecasts indicate that the County's household population (those living in households) will increase annually by about 1.8% whereas its group quarters population (those living in institutional settings, primarily correctional facilities, college dormitories, and nursing homes) will increase by about 1.1% annually between 2015 and 2050. (Kern Council of Governments, 2015)

Current employment forecasts predict a lower level of growth in the farming sector over the next 35 years. This reflects the potential impact of water supply constraints and the potential conversion of farmland to other uses such as habitat conservation, water recharge, solar, and urban development. The forecast does show an increase in the mining, logging, and oil and gas exploration and extraction sector. Employment in this sector is almost exclusively in oil and gas. Employment in this sector could vary based on the



consistency of oil prices. Total employment forecasts predict an upward trend in growth. (Kern Council of Governments, 2015)

General trends in development indicate a growth pattern which began in 2010 and was reaffirmed in 2013 by a more robust housing market. Wise public policies and social trends explain the healthier trend. For instance, there was federal intervention in the mortgage market and rising incomes. The federal government changed housing finance patterns which consequently influenced how housing was built, bought, and sold in the United States. Additionally, migration patterns help to explain demographic forecasts in the San Joaquin Valley. These trends explain development patterns among many of the Counties in the Valley, including Kern County. (Kern Council of Governments, 2015)

Participating jurisdictions have gone to great lengths to ensure future development within hazard areas is minimized and mitigated to the greatest extent possible. Section 5.3 (Capabilities Assessment) of Volume 1 for the County and each jurisdiction's capabilities assessment of Volume 2 of this MJHMP explain those proactive steps in greater detail. Buildings are increasingly more resilient to hazards through California's building codes, some of the strongest in the country. Nationally, building codes have continually improved disaster resilience, and since 1990 those great improvements have only added about 1% to construction costs. (National Institute of Building Sciences, 2019)



4.4 Vulnerability Assessment Methods

This section provides an overview of the methods used in the vulnerability assessments in Section 4.5. Vulnerabilities to each hazard are assessed in a two-step process, as outlined in this section. First, population, critical facilities, and county parcels are inventoried to develop a “lay of the land.” Second, the inventories are used to calculate estimated exposure and damage from hazards at various levels of severity. A more detailed explanation of the methodology is included in Appendix A.

The vulnerability assessment utilizes geospatial data along with local knowledge of past events. Geospatial data is essential in determining population and assets exposed to hazards identified in this plan. Geospatial analysis can be conducted if a natural hazard has a spatial footprint that can be analyzed against the locations of people and assets. In Kern County, dam failure, earthquake, flooding, landslide, soil subsidence, and wildfire have identifiable geographic extents and corresponding spatial information about each hazard.

Figure 4-7 illustrates the data inputs and outputs used to create the vulnerability analyses for each hazard in Section 4.5.

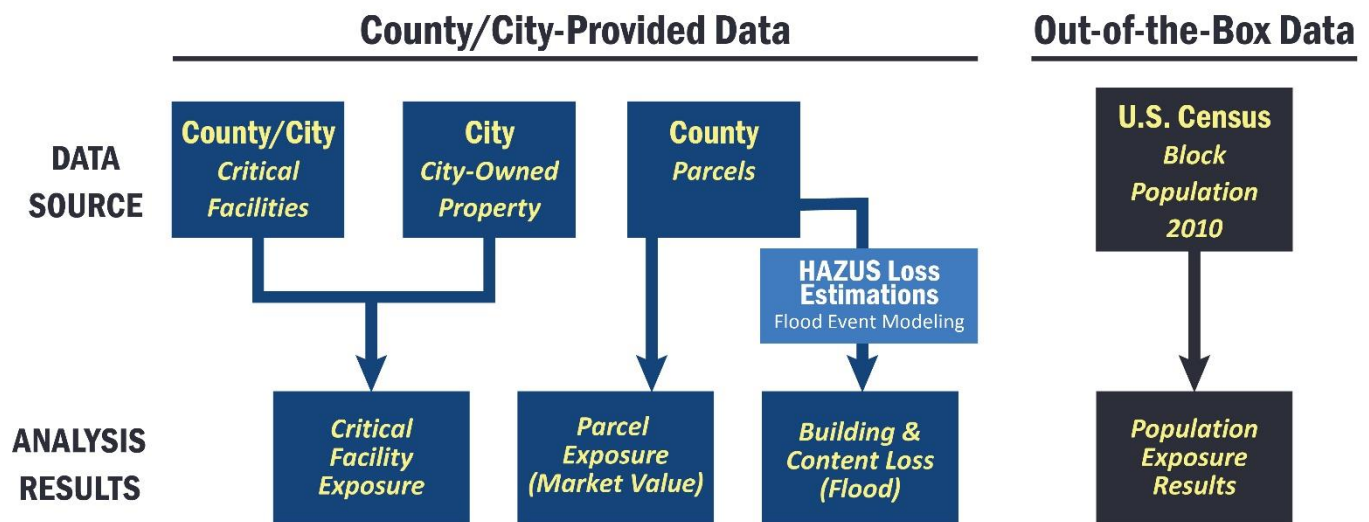


Figure 4-7: Data Source and Method

4.4.1 Population and Asset Inventory

In order to describe vulnerability for each hazard, it is important to first understand the total population and total assets at risk. The population and asset inventories provide a baseline to measure the significance or vulnerability to people and assets for natural hazard events. The asset inventories can also be used to estimate damages and losses expected during a “worst case scenario” event for each hazard. The following sections provide a description of the total population, critical facilities, and parcel inventory inputs.



4.4.1.1 Population

An initial step in producing the hazard-specific vulnerability assessments is to determine the population near each natural hazard. Each natural hazard scenario affects the County residents differently depending on the location of the hazard and the population density of where the hazard event could occur. For hazards that potentially affect the whole county such as earthquake or drought, the vulnerability assessment assumes 896,764 persons or 100% of the County's population is exposed.² Vulnerability assessments presented in Section 4.5 summarize the population exposure for each natural hazard if available.

4.4.1.2 Critical Facilities Inventory

Critical facilities are of particular concern when planning to mitigate hazards. A critical facility is a structure or other improvement that, because of its function, size, service area, or uniqueness, has the potential to cause disruption of vital socioeconomic activities if it is destroyed, damaged, or functionally impaired.

Critical facilities inventory data was developed from a variety of sources, including County, City, District, State, Federal, and private industry datasets. A critical infrastructure spatial database was developed to translate critical facilities information into georeferenced³ points and lifelines.

Critical facility points include police stations, fire stations, hospitals, elder care facilities, day care facilities, buildings containing hazardous materials (HAZMAT), schools, transportation infrastructure, utilities, and government buildings. **Lifelines** include communication, electric power, liquid fuel, natural gas, and transportation routes. A current representation of the critical facility points and lifelines are provided in Figure 4-8. Some critical facility information has been omitted from this document due to national security purposes.

Critical facilities and transportation and lifeline data came from a collection of sources, including but not limited to Kern County GIS, Kern County and local jurisdiction insurance data, California Department of Social Services (CDSS), California Energy Commission (CEC), Federal Communications Commission (FCC), Hazus, U.S. Army Corps of Engineers (USACE), FEMA, and National Park Service (NPS). All data sources have a level of accuracy acceptable for planning purposes. Due to the sensitivity of this information, a detailed list of facilities is not provided. The list is on file with each planning partner. The risk assessment for each hazard qualitatively discusses critical facilities with regard to that hazard.

² Population estimates were derived from 2018 Census American Community Survey (ACS) information.

³ To georeference something means to define its existence in physical space. That is, establishing its location in terms of map projections or coordinate systems. The term is used both when establishing the relation between raster or vector images and coordinates, and when determining the spatial location of other geographical features.



4.4.1.3 Parcel Value Inventory

The Kern County Assessor’s data is essential to developing parcel values exposed to each hazard and includes current fair market value of at-risk assets. Kern County Parcel Value Inventory is summarized in Table 4-6. This table only includes parcels that are located in unincorporated Kern County. The Parcel Value Inventory includes market value,⁴ content replacement value, and total assessed value (“total value”), and each hazard profile outlines predicted impacts to this inventory for each hazard’s geographic extent. These elements are called out in the table because, in the event of a disaster, the value of the infrastructure or improvements to the land is usually the focus of concern. Generally, the land is not a total loss, and structures can be rebuilt or contents replaced.

“Total market value” as presented in this plan reflect Kern County Assessor data including fair market value where available. If no fair market value was available for a given property, the value reflects the assessed improvement value.

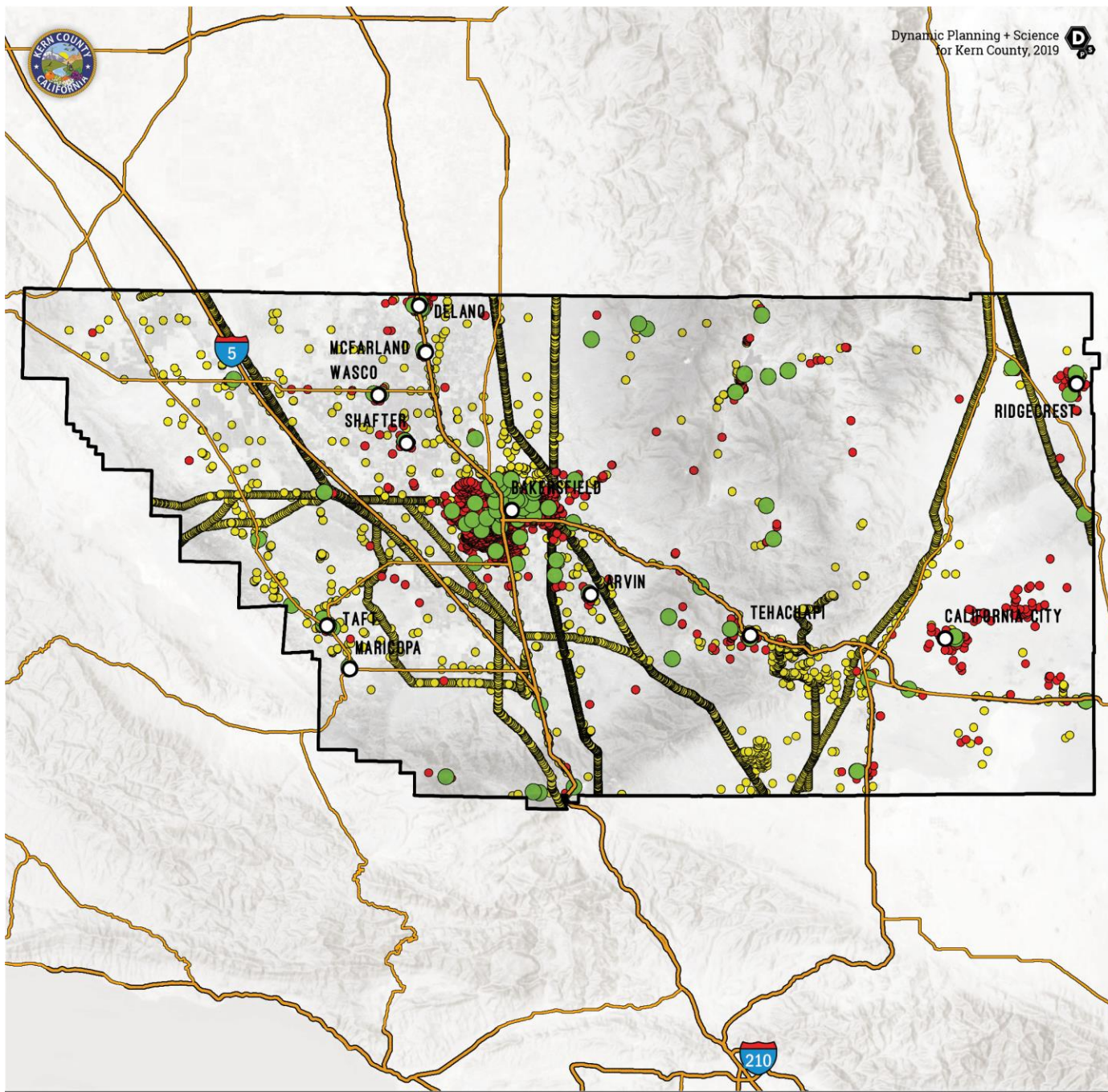
“Total content value” was calculated based on assessor’s use codes, translated to occupancy-based multipliers. Each occupancy class prescribes a specific content cost multiplier used to calculate the content cost values shown in the summary and in the hazard profiles in Section 4.5. Occupancy-based content cost multipliers used in this plan reflect those found in the FEMA Hazus 4.2 technical manuals.

Table 4-6: Parcel Counts and Value

	Total Parcels	Total Market Value (\$)	Total Content Value (\$)	Total Value (\$)
Unincorporated County	91,455	\$ 10,906,675	\$ 5,453,338	\$16,360,013

Currency in Thousands. Total market value as provided by County Assessor’s Office. Content value calculated using content multipliers per Hazus occupancy classes per county land use designation. Total value is the sum of total market value and total content value.

⁴ Market Value Includes a long-term asset which indicates the cost of the constructed improvements to land, such as buildings, driveways, walkways, lighting, and parking lots.



CRITICAL FACILITIES KERN COUNTY

*Data sources: CDSS, USACE, OSM, NBI, FCC, FEMA, CEC, Kern County, HAZUS.

MAP LEGEND

- ESSENTIAL FACILITIES
- HIGH POTENTIAL LOSS
- TRANSPORTATION AND LIFELINE
- ◆ HAZMAT

Figure 4-8: Critical Facilities in Kern County



4.4.2 Hazard Exposure and Damage Estimation

The population and inventory information are used to generate specific exposure and damage estimations based on the severity of specific hazard events. The hazards in Kern County which have known geographic extents and corresponding spatial information, and thus have exposure and damage estimations, are:

- earthquake,
- flooding,
- slope failure,
- soil subsidence,
- dam failure, and
- wildfire.

Population and Asset Exposure

“Exposure” of assets and population refers to the total counts of parcels, people, facilities, and assets within the planning area in which a hazard event may occur. A natural hazards overlay was developed to reflect the combination of many known natural hazard spatial footprints. The spatial overlay method enables summarization of building values, parcel counts, population exposure, and critical facility exposure within a hazard’s geographic extents. Figure 4-9 illustrates hypothetical flooding exposure. Exposure numbers were generated using Kern County Assessor, address point, and parcel data for replacement and content cost estimates.



Figure 4-9: Hazard Exposure Explanation Graphic

Damage Estimation

For flood and earthquake, detailed damage estimations were conducted through FEMA’s Hazus software. Hazus is a nationally applicable, standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. Hazus uses Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disasters. The estimated damage and losses provided by the Hazus Software is a based upon chosen severity of events and provides the ability to understand possible widescale damage to buildings and facilities.



In the hypothetical geography shown in Figure 4-10, even though both structures are exposed to flooding, it is expected that the structure with a first floor height below the depth of flooding will receive significantly more damage than the structure with a first floor height above the expected water depth. For a more detailed explanation on risk assessment methods, see Appendix A.

At-risk populations, critical infrastructure, improved parcels, and loss results for each hazard category are provided in bar chart summary tables in Section 4.5 to evaluate the percentage of assets exposed to different types of hazards. The side-by-side comparison allows participating jurisdictions to evaluate impacts of potential hazards to prioritize hazard mitigation energy and resources.

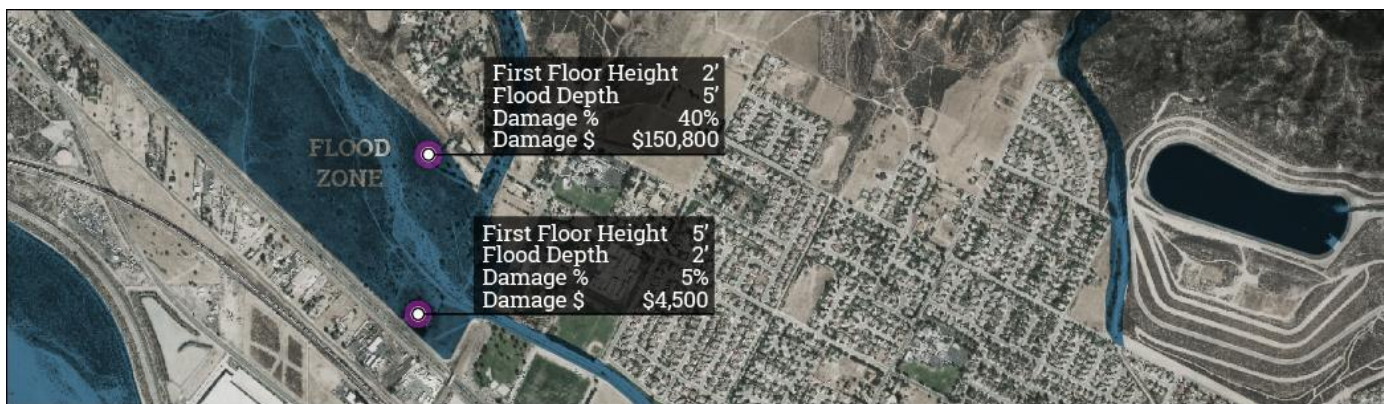


Figure 4-10: Hazus Damage Estimation Example



4.5 Vulnerability to Specific Hazards

This section introduces prevalent hazards within the unincorporated portions of Kern County and analyzes how each may affect populations, property, and critical facilities within the County’s jurisdiction. Importantly, the hazard mitigation strategy presented in Section 5 is informed by, and responds to, the particular vulnerabilities outlined in this section. The mitigation strategy provides prescriptions or actions to achieve the greatest reduction of vulnerability based on this section, which results in saved lives, reduced injuries, reduced property damage, and protection for the environment in the event of a natural hazard. Methods for calculating exposure and loss estimates are described in Section 4.4 and Appendix A.

This section provides quantifiable exposures to people and property and also contains damage and loss estimates for the unincorporated portions of the County. Participating Jurisdiction Annexes in Vol. 2 of this plan contain specific vulnerabilities to hazards. This section provides information for the following hazards that were prioritized by the MJHMP Planning Committee:

Severe Weather

SECTION 4.5.1



Flood

SECTION 4.5.2



Dam Failure

SECTION 4.5.3



Earthquake

SECTION 4.5.4



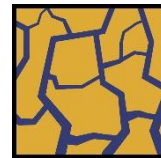
Wildfire

SECTION 4.5.5



Drought

SECTION 4.5.6



Slope Failure

SECTION 4.5.7



Soil Stability

SECTION 4.5.8





4.5.1 Severe Weather Hazard Profile

Severe weather refers to any dangerous meteorological phenomena with the potential to cause damage, serious social disruption, or loss of human life.

Severe weather events can be categorized into two groups: those that form over wide geographic areas are classified as general severe weather; those with a more limited geographic area are classified as localized severe weather. Severe weather, technically, is not the same as extreme weather, which refers to unusual weather events at the extremes of the historical distribution for a given area. (Crop Insurance Solutions, n.d.)



The MJHMP Planning Committee identified three types of severe weather events that typically impact Kern County: high wind, winter weather, and high heat. Thunderstorms are not highlighted as a severe weather hazard on their own, as the primary impact of thunderstorms is the potential spread of wildfire, which is described in detail in Section 4.5.5.

The following are characteristics of severe weather events that can occur in Kern County.

High Wind

Damaging winds are classified as those exceeding 60 mph. Damage from such wind accounts for half of all severe weather reports in the lower 48 states and is more common than damage from tornadoes. Wind speeds can reach up to 100 mph and can produce a damage path extending for hundreds of miles. There are seven types of damaging winds:

- **Straight-line winds**—Any thunderstorm wind that is not associated with rotation; this term is used primarily to differentiate from tornado winds. Most thunderstorms produce some straight-line winds as a result of outflow generated by the thunderstorm downdraft.
- **Downdrafts**—A small-scale column of air that rapidly sinks toward the ground.
- **Downbursts**—A strong downdraft with horizontal dimensions larger than 2.5 miles resulting in an outward burst or damaging winds on or near the ground. Downburst winds may begin as a microburst and spread out over a wider area, sometimes producing damage similar to a strong tornado. Although usually associated with thunderstorms, downbursts can occur with showers too weak to produce thunder.
- **Microbursts**—A small concentrated downburst that produces an outward burst of damaging winds at the surface. Microbursts are generally less than 2.5 miles across and short-lived, lasting only 5 to 10 minutes, with maximum wind speeds up to 168 mph. There are both wet and dry microbursts. A wet microburst is accompanied by heavy precipitation. Dry microbursts, common in places like the high plains and the intermountain west, occur with little or no precipitation reaching the ground.



- **Gust front**—A gust front is the leading edge of rain-cooled air that clashes with warmer thunderstorm inflow. Gust fronts are characterized by a wind shift, temperature drop, and gusty winds out ahead of a thunderstorm. Sometimes winds push up air above them, forming a shelf cloud or detached roll cloud.
- **Derecho**—A derecho is a widespread thunderstorm wind caused when new thunderstorms form along the leading edge of the boundary formed by horizontal spreading of thunderstorm-cooled air. The word “derecho” is of Spanish origin and means “straight ahead.” Thunderstorms feed on the boundary and continue to reproduce. Derechos typically occur in summer when complexes of thunderstorms form over plains, producing heavy rain and severe wind. The damaging winds can last a long time and cover a large area.
- **Bow Echo**—A bow echo is a linear wind front bent outward in a bow shape. Damaging straight-line winds often occur near the center of a bow echo. Bow echoes can be 200 miles long, last for several hours, and produce extensive wind damage at the ground. (The National Severe Storms Laboratory, n.d.)

Extreme Cold / Freeze Events

Extreme cold and freeze events are most likely to occur in Kern County during the months of November-February. Prolonged exposure to the cold can cause frostbite or hypothermia, with infants and the elderly being the most susceptible. Extreme cold can freeze and burst pipes and impair communication facilities. Late or early freeze events can have a devastating effect on agriculture and the economy of the region. Freeze events in Kern County usually occur in the Central Valley and are becoming less exceptional as extreme weather conditions become more common due to climate change.

Hail

Hail occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice. Super-cooled water may accumulate on frozen particles near the backside of a storm as they are pushed forward across and above the updraft by the prevailing winds near the top of the storm. Eventually, the hailstones encounter downdraft air and fall to the ground.

Hailstones grow two ways: by wet growth or dry growth. In wet growth, a tiny piece of ice is in an area where the air temperature is below freezing, but not super cold. When the tiny piece of ice collides with a super-cooled drop, the water does not freeze on the ice immediately. Instead, liquid water spreads across tumbling hailstones and slowly freezes. Since the process is slow, air bubbles can escape, resulting in a layer of clear ice. Dry-growth hailstones grow when the air temperature is well below freezing, and the water droplet freezes immediately as it collides with the ice particle. The air bubbles are “frozen” in place, leaving cloudy ice.

Hailstones can have layers like an onion if they travel up and down in an updraft, or they can have few or no layers if they are “balanced” in an updraft. One can tell how many times a hailstone traveled to the top of the storm by counting its layers. Hailstones can begin to melt and then re-freeze together, forming large, irregularly-shaped, damaging hail.



High Heat / Heat Waves

Heat waves are periods of abnormally hot weather lasting days to weeks. The number of heat waves has been increasing in recent years across the Country and locally. Figure 4-11 displays historical and projected annual average maximum temperature increase in California from 1950 to 2099. Climate change will continue to cause extreme heat events more often. Studies show that by the end of this century, the number of days with temperatures reaching 100°F or more is projected to increase dramatically across the United States as a result of climate change. What the public now considers to be an exceptional event could become routine across much of the country. As temperatures rise and extreme heat events become longer, more severe, and more frequent, experts expect to see more health problems and deaths caused by heat (Center for Disease Control).

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. In a normal year, about 175 Americans succumb to the demands of summer heat. According to the National Weather Service (NWS), among natural hazards, only the cold of winter—not lightning, hurricanes, tornados, floods, or earthquakes—takes a greater toll. (National Weather Service, 2020) 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. (Disasters Are Us, n.d.)

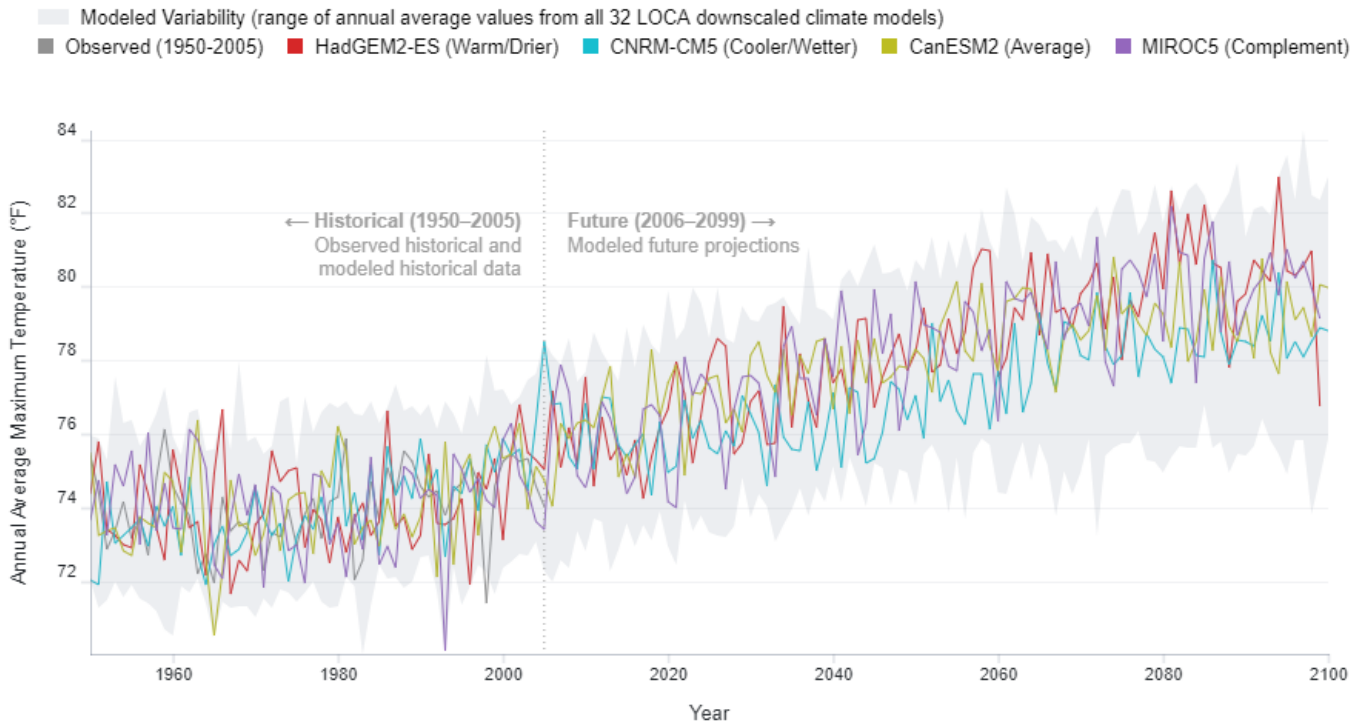
Heat disorders generally have to do with a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds the level the body can remove, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise and heat-related illness may develop. Elderly persons, small children, chronic invalids, those on certain medications or drugs, and persons with weight and alcohol problems are particularly susceptible to heat reactions, especially during heat waves in areas where moderate climate usually prevails. (Canadian Centre for Occupational Health and Safety, 2020)

Heat emergencies are often slower to develop, taking several days of continuous, oppressive heat before a significant or quantifiable impact is seen. Heat waves do not strike victims immediately, but rather their cumulative effects slowly take the lives of vulnerable populations. Heat waves do not cause damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios. While heat waves are obviously less dramatic, they are potentially more deadly. The worst single heat wave event in California occurred in Southern California in 1955, when an eight-day heat wave resulted in 946 deaths. (California Office of Emergency Services, 2008)



Annual Average Maximum Temperature

Data is shown for Kern County, California under the RCP 4.5 scenario in which emissions peak around 2040, then decline.



- Source: Cal-Adapt. Data: LOCA Downscaled Climate Projections (Scripps Institution of Oceanography), Gridded Historical Observed Meteorological Data (University of Colorado, Boulder).
- Four models have been selected by California’s Climate Action Team as priority models for research contributing to California’s Fourth Climate Change Assessment (Pierce et al., 2018). Projected future climate from these four models can be described as producing:
 - A warm/dry simulation (HadGEM2-ES)
 - A cooler/wetter simulation (CNRM-CM5)
 - An average simulation (CanESM2)
 - The model simulation that is most unlike the first three for the best coverage of different possibilities (MIROC5)

Figure 4-11 Historical & Projected Annual Average Maximum Temp Increase

Source: Cal-Adapt



Climate Change

The effects of climate change are varied and include warmer and more varied weather patterns, such as melting ice caps and poor air quality. As a result, climate change will likely worsen a number of natural hazards including severe weather. The effects of climate change on severe weather are most likely to create more frequent and prolonged periods of extreme heat. However, climate change will result in unpredictable temperature fluctuations that could lead to freeze events during the warmer months of the year which could have a devastating effect on agriculture. (United States Environmental Protection Agency, 2016)

4.5.1.1 Plans, Policies, and Regulatory Environment

There are very few formal regulations that pertain directly to severe weather events. The California Building Code,⁵ adopted by Kern County and the participating jurisdictions, is generally adequate to properly address development impacts from severe weather events.

Faulty Weather Protection in Kern County Code, § 1001.7

Kern County Code includes provision for severe weather preparedness having to do with substandard building conditions. Defective housing materials and general conditions demonstrating a lack of weather protection and requiring maintenance or repair include crumbling or loose plaster, ineffective waterproofing of exterior walls, roof or floors, and broken windows.

4.5.1.2 Past Events

Strong wind events and frost or freeze events have been the only type of severe weather events to occur in Kern County since the year 2000 (not high heat). Table 4-7 summarizes extreme weather events in Kern County since 2000, as recorded by the National Oceanic and Atmospheric Administration (NOAA). Strong wind events are most common, resulting in property damage every year since 2000.

Table 4-7: Severe Weather Damage Summary by Year 2000-2019

Year	Total Property Damage Value (\$)	Total Crop Damage Value (\$)
Strong Wind Events		
2002	12,000	0
2003	277,000	0
2004	218,000	0
2005	137,000	0
2006	376,000	112,500
2007	113,500	0
2008	106,900	9,000

⁵ Available at <https://www.dgs.ca.gov/BSC/Codes>.



Year	Total Property Damage Value (\$)	Total Crop Damage Value (\$)
2009	12,800	0
2010	708,000	0
2011	9,000	0
2012	147,000	0
2013	61,000	0
2014	31,000	0
2017	100,000	0
2018	6,000	0
2019	381,000	0
Total	2,696,200	121,500
Frost/Freeze Events		
2001	0	1,100,000
2006	0	5,420,000
2007	150,000	568,600,000
Total	150,000	575,120,000

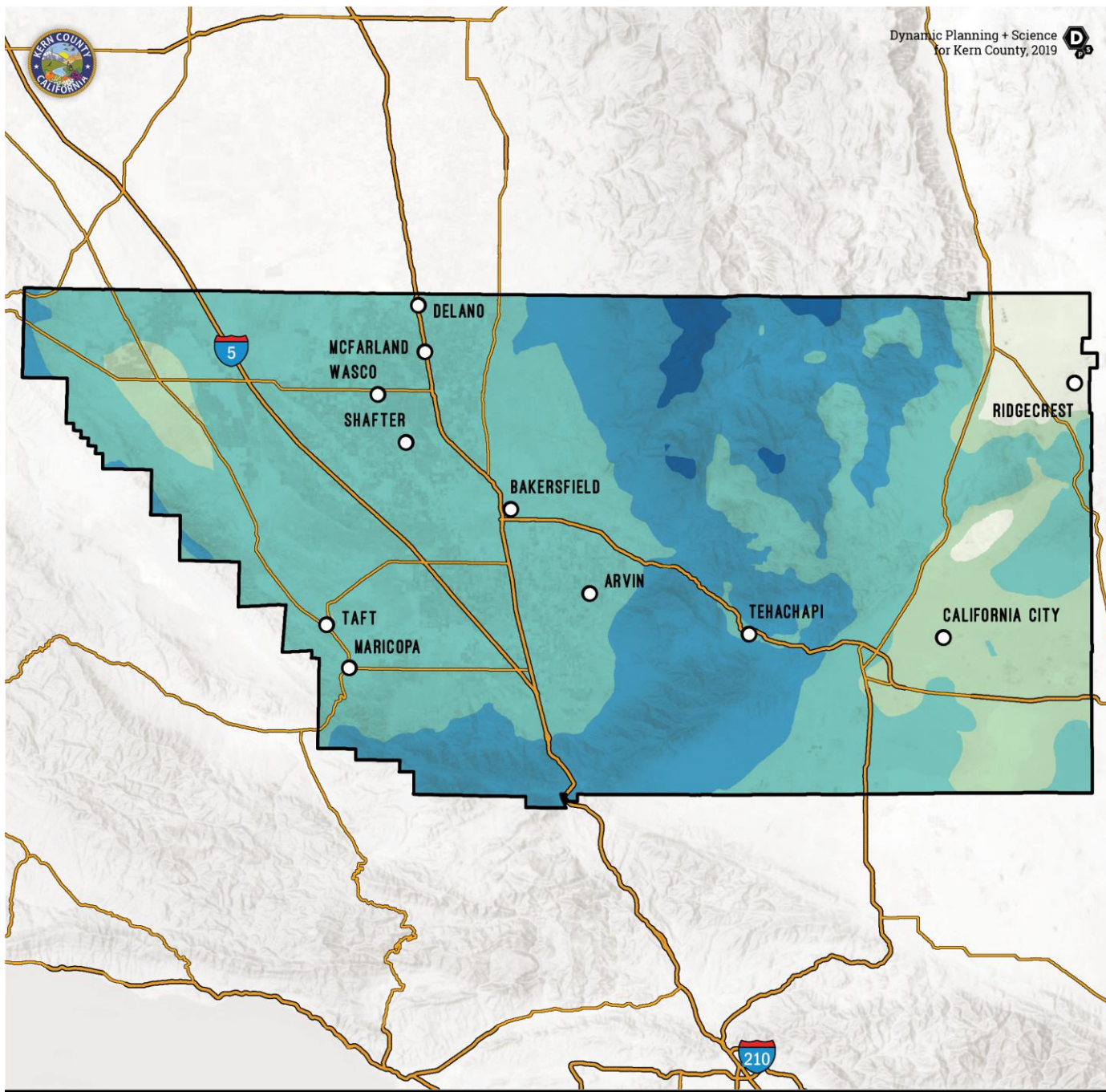
Source: NOAA Storm Events Database

4.5.1.3 Location

Severe weather events have the potential to happen anywhere in the planning area. Communities in the Central Valley are more susceptible to extreme weather and freeze events. Wind events are most damaging to areas that are heavily wooded. The following figures show average weather conditions for Kern County, including:

- Figure 4-12: Average Annual Precipitation,
- Figure 4-13: Normal Maximum Temperatures for July,
- Figure 4-14: Normal Minimum Temperatures for January, and
- Figure 4-15: Annual Average Wind Speed.

Table 4-8 explains further the classes of wind power density shown in Figure 4-15.



**AVERAGE ANNUAL PRECIPITATION
KERN COUNTY**

*Data sources: USDA - 1981-2010 Annual Average Precipitation by State.

MAP LEGEND

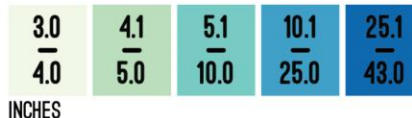
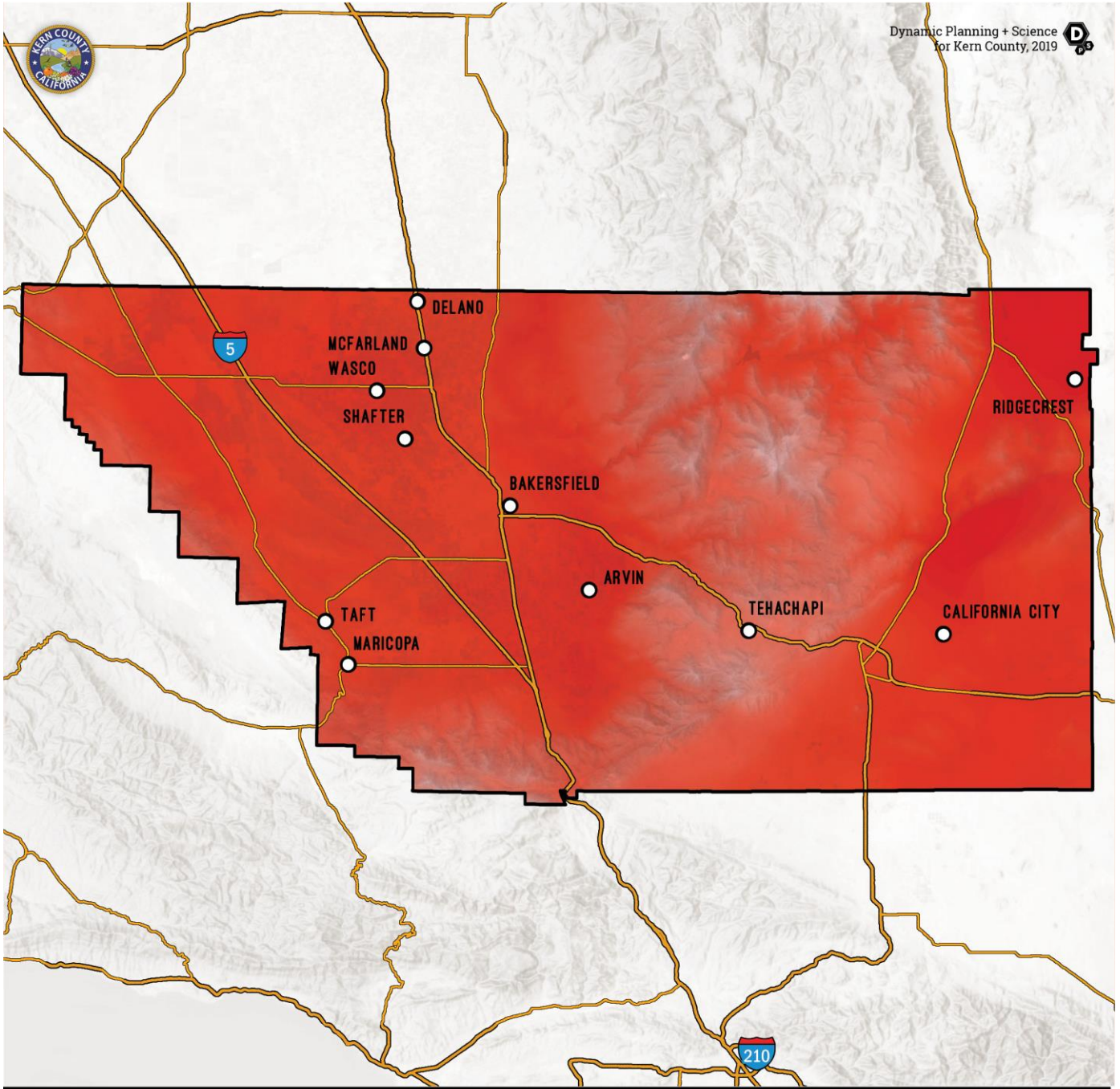


Figure 4-12 Kern County - Average Annual Precipitation



Dynamic Planning + Science
for Kern County, 2019

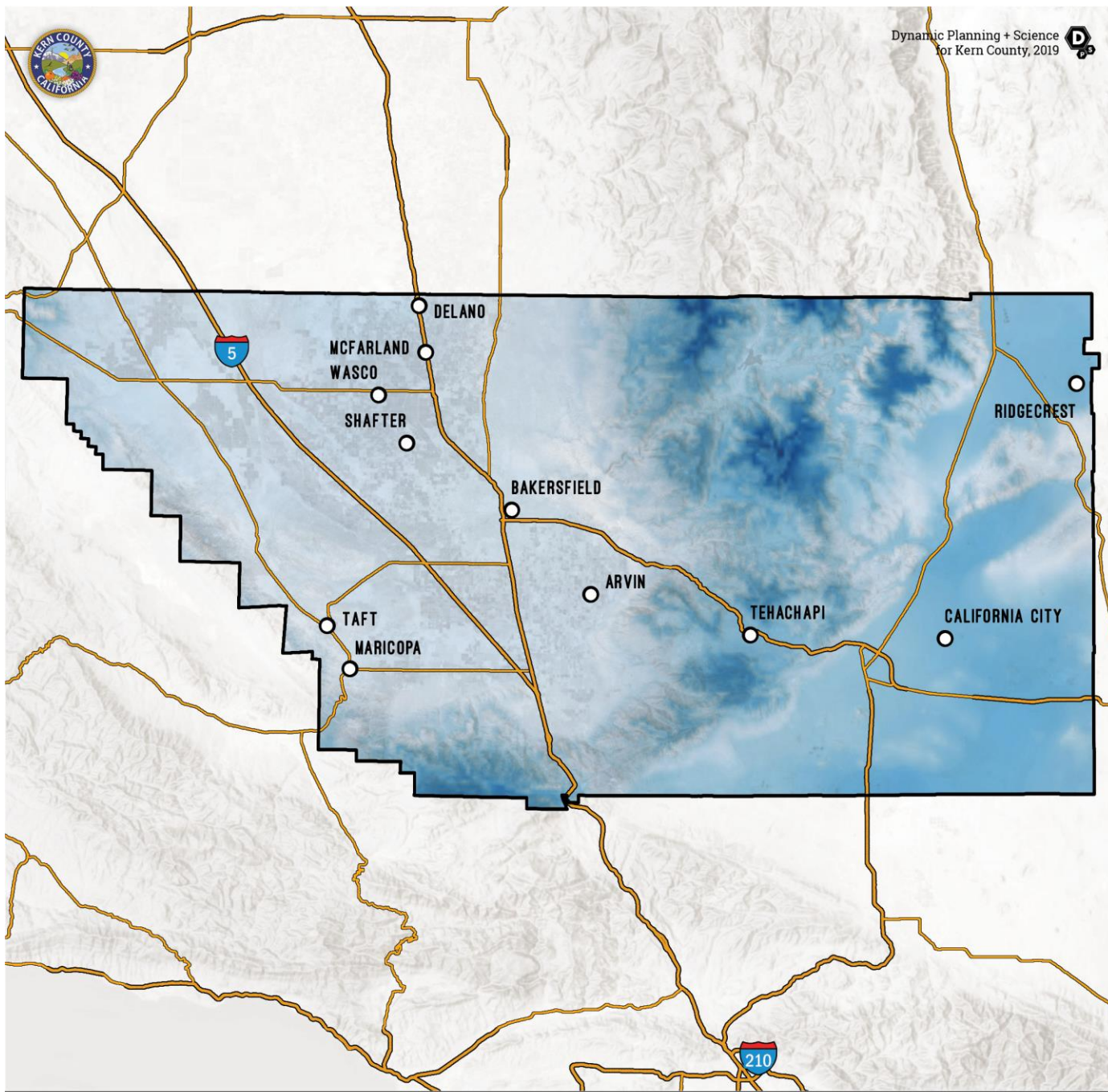
30-YR NORMAL MAXIMUM TEMPERATURE FOR JULY KERN COUNTY

*Data sources: PRISM 800m Resolution 30-YR Normals.

MAP LEGEND



Figure 4-13: 30-YR Normal Maximum Temperature for July



30-YR NORMAL MINIMUM TEMPERATURE FOR JANUARY KERN COUNTY

MAP LEGEND

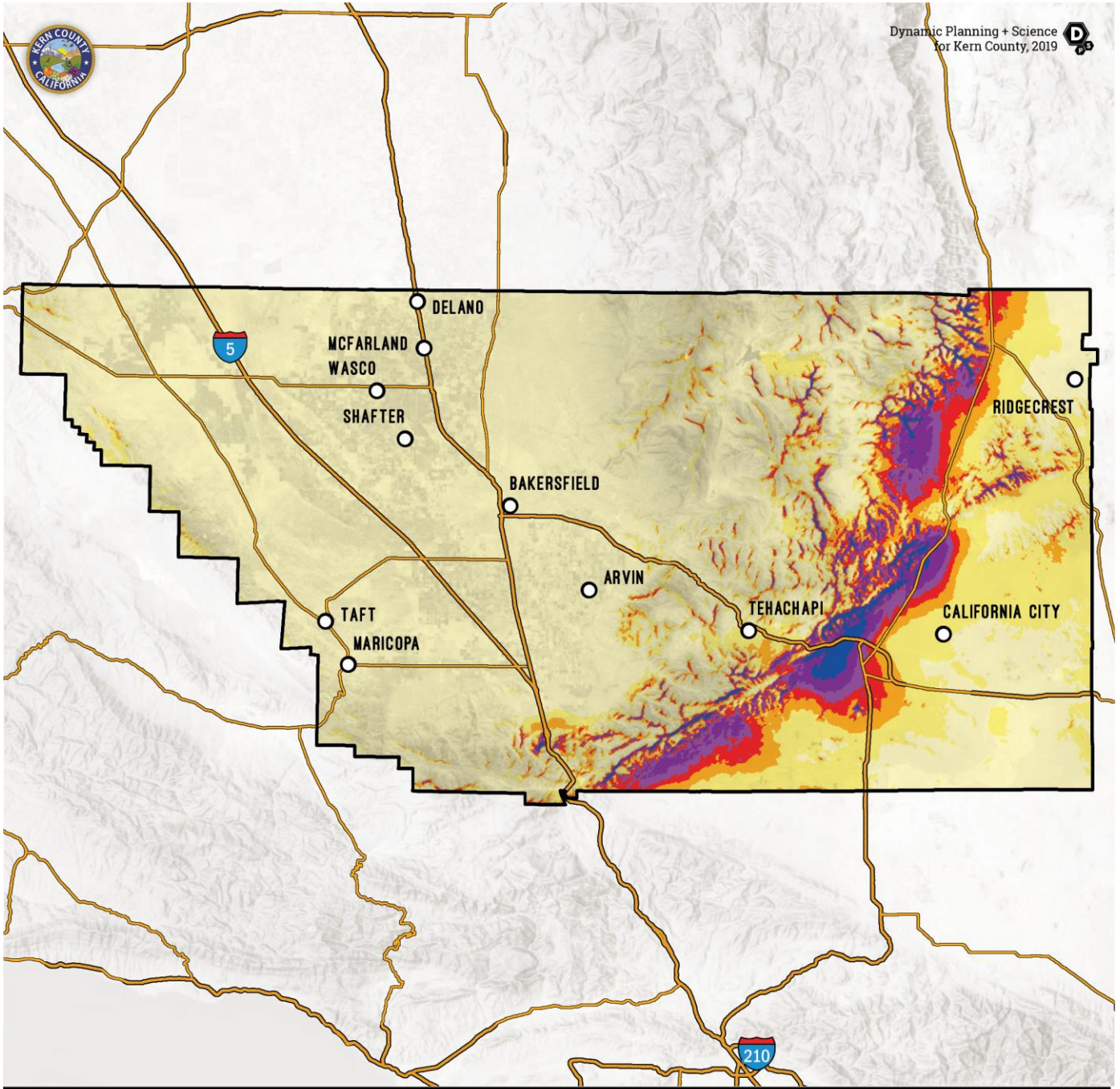


*Data sources: PRISM 800m Resolution 30-YR Normals.

Figure 4-14: 30-YR Normal Minimum Temperature for January



Dynamic Planning + Science
for Kern County, 2019



ANNUAL AVERAGE WIND SPEED (POWER CLASS) KERN COUNTY

*Data sources: NREL.

MAP LEGEND



Figure 4-15: Annual Average Wind Speed (Power Class)



Table 4-8: Classes of Wind Power Density at 10 m and 50 m^a

Wind Power Class	10 m (33 ft)		50 m (164 ft)	
	Wind Power Density (W/m ²)	Speed ^b m/s (mph)	Wind Power Density (W/m ²)	Speed ^b m/s (mph)
1	0	0	0	
	100	4.4 (9.8)	200	5.6 (12.5)
2	150	5.1 (11.5)	300	6.4 (14.3)
3	200	5.6 (12.5)	400	7.0 (15.7)
4	250	6.0 (13.4)	500	7.5 (16.8)
5	300	6.4 (14.3)	600	8.0 (17.9)
6	400	7.0 (15.7)	800	8.8 (19.7)
7	1000	9.4 (21.1)	2000	11.9 (26.6)

^a Vertical extrapolation of wind speed based on the 1/7 power law.

^b Mean wind speed is based on Rayleigh speed distribution of equivalent mean wind power density. Wind speed is for standard sea-level conditions. To maintain the same power density, speed increases 3%/1000 m (5%/5000 ft) elevation.

NOTE: Each wind power class should span two power densities. For example, Wind Power Class = 3 represents the Wind Power Density range between 150 W/m² and 200 W/m². The offset cells in the first column attempt to illustrate this concept.

4.5.1.4 Frequency/ Probability of Future Events

Severe weather events for Kern County since the year 2000, as shown in Table 4-7, have all been related to either wind or freeze events. Strong wind events since the year 2000 have caused a total of \$2.6 million worth of property damage in Kern County. Figure 4-15 displays average annual wind speeds by power class in Kern County and Table 4-8 describes wind power classes.

4.5.1.5 Severity and Extent

The most common problems associated with severe storms are immobility and loss of utilities. Fatalities are uncommon but can occur. Roads may become impassable due to flooding, downed trees, ice or snow, or a landslide. Crops can be damaged by below-freezing temperatures. Power lines may be downed due to high winds or ice accumulation, and services such as water or phone may not be able to operate without power. Utility companies will shutoff power (also known as, Public Safety Power Shutoffs) as a fire prevention measure in hot and dry periods.



Windstorms can be a problem in the planning area and could cause damage to utilities. It is important to note that the predicted wind speed given in wind warnings issued by the National Weather Service is for a one-minute average; gusts may be 25 to 30 percent higher.

Hail events can occur in Kern County. Events have occurred in the greater County and in the City of Taft with hail size ranging from .25 to .75 inches.

High heat events can occur throughout Kern County, and are projected to worsen with climate change. In 2018, the southern portion of California's central valley, and, in particular, the region including Los Angeles broke an all-time record of 111 degrees, surpassing the previous record of 109 degrees, set in 1939. (Washington Post, 2018)

4.5.1.6 Warning Time

Meteorologists can often predict the likelihood of a severe storm. This can give several days of warning time. However, meteorologists cannot predict the exact time of onset or severity of the storm. Some storms may come on more quickly and have only a few hours of warning time.

4.5.1.7 Secondary Hazards

The most significant secondary hazards associated with severe local storms are floods, falling and downed trees, landslides, downed power lines, and wildfire. Heavy rain can overwhelm both natural and man-made drainage systems, causing overflow and property destruction. Landslides occur when the soil on slopes becomes oversaturated and fails. Landslides are further outlined as slope failure in Section 4.5.7, while flooding is analyzed in Section 4.5.2.

4.5.1.8 Severe Weather Vulnerability Analysis

4.5.1.8.1 Population

It can be assumed that the entire planning area is exposed to some extent to severe weather events. Certain areas are more exposed due to geographic location and local weather patterns. Populations living at higher elevations with large stands of trees or power lines may be more susceptible to wind damage and black out.

Vulnerable populations such as the elderly, low income or linguistically isolated populations, people with life-threatening illnesses, and residents living in areas may become isolated from major roads in severe weather events. Power outages can be life threatening to those dependent on electricity for life support. These populations face isolation and exposure during severe weather events and could suffer more secondary effects of the hazard, and therefore vulnerable populations are of particular concern.



4.5.1.8.2 Property

All property is vulnerable during severe weather events, but properties in poor condition or in particularly vulnerable locations may risk the most damage. Those in higher elevations and on ridges may be more prone to wind damage. Those that are located under or near overhead lines or near large trees may be vulnerable to falling ice or may be damaged in the event of a collapse. Crops may be damaged by frost, especially if a frost event occurs after the growing season has already begun.

4.5.1.8.3 Critical Facilities and Infrastructure

All critical facilities exposed to flooding are also likely exposed to severe weather. Additional facilities on higher ground may also be exposed to wind damage or damage from falling trees. The most common problems associated with severe weather are loss of utilities. Downed power lines can cause blackouts, leaving large areas isolated. Phone, water, and sewer systems may not function. Roads may become impassable due to ice or snow or from secondary hazards such as landslides.

4.5.1.8.4 Lifelines

Loss of roads or power and communication lines are the primary lifeline failures resulting from severe weather and are mostly due to secondary hazards such as floods, falling and downed trees, landslides, and wildfire. Landslides caused by heavy prolonged rains can block roads. High winds can cause significant damage to trees and power lines, blocking roads with debris, incapacitating transportation, isolating population, and disrupting ingress and egress. Snowstorms in higher elevations can significantly impact the transportation system and the availability of public safety services. Of particular concern are roads providing access to isolated areas and vulnerable populations.

Prolonged obstruction of major routes due to landslides, snow, debris, or floodwaters can disrupt the shipment of goods and other commerce. Large, prolonged storms can have negative economic impacts for an entire region.

Severe windstorms, downed trees, and ice can create serious impacts on power and above-ground communication lines. Freezing of power and communication lines can cause them to break, disrupting electricity and communication. Loss of electricity and phone connection would leave certain populations isolated because residents would be unable to call for assistance.



4.5.1.8.5 Future Trends in Development

All future development will be affected by severe storms. The ability to withstand impacts lies in sound land use practices and consistent enforcement of codes and regulations for new construction. Participating jurisdictions have adopted the California Building Code, which corresponds to the International Building Code, to meet California mandates. This code is equipped to deal with the impacts of severe weather events. Land use policies identified in general plans within the planning area also address many of the secondary impacts, such as flood and landslide, of the severe weather hazard. With these tools, the participating jurisdictions are well equipped to deal with future growth and the associated impacts of severe weather.

4.5.1.8.6 Severe Weather Hazard Problem Statements

As part of the mitigation action identification process, the Planning Committee for the County and for each jurisdiction identified issues and weaknesses, also called problem statements, for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and flood data. Severe weather problem statements for Kern County are listed in Table 4-9; problem statements for all other participating jurisdictions are accessed in Volume 2 of this plan.

Identifying these common issues and weaknesses assists the Planning Committee in understanding the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. See Table 5-6 for a full list of mitigation actions and the corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-9 and Table 5-6.



Table 4-9 Severe Weather Problem Statements

Problem No.	Hazard	Area of Concern	Mitigation Alternatives	Primary Agency	Problem Description	Related MA
ps-EW-KC-227	Extreme Weather	Impact	PPRO - Property Protection , NRP - Natural Resource Protection , ES - Emergency Services , SP - Structural Projects	County of Kern	Heavy rains could create localized flooding issues around County infrastructure including buildings and roads, posing a threat to buildings and creating hazardous travel conditions The following culverts have been identified as undersized by Kern County and frequently create flooding issues after heavy rain events: LAKE ISABELLA BLVD, 200' S OF ELIZABETH NORRIS RD, LAKE ISABELLA ; FRAZIER MTN PARK RD, 2,200' E OF MT PINOS WY E, FRAZIER PARK; CALIENTE CREEK RD, BETWEEN MILLERSVILLE AND TWIN OAKS; COPUS RD, 3,000' W OF I-5 FWY	ma-FL-KC-98
ps-EW-KC-228	Extreme Weather	Threat	PE&A - Public Education & Awareness , NRP - Natural Resource Protection	County of Kern	Strong winds can blow over trees and utility lines, posing a hazard to traffic and pedestrians	ma-AH-KC-179
ps-EW-KC-229	Extreme Weather	Threat	PRV - Prevention	County of Kern	Increased impervious surfaces can lead to the urban heat island effect and increased runoff during heavy rains events that may overwhelm storm drain facilities that have received insufficient storm water maintenance	ma-EW-KC-301
ps-EW-KC-338	Extreme Weather	Threat	PE&A - Public Education & Awareness	County of Kern	Winter weather events can interrupt travel on County roads leading to hazardous driving conditions and road closures	ma-EW-KC-435



4.5.2 Flood Hazard Profile

Flooding is one of the three primary hazards in California, along with earthquake and wildfire, and represents the second most destructive source of hazard, vulnerability, and risk statewide. (California Office of Emergency Services, 2018) Flooding is a priority hazard for Kern County as well.



Connections between a river and its floodplain are most apparent during and after major flood events. A **floodplain** is the area adjacent to a river, creek, or lake that becomes inundated during a flood. Floodplains may be broad, as when a river crosses an extensive flat landscape, or narrow, as when a river is confined in a canyon. These areas form a complex physical and biological system that supports a variety of natural resources and provides natural flood and erosion control. When a river is separated from its floodplain with levees and other flood control facilities, its natural, built-in benefits can be lost, altered, or significantly reduced. (Federal Emergency Management Agency)

There are four types of flood events in the Kern County area: riverine, flash, urban stormwater, alluvial fan, and dam failure. Regardless of the type, the cause is primarily the result of severe weather and excessive rainfall, either in the flood area or upstream reach. (The National Severe Storms Laboratory, n.d.)

Riverine flooding occurs when a watercourse exceeds its 'bank-full' capacity and is the most common type of flood event. Riverine flooding occurs as a result of prolonged rainfall that is combined with saturated soils from previous rain events, or combined with snowmelt, and is characterized by high peak flows of moderate duration and by a large volume of runoff. Riverine flooding occurs in river systems whose tributaries drain large geographic areas and can include many watersheds and sub-watersheds. The duration of riverine floods varies from a few hours to many days. Factors that directly affect the amount of flood runoff include precipitation amount, intensity and distribution, soil moisture content, channel capacity, seasonal variation in vegetation, snow depth, and water-resistance of the surface due to urbanization. (*Id*)

In Kern County, riverine flooding can occur anytime during the period from November through April. Flooding is more severe when antecedent rainfall has resulted in saturated ground conditions

The term "flash flood" describes localized floods of great volume and short duration, generally in less than four hours. In contrast to riverine flooding, this type of flood usually results from a heavy rainfall in a relatively small drainage area. Precipitation of this sort usually occurs in the spring and summer. (Kern County MJHMP, 2014)

Urbanization may increase peak flow runoff as well as the total volume of stormwater runoff from a site. The increase is dependent upon the type of soil and its topography in relation to the proposed development. Comparison of the peak flow and volume impacts to the watershed should be analyzed whenever development is proposed to ensure that any increases are accommodated. (United States Geological Survey, 2016)



Flooding may result as a secondary impact from an earthquake, and may cause failure of dams, canal banks, or areas where landslides block drainage channels, streams, and/or rivers. *See Section 0 for the Earthquake Hazard Profile.*

Dam failures also often result in flash flooding. However, dam failures are discussed separately in this plan. *See Section 4.5.3.*

Floodplain Definitions

100-YR Floodplain

The boundaries of the 100 year (100-YR) floodplain coincide with an annual risk of 1% and are a FEMA study product consisting of both floodway and flood fringe.

500-YR Floodplain

The boundaries of the floodplain coincide with an annual risk of 0.2% and are a FEMA study product. The 500-YR floodplain includes the 100-YR.

Floodway

This includes the channel of the tributary and the land adjacent to it. This zone needs to remain free from obstruction so the 100-YR floodplain can be conveyed downstream.

Flood Fringe

This is the remaining portion of the 100-YR floodplain, excluding the floodway. This zone can be obstructed or developed if criteria are met.

Special Flood Hazard Area (SFHA)

An area having special flood, mudflow, or flood-related erosion hazards and shown on a Flood Insurance Rate Map (FIRM). The SFHA is the area where the National Flood Insurance Program's (NFIP) floodplain management regulations must be enforced.

Floodplain Ecosystems

Floodplains can support ecosystems that are rich in quantity and diversity of plant and animal species. A floodplain can contain 100 or even 1,000 times as many species as a river. Wetting of the floodplain soil releases an immediate surge of nutrients left over from the last flood and resulting from the rapid decomposition of organic matter that had accumulated. Microscopic organisms thrive, and larger species enter a rapid breeding cycle. Opportunistic feeders, particularly birds, move in to take advantage. The production of nutrients peaks and falls away quickly; however, the surge of new growth endures for some time. This makes floodplains particularly valuable for agriculture. Species growing in floodplains are markedly different from those that grow outside floodplains. For instance, trees in floodplains and riparian areas tend to be very tolerant of root disturbance and very quick-growing compared to non-riparian trees.

Floodplains that are undisturbed or have been restored to a natural state provide many benefits to both human and natural systems. In their natural vegetative state, undisturbed floodplains provide the following benefits:



- Slow the rate at which incoming surface runoff reaches the main body of water, slowing down the impact of flood events.
- Maintain water quality by allowing surface runoff to drop sediment into the natural soil, preventing it from depositing in streams and rivers.
- Recharge groundwater. The slowing of runoff allows additional time for the runoff to recharge existing groundwater aquifers.
- Provide habitat for large and diverse populations of plants and animals.

Floodplains are often compromised by human development. Because they border water bodies, floodplains have historically been popular sites to establish settlements. Human activities tend to concentrate in floodplains because water is readily available, land is fertile and suitable for farming, transportation by water is easily accessible, and land is flatter and easier to develop.

But human activity in floodplains frequently interferes with the natural function of floodplains. It can affect the distribution and timing of drainage, thereby increasing flood problems. Human development can create local flooding problems by altering or confining drainage channels. This increases flood potential in two ways: it reduces the stream's capacity to contain flows, and it increases flow rates or velocities downstream during all stages of a flood event. Human activities can interface effectively with a floodplain as long as steps are taken to mitigate the activities' adverse impacts on floodplain functions.

4.5.2.1 Plans, Policies, and Regulatory Environment

National Flood Insurance Program (NFIP)

The NFIP makes federally-backed flood insurance available to homeowners, renters, and business owners in participating communities. Kern County and the cities of Arvin, Bakersfield, California City, Delano, Maricopa, McFarland, Shafter, Taft, Tehachapi, and Wasco all participate in NFIP.

For most participating communities, FEMA has prepared a detailed Flood Insurance Study (FIS). The study presents water surface elevations for floods of various magnitudes, including the 1-percent annual chance flood (the 100-year flood) and the 0.2-percent annual chance flood (the 500-year flood).

Base-flood elevations and the boundaries of the 100- and 500-year floodplains are shown on Flood Insurance Rate Maps (FIRMs), which are the principal tool for identifying the extent and location of the flood hazard. FIRMs also designate and display the floodway which is the channel of the river or stream and adjacent land that must remain free from obstruction so that the 100-year flood can be conveyed downstream. 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. The most recent countywide FIRM was completed September 26th, 2008 and is a digital flood insurance rate map (DFIRM).



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-YR flood;
- New floodplain development must not aggravate existing flood problems or increase damage to other properties; and
- New floodplain development must exercise a reasonable and prudent effort to reduce its adverse impacts on threatened salmonid species.

Structures permitted or built in the County before December 31, 1974, are called “pre-FIRM” structures, and structures built afterwards are called “post-FIRM.” Post-FIRM properties are eligible for reduced flood insurance rates. Such structures are less vulnerable to flooding since they were constructed after regulations and codes were adopted to decrease vulnerability. Pre-FIRM properties are more vulnerable to flooding because they do not meet code or are located in hazardous areas. The insurance rate is different for the two types of structures.

Compliance is monitored by FEMA regional staff and by the California Department of Water Resources under a contract with FEMA. Maintaining compliance under the NFIP is an important component of flood risk reduction. All planning partners that participate in the NFIP have identified initiatives to maintain their compliance and good standing.

Community Rating System (CRS)

The CRS is a voluntary program within the NFIP that encourages floodplain management activities that exceed the minimum NFIP requirements. Flood insurance premiums are discounted to reflect the reduced flood risk resulting from community actions that meet the three goals of the CRS: 1) reduce flood losses, 2) facilitate accurate insurance rating, and 3) promote awareness of flood insurance.

For participating communities, flood insurance premium rates are discounted in increments of 5 percent according to the community’s classification. For example, a Class 1 community would receive a 45 percent premium discount, and a Class 9 community would receive a 5 percent discount. Class 10 communities are those that do not participate in the CRS; they receive no discount. The CRS classes for local communities are based on 18 creditable activities related to public information, mapping and regulations, flood damage reduction, and flood preparedness.

CRS activities can help to save lives and reduce property damage. Communities participating in the CRS represent a significant portion of the nation’s flood risk; over 66 percent of the NFIP’s policy base are communities in the CRS. Communities receiving premium discounts through the CRS range from small to large and represent a broad mixture of flood risks, including both coastal and riverine flood risks. Table 4-10 lists NFIP and CRS statistics for the County.



Table 4-10: Flood Insurance Statistics for Kern County

NFIP and CRS Status & Information	
County of Kern	
NFIP Status	Participating since 09/29/86
CRS Class	9
Policies in Force	3,168
Policies in SFHA	2,678
Policies in non-SFHA	490
Total Claims Paid	128
Paid Losses	\$791,697
Repetitive Loss Properties	0
Severe Repetitive Loss Properties	0
Repetitive Loss Payment by NFIP on Building	N/A
Repetitive Loss Payment by NFIP on Contents	N/A

Note: The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data are used for floodplain management, mitigation, or research purposes. Therefore, this plan does not identify the repetitive loss properties or include claims data for any individual property.

Cobey-Alquist Floodplain Management Act

The Cobey-Alquist Floodplain Management Act of 1965 provided state-level guidance and review of floodplain management, including the review of floodplain management plans, establishment of floodplain management regulations, and the use of designated floodways. The California Department of Water Resources (DWR) adopts regulations, maintains a statewide flood management data collection and planning program, manages a statewide grant program, and helps coordinate emergency flood response operations.

State Plan of Flood Control (SPFC) in the Central Valley

The SPFC describes authorized project levees and related facilities for which the State of California has accepted responsibility for maintenance. The Plan further describes the existing flood control works of the State-federal flood protection system in California’s central valley, in addition to the lands, modes of operations and maintenance necessary for the system to function, conditions, and programs and plans for the system. (Department of Water Resources, 2010) (Legislative Analyst’s Office, 2019)



Kern County General Plan

The 2004 Kern County General Plan includes many policies, implementation measures, and goals in the Land Use and Safety Elements that limit development occurring in floodplains and mitigate impacts from such development.

Policies around flooding include limited development in floodplains, generally forbidding structures that impede flow in floodplains, and preserving important flood channels and water courses from development more broadly. The Kern County General Plan is currently being updated and will consider this MJHMP Update as it continues to shape policies around flood mitigation and protection.

Floodplain Management Ordinance in Kern County Code, § 17.48

The Kern County Code addresses mitigation options for reducing flood losses through restricting or prohibiting development that may be dangerous due to flooding and erosion. These methods and provisions additionally stipulate that vulnerable uses be protected against flood damage during construction; the management of natural floodplains and stream channels in order to accommodate flood waters; the management of any development which might increase flood damage; and the management of flood barrier construction, which might increase flood hazards in other areas.

The County’s regulations also prohibit the encroachment of new development that would increase any flood levels within the severe flood hazard area. Contingent on this first provision being satisfied, all new construction and other proposed development shall comply with all other applicable flood hazard reduction provisions of this chapter.

4.5.2.2 Major Flood Events

Table 4-11 shows the flood events that took place in Kern County since the year 2000 that caused either property or crop damage. (NOAA, 2019)

Table 4-11: Kern County Flood Events Since 2000

Date	Flood Type	Property Damage Value (\$)	Crop Damage Value (\$)
1/8/2002	Flood	25,000	0
11/8/2002	Flood	23,000	0
2/12/2003	Flood	50,000	0
7/31/2003	Flash Flood	5,000	0
12/25/2003	Flood	30,000	0
2/22/2004	Flood	5,000	0
10/26/2004	Flood	5,000	0
10/26/2004	Flood	5,000	0
1/9/2005	Flood	2,000,000	0
1/10/2005	Flood	500,000	0
1/10/2005	Flood	250,000	0



Date	Flood Type	Property Damage Value (\$)	Crop Damage Value (\$)
2/21/2005	Flood	0	300,000
2/22/2005	Flood	5,000	0
8/15/2005	Flash Flood	198,500	0
10/17/2005	Flash Flood	75,000	0
10/17/2005	Flash Flood	25,000	0
10/29/2007	Flash Flood	10,000	0
1/27/2008	Flash Flood	25,000	0
1/27/2008	Flood	5,000	0
1/27/2008	Flood	1,000	0
7/12/2008	Flash Flood	1,500,000	0
7/13/2008	Flash Flood	50,000	0
7/13/2008	Flash Flood	25,000	0
7/14/2008	Flash Flood	100,000	0
7/15/2008	Flash Flood	20,000	0
7/16/2008	Flash Flood	1,000	0
7/20/2008	Flash Flood	30,000	0
12/10/2009	Flood	25,000	0
1/18/2010	Flood	100,000	0
1/18/2010	Flash Flood	10,000	0
1/19/2010	Flood	35,000	0
10/1/2010	Flood	5,000	0
10/2/2010	Flash Flood	10,000	0
10/2/2010	Flood	5,000	0
10/6/2010	Flash Flood	100,000	0
10/6/2010	Flood	10,000	0
10/17/2010	Flood	5,000	0
12/19/2010	Flood	5,000,000	0
12/19/2010	Flood	50,000	0
12/20/2010	Flash Flood	5,000	0
12/22/2010	Flood	350,000	0
12/29/2010	Flood	1,000,000	0
1/2/2011	Flood	12,700,000	0
1/2/2011	Flood	800,000	0
2/26/2011	Flood	5,000	0
2/26/2011	Flood	2,500	0
3/20/2011	Flood	5,000	0
3/23/2011	Flood	2,000	0
3/23/2011	Flood	2,000	0
7/4/2011	Flash Flood	5,000	0
7/5/2011	Flash Flood	2,500	0
7/30/2011	Flash Flood	5,000	0



Date	Flood Type	Property Damage Value (\$)	Crop Damage Value (\$)
8/1/2011	Flash Flood	25,000	0
8/27/2011	Flash Flood	25,000	0
9/11/2011	Flood	25,000	0
3/17/2012	Flood	12,000	0
3/17/2012	Flood	6,000	0
4/13/2012	Flood	15,000	0
8/22/2012	Flash Flood	60,000	0
10/11/2012	Flood	25,000	0
3/8/2013	Flood	5,000	0
7/22/2013	Flash Flood	50,000	0
8/18/2013	Flash Flood	50,000	0
8/19/2013	Flash Flood	100,000	0
8/19/2013	Flash Flood	100,000	0
2/28/2014	Flood	20,000	0
12/31/2016	Flash Flood	10,000	0
1/5/2017	Flood	36,000	0
1/5/2017	Flood	15,000	0
1/5/2017	Flood	6,000	0
1/22/2017	Flood	150,000	0
3/6/2019	Flash Flood	50,000	0
3/6/2019	Flash Flood	20,000	0
3/6/2019	Flash Flood	10,000	0

Source: NOAA Storm Events Database



4.5.2.3 Location

Kern County, due to its large extent and varied geography, has several hundred potential flood sources. Figure 4-17 displays FEMA flood zones within Kern County. More detailed views of FEMA flood zones are available for participating jurisdictions through the Risk Assessment Mapping Platform (RAMP) on mitigatehazards.com. The types of floodplains within the County are diverse and include riverine floodplains (fast moving channelized flow), distributary flow floodplains (broad, slow moving, shallow flow), and alluvial fan floodplains (heavily sediment-laden, broad, shifting, and rapid moving flow).

Kern County’s watersheds are effectively a closed basin system, with all drainage discharging to one of the following lake basins in the County: Tulare Lake, Kern Lake, Lake Isabella (manmade), Koehn Lake, Rogers Lake, Buena Vista Lake, Castac (Tejon) Lake, China Lake, and Rosamond Lake. These lakes temporarily enlarge during flood events. Rogers Lake, China Lake, and Rosamond Lake are “dry lakes,” meaning that only under certain conditions do they fill with water. Figure 4-16 displays the watersheds in Kern County.

Most of the major streams are fed by melting snow from high in the Sierra Nevada. The Kern River is the major river in the County and has an average annual runoff of 700,000 acre feet. The Kern River flows from the Sierras northeast of Bakersfield, is dammed at Lake Isabella, and continues approximately 30 miles through the steep Kern River Canyon to the Valley, where it flows through Bakersfield. The river enters the Buena Vista lakebed twenty-one miles downstream of Bakersfield or flows to Tulare Lake via the Kern River Flood Canal. Flows can also be diverted into the California Aqueduct via the Kern River-California Aqueduct Intertie, built in 1977. (Kern County MJHMP, 2014)

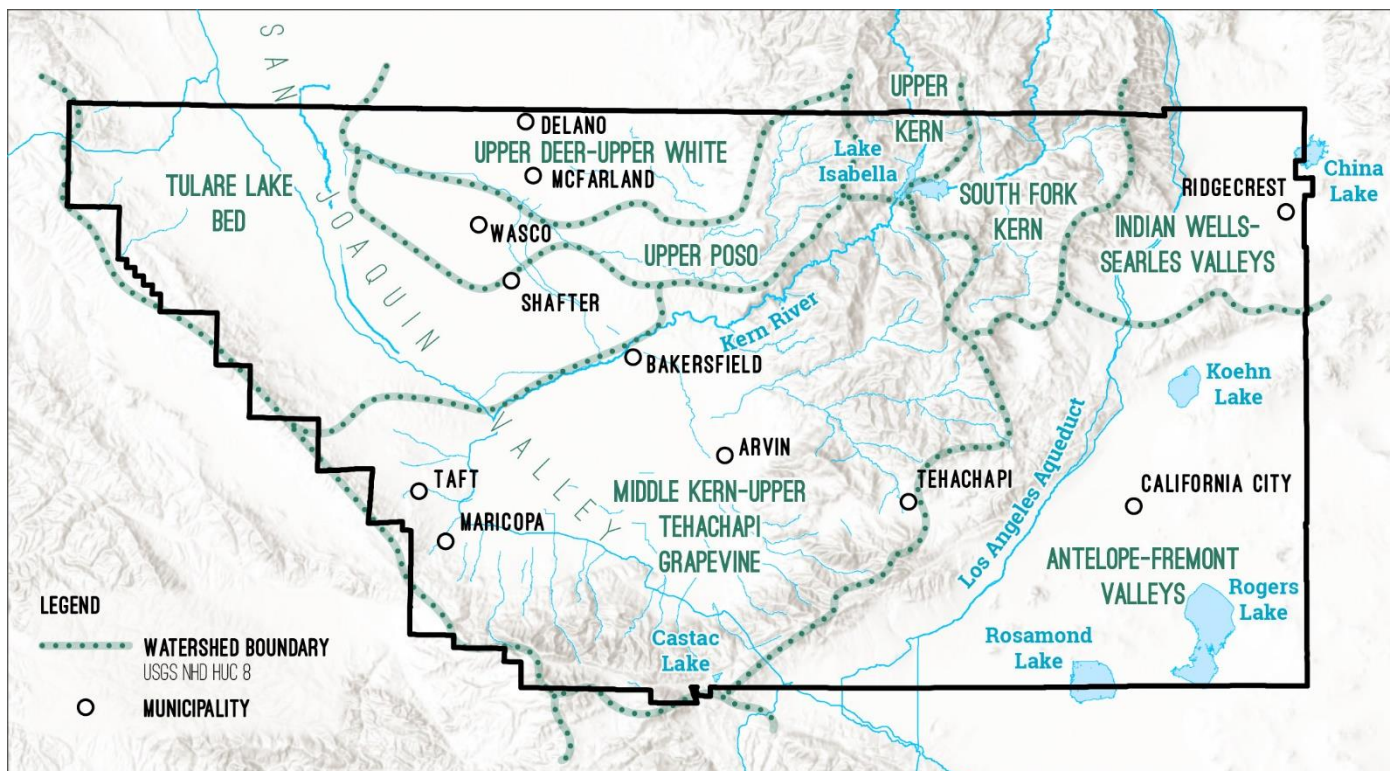




Figure 4-16 Watershed Map

Valley Flood Sources

The Kern River is the source of flooding for the Central Valley in Kern County. Many small streams also cause flooding in the Valley where they discharge from steep canyons. While confined in the upland areas, the streams tend to spread onto alluvial fans with poorly defined drainages on the valley floor. Flow is further disrupted by cultivation and urbanization. This type of flooding occurs at the Little Poso Creek, Caliente Creek, Walker Basin Creek, Sycamore Canyon, Little Sycamore Canyon, Comanche Creek, Tejon Creek, El Paso Creek, Grapevine and Tecuya Creek, and in the vicinity of Taft.

Flooding is typically broad and shallow, two feet deep or less. All surface water originating in or passing through Central and Western Kern County infiltrates into the San Joaquin Valley aquifer or drains into Tulare and Buena Vista Lakes. Man-made drainages that could potentially lead to flooding include several diversion canals that siphon water from the Kern River that flow through the City of Bakersfield, as well as the California Aqueduct and Kern Water Bank Canal. Some of these canals have above-grade sections that can result in local flooding when the canals fail, much like a levee failure flood.

Poso Creek is a major water course that flows north westerly through Kern County. The watershed covers more than 250,000 acres. Precipitation on this watershed ranges from six to thirty inches annually. In years of high rainfall extensive flooding occurs along a 25 mile reach from Zerker Road to the Kern National Wildlife Refuge. For the flood years of 1969 and 1978 flood waters broke out of the Poso Creek Channel and inundated an area of 17,280 acres. Improvements were made under the Emergency Watershed Protection Act for repairs implemented in 1978 and 1979. The channel now is designed to carry 1,050 cfs. More flooding occurred in 1997 and 1998. A major project was undertaken to repair the levees with assistance from the NRCS through an Emergency Watershed Protection grant in 1997. However, the 1998 flooding was curtailed with assistance from two of the local water districts. (FEMA, 2008, p. 21)

Desert Flood Sources

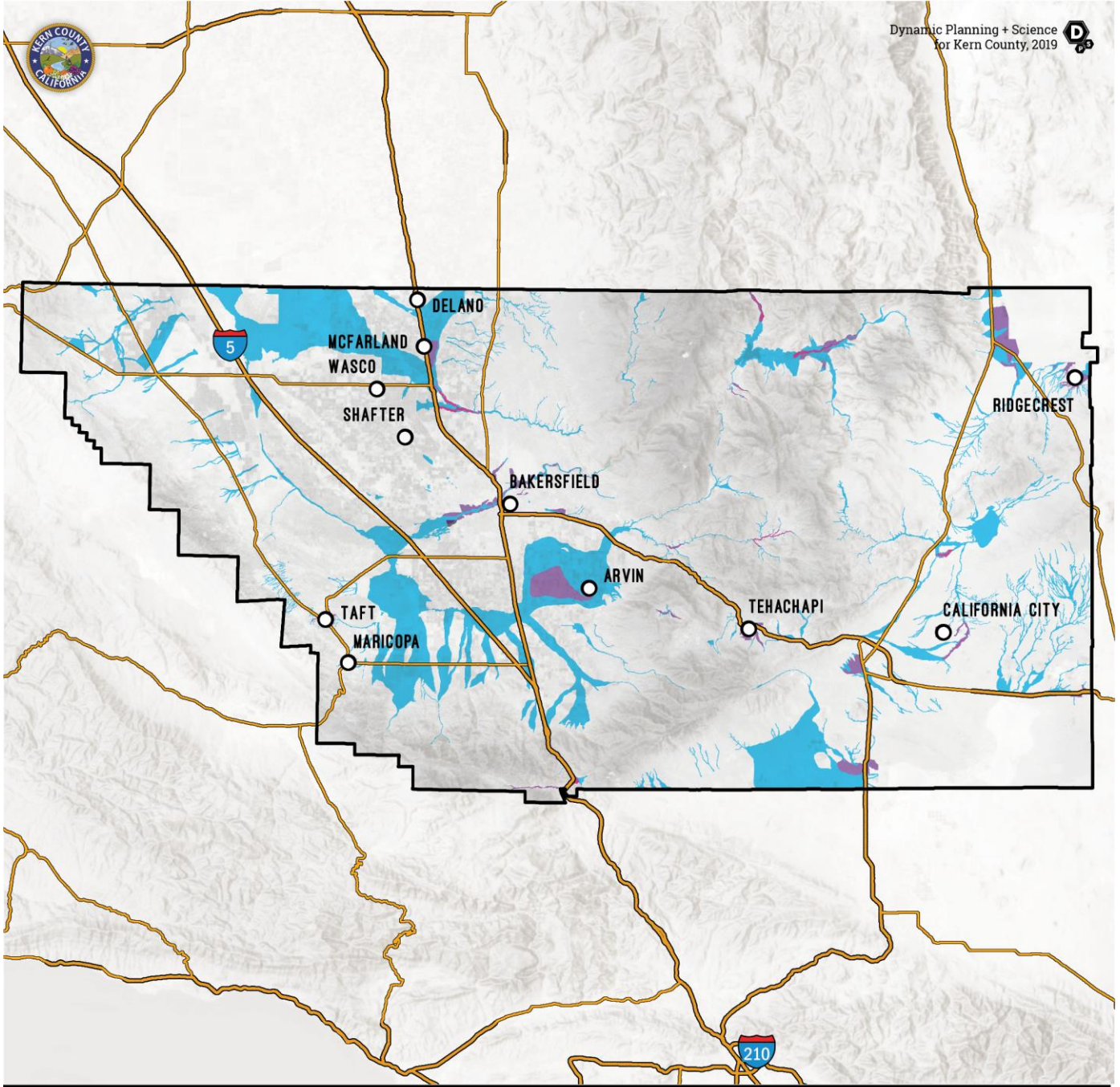
The desert zone lies in the eastern portion of Kern County and has flood problems similar to the Valley, where intermittent streams shift across alluvial fans. Streets, roads, and railroads often divert flows and may increase flood problems. Most flood sources that affect the desert areas originate in local drainages in the eastern portion of Kern County; only Jawbone Canyon Wash originates in the Sierra Nevada range. (FEMA, 2008, p. 21)

Mountain Flood Sources

Floods in the Mountain region typically have flood flows that peak quickly and have high velocities. Floods can occur on streams that include Cuddy Creek, Upper Sycamore Creek, Antelope Creek, Blackburn Creek, Caliente Creek, Erskine and Kelso Creeks. Flows typically are more confined to narrow valleys, but alluvial fan flooding can occur in the vicinity of Lake Isabella. Life safety is a concern in this region due to the flash floods that could potentially impact travelers and those participating in outdoor recreation in the mountain valleys. (FEMA, 2008, p. 21)



Dynamic Planning + Science
for Kern County, 2019



FEMA FLOOD ZONES KERN COUNTY

*Data sources: FEMA.

MAP LEGEND

100-YR

100-YR FLOODWAY

500-YR

PROTECTED BY LEVEE

Figure 4-17: FEMA Flood Zone Exposure Map



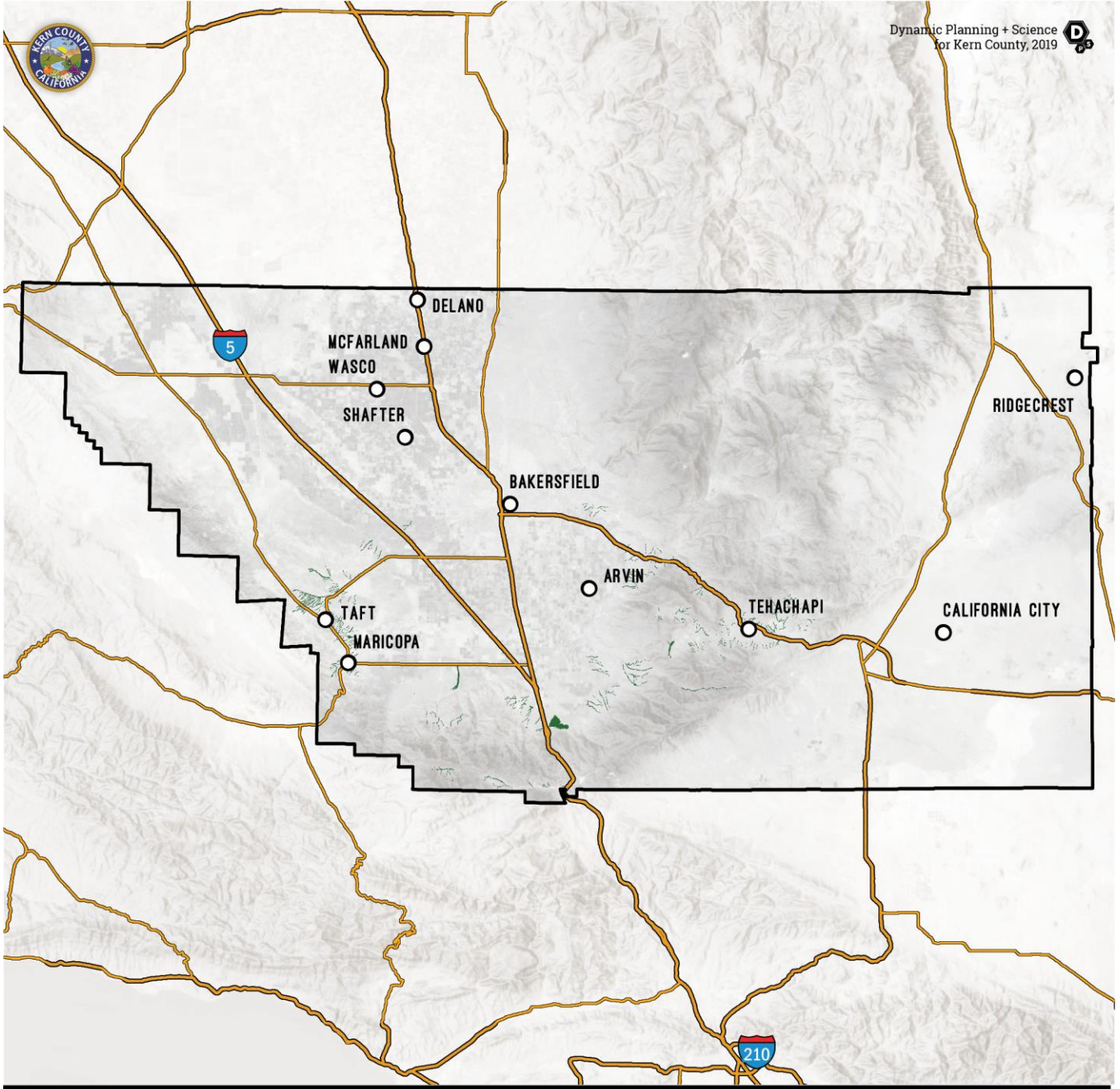
4.5.2.3.1 Flood Awareness Zones

Flood Awareness Zones have been developed by California DWR to map areas of additional flood threat throughout the state. The intent of the Awareness Floodplain Mapping project is to identify all pertinent flood hazard areas for areas that are not mapped under the Federal Agency Management Agency's (FEMA) National Flood Insurance Program (NFIP) and to provide the community and residents an additional tool in understanding potential flood hazards currently not mapped as a regulated floodplain. The awareness maps identify the 100-YR flood hazard areas using approximate assessment procedures. These floodplains are shown simply as flood prone areas without specific depths and other flood hazard data. Flood awareness zones for Kern County are shown in Figure 4-18.

4.5.2.4 Measuring Frequency and Severity

The frequency and severity of flooding are measured using a discharge probability, a statistical tool which defines the probability that a certain river discharge or flow level will be equaled or exceeded within a given year. Flood studies use historical records to determine the probability of occurrence for the different discharge levels. The flood frequency equals 100 divided by the discharge probability. For example, the 100-YR discharge has a 1-percent chance of being equaled or exceeded in any given year. The "annual flood" is the greatest flood event expected to occur in a typical year. These measurements reflect statistical averages only; it is possible for two or more floods with a 100-YR or higher recurrence interval to occur in a short time period. The same flood can have different recurrence intervals at different points on a river.

The extent of flooding associated with a 1-percent annual probability of occurrence (the base flood or 100-YR flood) is used as the regulatory boundary by many agencies. Also referred to as the special flood hazard area (SFHA), this boundary is a convenient tool for assessing vulnerability and risk in flood-prone communities. Many communities have maps that show the extent and likely depth of flooding for the base flood. Corresponding water-surface elevations describe the elevation of water that will result from a given discharge level, which is one of the most important factors used in estimating flood damage.



DWR AWARENESS ZONES KERN COUNTY

*Data sources: DWR.

MAP LEGEND



Figure 4-18 DWR Awareness Zones



4.5.2.5 Frequency/ Probability of Future Occurrences

Kern County will experience flooding in the future, with the probability of flooding in Kern County between 10 and 100% annually. The majority of the floods in Kern County have occurred from winter-through-spring rainfall, but several have been the result of heavy rain events during the months of July, August, and September. Flooding in Southern California is often associated with the El Nino weather phenomenon. El Nino is a term originally used to describe the appearance of warm (surface) water from time to time in the eastern equatorial Pacific region along the coasts of Peru and Ecuador. This ocean warming can strongly affect weather patterns all over the world. El Nino events are often associated with above normal precipitation in the southwestern United States. El Niños often occur during the Christmas season. La Niña is the opposite or “cold phase” of the El Niño cycle. It was once suggested that minor El Niño events occurred about every two to three years and major ones about every 8 to 11 years. Today, scientists note that El Niño has a return period of four to five years. When an El Niño event occurs, it often lasts from 12 to 18 months. (National Oceanic and Atmospheric Administration , 2020)

4.5.2.6 Severity and Extent

The main factors affecting flood damage are water depth and velocity. Deeper and faster flood flows can cause more damage. Shallow flooding with high velocities can cause as much damage as deep flooding with slow velocity. This is especially true when a channel migrates over a broad floodplain, redirecting high velocity flows and transporting debris and sediment. Flood severity is often evaluated by examining peak discharges; Table 4-12 lists peak flows used by FEMA to map Kern County floodplains.

Table 4-12: Summary of Discharges in Kern County

Flooding Source/Location	Drainage sq. Miles	Peak Discharge (cubic feet/second)			
		10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Antelope Creek					
At Tehachapi Western Corporate Limit	25.4	2,730	6,970	9,090	18,000
At Western Corporate Limits	4.8	650	1,150	1,380	1,900
Blackburn Creek					
At Tehachapi Boulevard and Dennison Road	10.1	2,410	5,780	7,450	11,850
At Western Corporate Limits	16.2	2,730	6,970	9,090	18,000
Downstream of Tehachapi Boulevard	28.2	3,310	8,250	12,030	23,000
Near Highline Road	4.5	*	*	5,290	*
Caliente Creek					
Above Bealville Road Bridge	186.1	1,800	7,550	19,800	56,000
At State Highway 58	467.8	3,600	16,000	27,000	87,500
Caliente Creek Near Loraine					
Upstream of Confluence of Weaver Creek	20.0	325	1,800	3,350	12,300



Flooding Source/Location	Drainage sq. Miles	Peak Discharge (cubic feet/second)			
		10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Downstream of Indian Creek Confluence	124.0	1,650	9,050	16,900	61,000
Upstream of Sand Canyon Confluence	51.0	800	4,000	7,650	26,000
Upstream of Unnamed Tributary Confluence	47.0	770	3,800	7,100	24,000
Cuddy Creek					
At Lebec Road	46.4	850	3,900	7,750	25,000
El Paso Wash					
At North Downs St. & Ridgecrest-Inyoken Rd.	12.7	240	1,670	3,000	7,050
Erskine Creek					
At State Highway 178	37.7	850	2,300	7,700	25,000
Grapevine Canyon Creek	11.0	520	4,330	9,200	42,000
Grapevine Canyon Creek	11.0	520	4,330	9,200	42,000
Kelso Creek					
At State Highway 178	159.5	2,850	11,000	22,700	68,000
Kern River					
At Gaging Station 5.8 Miles NE of Bakersfield Post Office	2,407.0	2,800	7,000	10,200	28,700
At Kernville Gaging Stations	2,407.0	2,800	7,000	10,200	28,700
At Stockdale Highway	*	2,800	7,000	10,200	28,700
Poso Creek					
At State Highway 58	368.0	2,900	11,500	19,000	52,000
Upper Sycamore					
At Lower End of Valley Rd.	14.9	260	990	2,900	10,000

* Data not available

Source: Table 5 Summary of Discharges from FEMA FIS Text, 2008

4.5.2.7 Warning Time

The type and rate of flooding experienced in Kern County varies. In general, warning times for floods can be between 24 and 48 hours to prepare communities to reduce flood damages. Seasonal notification for flooding can enhance awareness for citizens at risk, and, when communicated effectively, advance notification can reach target audiences on a large scale.



4.5.2.7.1 DWR Awareness Zones Notification

The Flood Risk Notification Program (FRN Program) is part of DWR's FloodSAFE California Initiative. The program's key goal is to increase flood risk awareness by effectively communicating that risk to individual property owners, the public, and local, state, and federal agencies. This includes encouraging people to understand the levee system that protects them; be prepared and aware of their flood risk; and take appropriate actions before, during, and after flooding to protect themselves, minimize damage to their property or personal possessions, and facilitate recovery.

To achieve this goal, the FRN Program:

- sends out an annual notice to property owners whose property is at risk of flooding,
- maintains accurate Levee Flood Protection Zone (LFPZ) maps ⁶ and an associated parcel information database,
- provides people with useful ways to assess risk and reduce flood loss,
- establishes outreach and educational projects with public involvement,
- expands its interactive Flood Risk Notification website, and
- collaborates with federal agencies, local agencies, and communities.

In September of 2010, DWR provided the first annual written notice of flood risks to each landowner whose property is protected by State Plan of Flood Control (SPFC) levees and is within an LFPZ. The notice informs recipients of their property's potential flood risks and potential sources of flooding and offers flood emergency planning and preparedness tips. It encourages recipients to take preventative actions such as purchasing flood insurance, elevating or "floodproofing" their buildings, and preventing blockage of channels, drains, and ditches.

4.5.2.8 Secondary Hazards

The most problematic secondary hazard for flooding is bank erosion, which in some cases can be more harmful than actual flooding. Flooding is also responsible for landslides when high flows over-saturate soils on steep slopes and cause them to fail. Hazardous materials spills are a secondary hazard of flooding if storage tanks rupture and spill into streams or storm sewers. (Department of Environmental Conservation, 2020)

Wildland fires within a watershed can exacerbate the flood hazard by virtue of increased rate and volume of runoff and attendant erosion and sediment discharge. (United States Geological Survey, 2020)

4.5.2.9 Climate Change Impacts

The effects of climate change are varied and include warmer and more varied weather patterns, melting ice caps, and poor air quality, for example. As a result, climate change will likely worsen a number of natural hazards including flooding. Climate change will shift rainfall patterns, making heavy rains more

⁶ These maps are different from Federal Emergency Management Agency regulatory maps.



frequent in many areas. An increase in heavy rain events will lead to more flooding including flash floods that happen suddenly as a result of heavy rain and localized flooding which involves pooling of water in low-lying areas. Heavy rain events can inundate and overwhelm stormwater drainage systems resulting in localized flooding where pooling of water can cause significant damage to buildings. Overwhelmed stormwater drainage facilities also create hazardous conditions on roadways where water pools in low lying areas creating dangerous driving conditions. (United States Environmental Protection Agency, 2020)

4.5.2.10 Flood Vulnerability Analysis

Both an exposure analysis and Hazus loss estimation analysis were conducted to develop the flood vulnerability analysis for Kern County. Flood exposure numbers were generated using the inventories outlined in 4.5.2.10.1 County inventories were overlaid with FEMA delineated flood plains to determine exposure. These risk assessment exposure analysis values do not include Hazus-generated results.

Hazus flood vulnerability data was generated using a Level 2 Hazus-MH 4.2 analysis. Hazus is a FEMA software product that uses a GIS to analyze 100-year depth grids derived from FEMA 100-year "A" zones with Base Flood Elevations (BFE) to estimate loss. Parcel data defined in 4.5.2.10.1 was imported into Hazus as User Defined Facilities (UDF) and serves as the basis for replacement and content cost estimations as well as associated loss. Where flood vulnerability is mentioned absent of Hazus, exposure analysis figures are used. Figure 4-20 displays a snapshot of flood exposure and damage estimation in Unincorporated Kern County.

4.5.2.10.1 Flood Exposure

The tables and graphs in this section detail population, property, and infrastructure that are exposed to flooding in Unincorporated Kern County. Flood exposure is categorized by exposure to different flood hazard zones including the floodway, flood fringe, 100-year floodplain, and 500-year floodplain. The tables and graphs also include a category of 100-year total which is a combined total of floodway, flood fringe, and 100-year floodplain categories. The 500-year sans 100-year category includes only the 500-year floodplain, and the 500-year total includes all of the categories combined. Refer to section 4.5.2 for floodplain definitions to better understand these flood hazard areas.

Population

Population counts of those living in the floodplain were generated by analyzing County assessor and parcel data that intersect with the 100-YR and 500-year floodplains identified on FIRMs. Using GIS, U.S. Census Bureau information was used to intersect the floodplain and an estimate of population was calculated by weighting the population within each census block and track with the percentage of flood risk area. Using this approach, Table 4-13 and displays the results of this analysis showing how much of the population of Unincorporated Kern County is exposed to flood hazard zones.



Population Exposure

Population Count in the 100-Year and 500-YR Floodplains

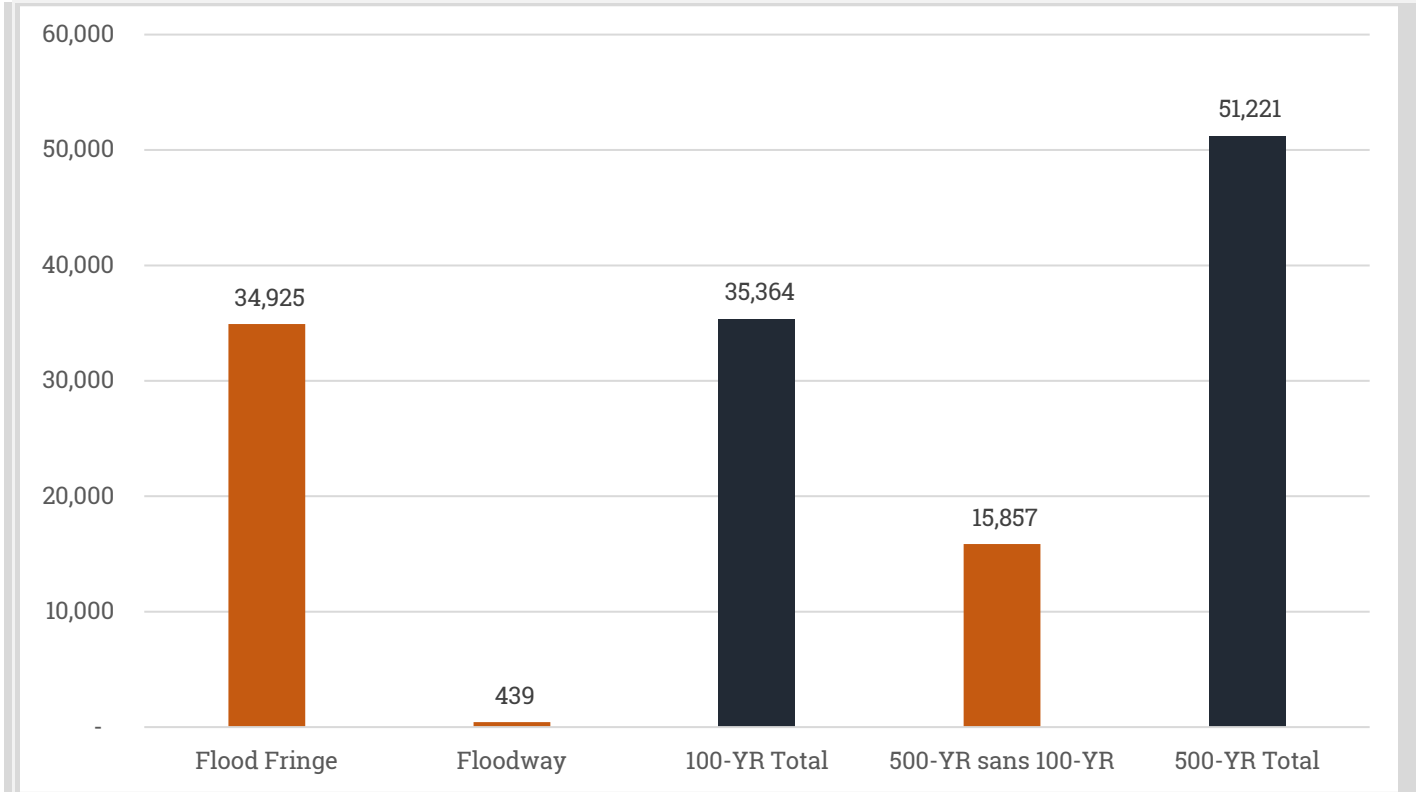


Figure 4-19 Population Exposure to Flood (Unincorporated County)

Table 4-13: Summary Population Exposure to Flood (Unincorporated County)

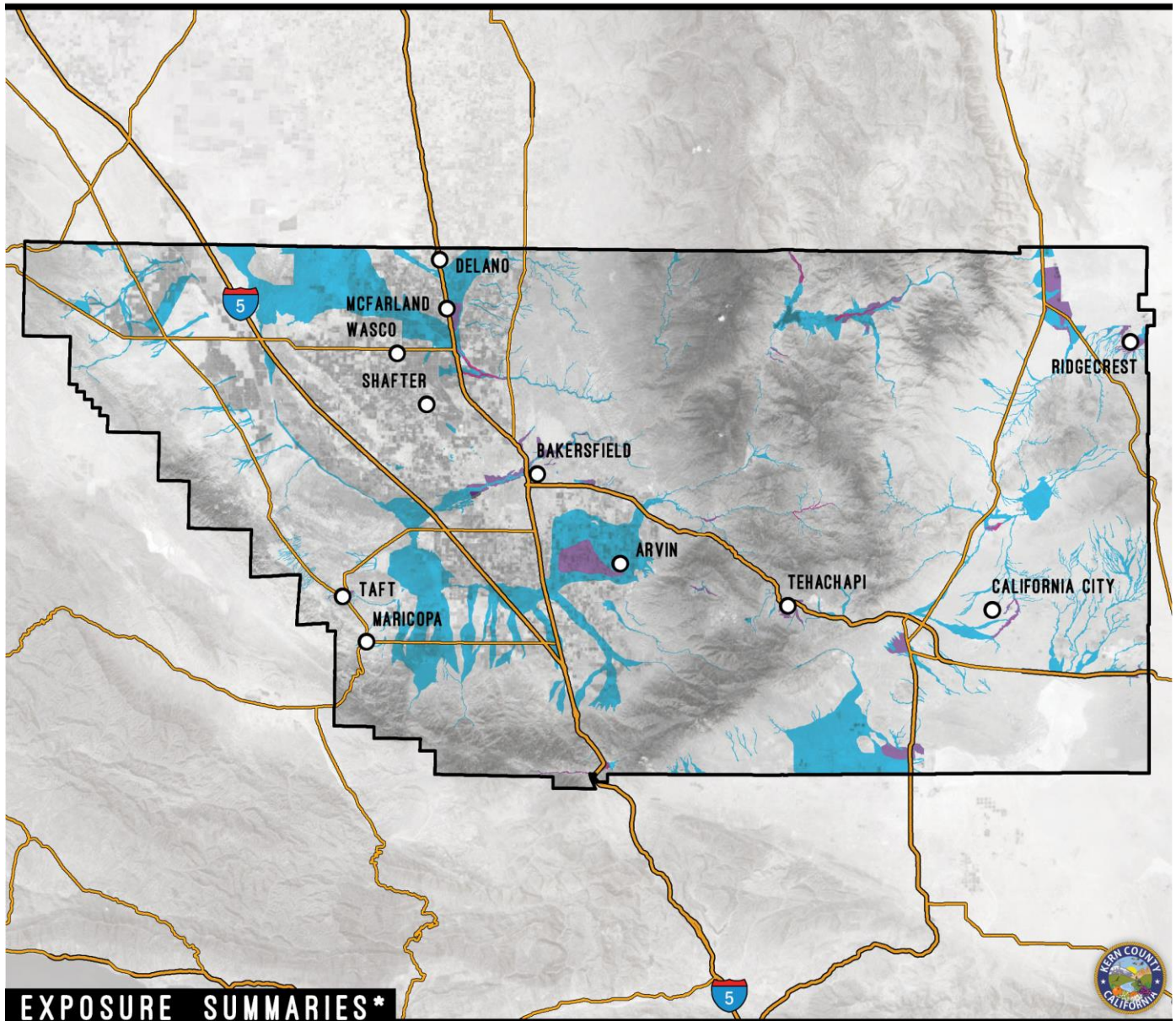
	Total Population
Unincorporated County	299,935

Flood Hazard Zone	Population Count	% of Total
Flood Fringe	34,925	11.64%
Floodway	439	0.15%
100-YR Total	35,364	11.79%
500-YR sans 100-YR	15,857	5.29%
500-YR Total	51,221	17.08%



FEMA FLOOD ZONE VULNERABILITY & EXPOSURE SNAPSHOT

KERN COUNTY



EXPOSURE SUMMARIES*

POPULATION		PARCEL		PARCEL VALUE		CRITICAL INFRASTRUCTURE			
COUNT		COUNT		IMPROVEMENT		COUNT			
51,220	17%	14,968	16%	\$1,497,380,907	14%	Essential Facilities	11	22%	
				CONTENT		High Potential Loss	139	19%	
				\$748,831,453	14%	Transportation & Lifeline	1,104	20%	2,962 <small>LINEAR MILEAGE</small>

MAP LEGEND	
100-YR	100-YR FLOODWAY
500-YR	PROTECTED BY LEVEE

*Exposure summaries include 100-year and 500-year flood zone areas. Hazard data source: FEMA.
(%) - Percent of respective category totals for jurisdiction.

Dynamic Planning + Science
for Kern County, 2019

Figure 4-20: FEMA Flood Zone Exposure and Snapshot Map



Structures and Parcel Value

Table 4-14 summarizes parcels in Unincorporated Kern County that are exposed to flood hazard areas. The beginning of Section 4.5.2 includes definitions of the various flood hazard areas.

Table 4-14: Parcels Exposed to NFIP Flood Zones (Unincorporated County)

	Total Parcels	Total Market Value (\$)	Total Content Value (\$)	Total Value (\$)
Unincorporated County	91,455	\$10,906,675	\$ 5,453,338	\$ 16,360,013

Flood Hazard Zone	Parcel Count	% of Total	Market Value Exposure (\$)	Content Value Exposure (\$)	Total Exposure (\$)	% of Total
Flood Fringe	7,823	8.6%	\$678,412	\$ 339,206	\$ 1,017,618	6.2%
Floodway	143	0.2%	\$ 11,380	\$ 5,690	\$ 17,070	0.1%
100-YR Total	7,966	8.7%	\$ 689,792	\$ 344,896	\$ 1,034,688	6.3%
500-YR sans 100-YR	7,002	7.7%	\$ 807,307	\$ 403,653	\$ 1,210,960	7.4%
500-YR Total	14,968	16.4%	\$ 1,497,099	\$ 748,549	\$2,245,648	13.7%

Currency in Thousands

Note: The table above does not display loss estimation results; the table exhibits total value at risk based upon the hazard overlay and Kern County Assessor data.

Critical Facilities and Infrastructure

Table 4-15 summarizes the critical facilities and infrastructure located in the flood fringe, floodway, and 100-year and 500-year floodplains of Kern County.

Table 4-15: Critical Facility Points in the Floodplain

Infrastructure Type	Flood Fringe	Floodway	100-YR Total	500-YR sans 100-YR	500-YR Total
Essential Facility	6	-	6	5	11
EOC	-	-	-	-	-
Fire Station	6	-	6	2	8
Hospital	-	-	-	-	-
Police Station	-	-	-	-	-
Sheriff Station	-	-	-	3	3
High Potential Loss	79	-	79	60	139
Adult Residential facility	2	-	2	1	3
Child Care Center	11	-	11	9	20
Dam	5	-	5	-	5
Family Child Care Home	9	-	9	9	18
Foster Family Agency	-	-	-	-	-
Historic Building	-	-	-	1	1
Home Care Organization	-	-	-	-	-



Infrastructure Type	Flood Fringe	Floodway	100-YR Total	500-YR sans 100-YR	500-YR Total
Library	6	-	6	2	8
Residential Child Care	1	-	1	-	1
Residential Elder Care	-	-	-	1	1
School	14	-	14	14	28
County Insured Asset*	20	-	20	13	33
Cooling Center	-	-	-	1	1
Healthcare Facility	2	-	2	2	4
Special Needs Facility	9	-	9	7	16
City Hall	-	-	-	-	-
Historic Site	-	-	-	-	-
Transportation and Lifeline	968	14	982	122	1,104
Airport	-	-	-	2	2
Bridge	129	12	141	12	153
Power Plant	22	1	23	1	24
Substation	17	1	18	7	25
Transmission Line Tower	741	-	741	98	839
NG Facility	13	-	13	2	15
Wind Turbine	42	-	42	-	42
Bus Facility	1	-	1	-	1
Potable Water Facility	1	-	1	-	1
Waste Water Facility	1	-	1	-	1
Oil Facility	1	-	1	-	1
Railroad Facility	-	-	-	-	-
Grand Total	1,053	14	1,067	187	1,254

**These insured assets may include critical infrastructure already represented in other Infrastructure Types. For more information on these insured assets, see the Damage Estimation at Section 4.5.2.10.2.*

Linear Utilities

It is important to determine who may be at risk if infrastructure is damaged by flooding. Roads or railroads that are blocked or damaged can isolate residents and can prevent access throughout the county, including for emergency service providers needing to get to vulnerable populations or to make repairs. Bridges washed out or blocked by floods or debris also can cause isolation. Water and sewer systems can be flooded or backed up, causing health problems. Underground utilities can be damaged. Levees can fail or be overtopped, inundating the land that they protect. Table 4-16 shows critical facilities (linear) in the floodplain.



Table 4-16: Lifelines in the Floodplain (Unincorporated County)

Lifelines (miles) - Flood Risk Exposure					
Infrastructure Type (linear)	Flood Fringe	Floodway	100-YR Total	500-YR sans 100-YR	500-YR Total
Levee	304.90	-	304.90	4.01	308.91
NG Pipeline	158.28	0.39	158.67	11.30	169.97
Railroad	79.34	0.89	80.23	15.34	95.57
Street	1600.74	22.18	1622.92	334.39	1957.31
<i>4WD trail</i>	7.58	-	7.58	0.14	7.72
<i>4WD trail, major</i>	-	-	-	0.08	0.08
<i>Alley</i>	0.94	-	0.94	0.55	1.49
<i>Cul-de-sac</i>	0.46	-	0.46	0.13	0.59
<i>Driveway</i>	17.62	0.35	17.97	3.10	21.06
<i>Interstate</i>	43.27	2.02	45.29	10.24	55.53
<i>Local road</i>	636.93	11.63	648.57	124.06	772.63
<i>Local road, major</i>	574.65	3.12	577.77	124.84	702.60
<i>Primary highway</i>	41.93	0.04	41.97	8.84	50.81
<i>Ramp</i>	8.11	0.59	8.70	3.60	12.30
<i>Road, parking area</i>	3.37	-	3.37	-	3.37
<i>Service road</i>	0.53	-	0.53	2.17	2.70
<i>State/county highway</i>	231.44	4.30	235.74	54.57	290.31
<i>State/county highway, major</i>	-	-	-	-	-
<i>Thoroughfare, major</i>	33.83	0.13	33.96	1.82	35.79
<i>Walkway</i>	0.08	-	0.08	0.23	0.31
Transmission Line	387.13	5.78	392.91	37.08	429.99
Grand Total	2530.39	29.25	2559.64	402.12	2961.76

Roads

Kern County Public Works (KCPW) maintains a list of roads throughout the County to avoid during a flood event. That list can be viewed by contacting the Kern County Public Works directly. It is also available on the Kern County Public Works website. KCPW also has real-time closure notifications provided at <https://kernpublicworks.com/transportation/road-status-closures>

Water and Sewer Infrastructure

Water and sewer systems can be affected by flooding. Floodwaters can back up drainage systems, causing localized flooding. Culverts can be blocked by debris from flood events, also causing localized urban flooding. Floodwaters can get into drinking water supplies, causing contamination. Sewer systems can be backed up, causing wastewater to spill into homes, neighborhoods, rivers, and streams.



4.5.2.10.2 Flood Damage Estimation

This section provides estimations of damages to County insured assets and residential buildings in the 100-year and 500-year flood zones. This section first looks at overall damages for County insured assets and residential buildings in the 100-year flood zone, then looks specifically at potential damage to various County insured assets according to type (e.g., administrative buildings, equipment and services, or recreation). This section then repeats this information for the 500-year flood zone.

Damage estimations, as calculated by Hazus, estimate losses to structures from flooding by analyzing the depth of flooding and type of structure. Using historical flood insurance claim data, Hazus estimates the percentage of damage to structures and their contents by applying established damage functions to an inventory. For this analysis, all non-vacant parcels with current market values were used instead of the default inventory data provided with Hazus. Table 4-17 and Figure 4-21 show the 100-year flood loss estimation (based on depth) in NFIP flood zones by occupancy type. Figure 4-22 and Table 4-19 shows the 500-year flood loss estimation (based on depth) in NFIP flood zones by occupancy type.

The County's insurance data was obtained and formatted for use in Hazus for a detailed damage estimation of County-owned insured assets. This combined government dataset has additional information including number of floors, building value, content value, and construction type that greatly enhances Hazus results. Table 4-18 displays damage estimation for County insured assets located in the 100-year flood zone, and Table 4-20 displays the same in the 500-year flood zone.



Damage Estimation for 100 yr. Floodplain

Table 4-17 and Figure 4-21 display damage estimation summaries for the 100-year floodplain in Unincorporated Kern County by occupancy type.

Table 4-17: 100 YR Flood Damage Estimation by Occupancy Type

Building Type	Building Damage (\$)	Building Damage (% of total loss)	Content Damage (\$)	Content Damage (% of total loss)	Total Damage (\$)	Proportion of Loss (%)
County Insured Assets						
Government Service [†]	\$ 117,332	0.1%	\$ 69,557	0.0%	\$ 186,888	0.1%
Emergency Response ^{††}	\$ -	0.0%	\$ -	0.0%	\$ -	0.0%
Residential						
Single Family	\$ 138,281,371	72.2%	\$ 41,169,002	21.5%	\$179,450,373	93.7%
Mobile Home	\$ 2,659,571	1.4%	\$ 876,594	0.5%	\$3,536,165	1.8%
Multi Family Duplex	\$ 4,249,036	2.2%	\$ 2,584,794	1.3%	\$ 6,833,830	3.6%
Multi Family 3-4 Units	\$ 901,543	0.5%	\$ 550,297	0.3%	\$ 1,451,840	0.8%
Multi Family 5-9 Units	\$ 33,282	0.0%	\$13,313	0.0%	\$ 46,595	0.0%
Multi Family 10-19 Units	\$ -	0.0%	\$ -	0.0%	\$ -	0.0%
Multi Family 20-49 Units	\$ -	0.0%	\$ -	0.0%	\$ -	0.0%
Total	\$ 146,242,134	76.4%	\$ 45,263,557	23.6%	\$191,505,691	

[†]Government Services includes: admin, airport, animal, building, bus, correctional, equipment, golf course, health, leased, library, misc, museum, office, park, recreation, relay, shop, storage, vacant, veterans, warehouse, water, yard

^{††}Emergency Response includes Sherriff Offices and Fire Departments

Note: Total Inventory Values
 1 - Building Replacement Costs = \$11,868,231,028.60
 2 - Content Replacement Costs = \$5,673,439,613.70
 3 - Total Value = \$17,541,670,642.30

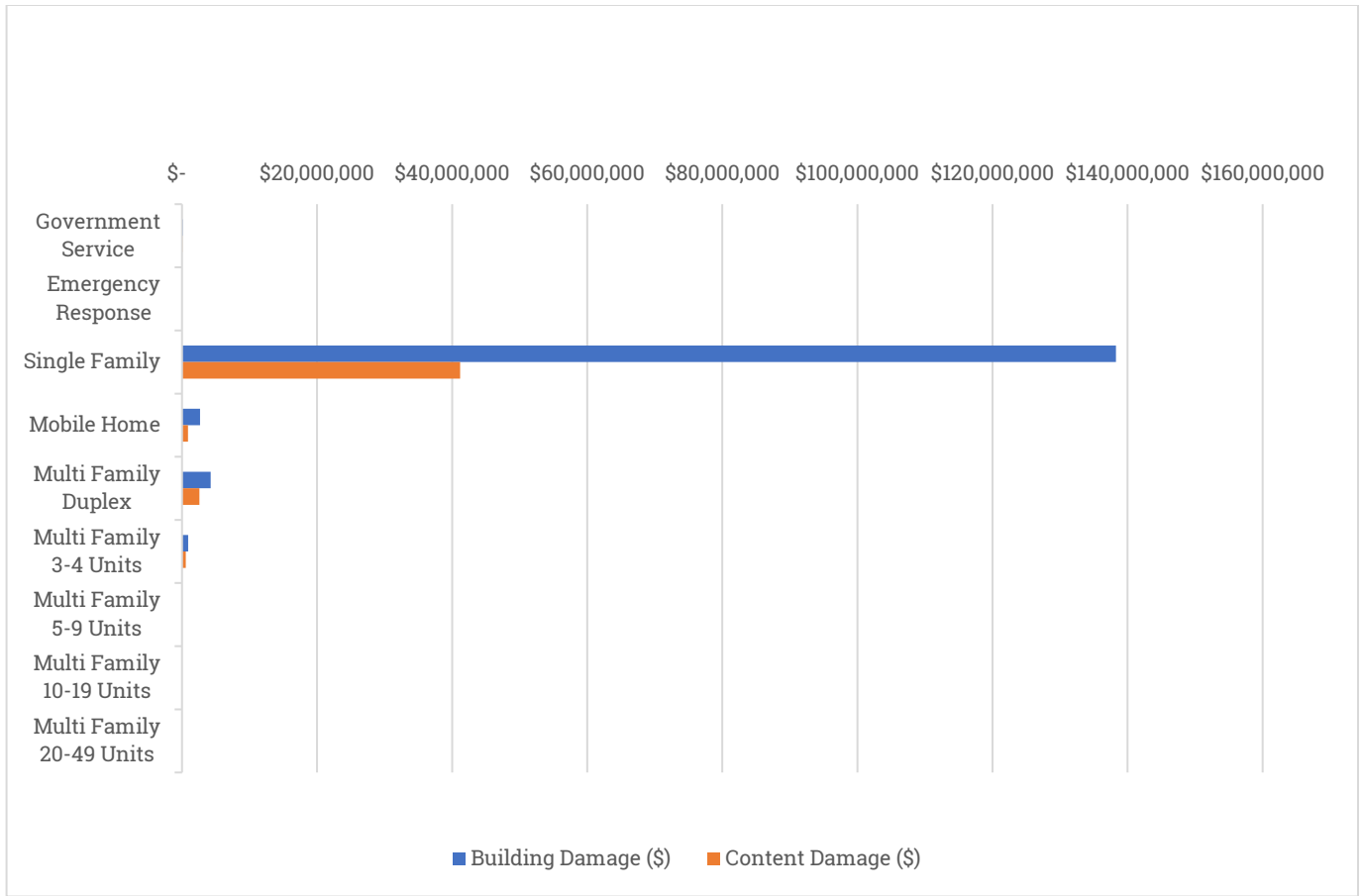


Figure 4-21 100-YR Flood Damage Estimation by Occupancy

Table 4-18 displays damage estimation for County insured assets located in the 100-year flood zone.

Table 4-18 100 YR Flood Damage Estimation of County Insured Assets

Asset Type	Bldg. Count	Bldg. Cost USD	Content Cost USD	Bldg. Dmg. %	Content Dmg. %	Bldg. Loss %	Content Loss %	Total Value Loss USD	Total Loss as % of Values
Administrative & Office	2	\$2,265,678	\$2,000	0.0%	0.0%	\$0	\$0	\$0	0.0%
Admin	2	\$2,265,678	\$2,000	0.0%	0.0%	\$0	\$0	\$0	0.0%
Equipment & Storage	2	\$796,212	\$12,274	0.0%	0.0%	\$0	\$0	\$0	0.0%
Yard	2	\$796,212	\$12,274	0.0%	0.0%	\$0	\$0	\$0	0.0%
Other Assets	3	\$1,396,511	\$620,194	2.8%	20.1%	\$117,332	\$69,557	\$186,888	9.3%
Leased	3	\$1,396,511	\$620,194	2.8%	20.1%	\$117,332	\$69,557	\$186,888	9.3%
Recreation	3	\$1,227,733	\$18,257	0.0%	0.0%	\$0	\$0	\$0	0.0%
Park	1	\$135,359	\$1,000	0.0%	0.0%	\$0	\$0	\$0	0.0%
Recreation	2	\$1,092,374	\$17,257	0.0%	0.0%	\$0	\$0	\$0	0.0%
Services	8	\$5,612,671	\$418,183	0.0%	0.0%	\$0	\$0	\$0	0.0%



Asset Type	Bldg. Count	Bldg. Cost USD	Content Cost USD	Bldg. Dmg. %	Content Dmg. %	Bldg. Loss %	Content Loss %	Total Value Loss USD	Total Loss as % of Values
Fire	4	\$2,893,100	\$306,260	0.0%	0.0%	\$0	\$0	\$0	0.0%
Library	2	\$2,620,412	\$2,000	0.0%	0.0%	\$0	\$0	\$0	0.0%
Sheriff	2	\$99,159	\$109,923	0.0%	0.0%	\$0	\$0	\$0	0.0%
Grand Total	18	\$11,298,805	\$1,070,908	0.5%	3.3%	\$117,332	\$69,557	\$186,888	1.5%

Damage Estimation for 500 yr. Floodplain

Table 4-19 and Figure 4-22 display the damage estimation summaries for the 500 yr. floodplain in Unincorporated Kern County by occupancy type.

Table 4-19: Damage Estimation Summary for 500 yr. Floodplain

Building Type	Building Damage (\$)	Building Damage (% of total loss)	Content Damage (\$)	Content Damage (% of total loss)	Total Damage (\$)	Proportion of Loss (%)
County Insured Assets						
Government Service [†]	\$ 460,297	0.1%	\$ 56,267	0.0%	\$ 516,563	0.3%
Emergency Response ^{††}	\$ 33,985	0.0%	\$8,682	0.0%	\$ 42,667	0.0%
Residential						
Single Family	\$251,352,817	75.7%	\$ 68,051,451	35.5%	\$ 319,404,268	166.8%
Mobile Home	\$ 2,613,035	0.8%	\$1,116,376	0.6%	\$ 3,729,412	1.9%
Multi Family Duplex	\$ 3,570,518	1.1%	\$ 2,041,086	1.1%	\$ 5,611,604	2.9%
Multi Family 3-4 Units	\$ 1,825,942	0.5%	\$ 1,037,288	0.5%	\$ 2,863,229	1.5%
Multi Family 5-9 Units	\$ 822	0.0%	\$ 329	0.0%	\$ 1,151	0.0%
Multi Family 10-19 Units	\$ 38,416	0.0%	\$ 26,380	0.0%	\$ 64,796	0.0%
Multi Family 20-49 Units	\$ -	0.0%	\$ -	0.0%	\$ -	0.0%
Total	\$ 259,895,832	78.2%	\$ 72,337,858	21.8%	\$ 332,233,690	

[†]Government Services includes: admin, airport, animal, building, bus, correctional, equipment, golf course, health, leased, library, misc, museum, office, park, recreation, relay, shop, storage, vacant, veterans, warehouse, water, yard

^{††}Emergency Response includes Sherriff Offices and Fire Departments

Note: Total Inventory Values
 1 - Building Replacement Costs = \$11,868,231,028.60
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 3 - Total Value = \$17,541,670,642.30

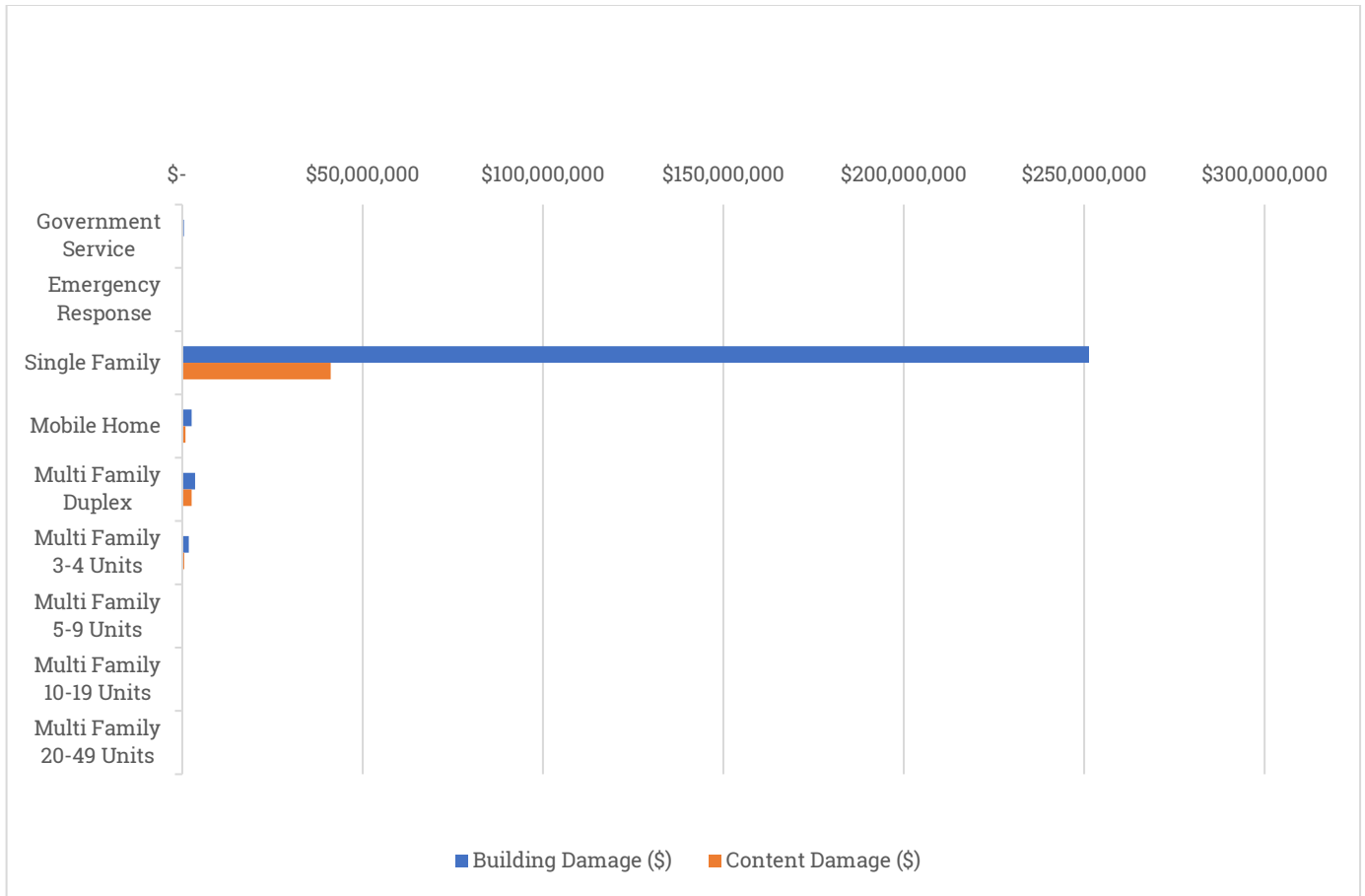


Figure 4-22 500 YR Flood Damage Estimation by Occupancy Type



Table 4-20 displays damage estimation for County facilities located in the 500-year flood zone.

Table 4-20 500-YR Flood Damage Estimation of County Facilities

Row Labels	Bldg. Count	Bldg. Cost USD	Content Cost USD	Bldg. Dmg. %	Content Dmg. %	Bldg. Loss %	Content Loss %	Total Value Loss USD	Total Loss as % of Values
Equipment & Storage	1	\$579,319	\$36,616	4.9%	29.3%	\$28,285	\$10,726	\$39,011	6.3%
Storage	1	\$579,319	\$36,616	4.9%	29.3%	\$28,285	\$10,726	\$39,011	6.3%
Other Assets	2	\$2,000	\$480,268	0.0%	0.0%	\$0	\$0	\$0	0.0%
Leased	2	\$2,000	\$480,268	0.0%	0.0%	\$0	\$0	\$0	0.0%
						\$289,83			
Recreation	3	\$3,414,586	\$49,963	8.7%	58.3%	7	\$45,333	\$335,170	9.7%
Recreation	3	\$3,414,586	\$49,963	8.7%	58.3%	7	\$45,333	\$335,170	9.7%
						\$176,16			
Services	4	\$5,634,901	\$207,245	3.1%	8.9%	0	\$8,889	\$185,049	3.2%
Fire	3	\$1,513,954	\$206,245	2.9%	5.0%	\$33,985	\$8,682	\$42,667	2.5%
						\$142,17			
Library	1	\$4,120,947	\$1,000	3.5%	20.7%	5	\$207	\$142,382	3.5%
						\$494,28			
Grand Total	10	\$9,630,806	\$774,092	4.3%	24.0%	1	\$64,949	\$559,230	5.4%

4.5.2.11 Future Trends in Development

Levees in Kern County provide the community with some degree of protection from flooding. Kern County has a comprehensive floodplain management ordinance (Kern County Code § 17.48) to restrict and mitigate impacts from future development occurring within floodplains and floodways. The County has also undertaken several studies on reducing flood risk and converted those follow up projects into mitigation actions. For example, see Caliente Creek Feasibility Study and Conceptual Plan.

The Kern County Water Agency (KCWA) has limited flood control responsibilities through Improvement District No. 1 in the Rosedale area of Bakersfield and Improvement District No. 3 to provide flood protection to Weldon Valley residents east of Isabella Reservoir. (KCWA, 2018)

The County and its planning partners are equipped to handle future growth within flood hazard areas. The County and all other municipal planning partners have General Plans that address frequently flooded areas in their Safety Elements. All partners have committed to linking their General Plans to this MJHMP. This will create an opportunity for wise land use decisions as future growth impacts flood hazard areas.



4.5.2.12 Flood Hazard Problem Statements

As part of the mitigation action identification process, the Planning Committee for the County and for each jurisdiction identified issues and weaknesses, also called problem statements, for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and flood data. Flood problem statements for the County are listed in Table 4-21; problem statements for all other participating jurisdictions are accessed in Volume 2 of this plan.

Identifying these common issues and weaknesses assists the Planning Committee in understanding the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. See Table 5-6 for a full list of mitigation actions and the corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-21 and Table 5-6.

Table 4-21 Flood Problem Statements

Problem No.	Hazard	Area of Concern	Mitigation Alternatives	Primary Agency	Problem Description	Related MA
ps-FL-KC-173	Flood	Impact	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness	County of Kern	Floods and their impacts will vary by community, and will likely only affect certain areas of the County during specific timeframes.	ma-FL-KC-110, ma-FL-KC-70
ps-FL-KC-174	Flood	Impact	PPRO - Property Protection , NRP - Natural Resource Protection	County of Kern	While many of the floods are shallow sheet flow events, they have resulted in property damage, road washouts, and transportation disruptions.	ma-FL-KC-284
ps-FL-KC-175	Flood	Impact	PPRO - Property Protection , SP - Structural Projects	County of Kern	County bridges are affected by scouring during flooding. Reference the County Poor Health Bridges Report for bridges of poor quality that require attention- https://www.dropbox.com/s/kkb4c685iwlefsd/Poor%20Health%20Bridges%20Report.pdf?dl=1	ma-FL-KC-285
ps-FL-KC-176	Flood	Victim	PRV - Prevention	County of Kern	Problems still occur in areas that have no mapped floodplain or where floodplain maps are inaccurate.	ma-FL-KC-110, ma-FL-KC-70
ps-FL-KC-177	Flood	Victim	PRV - Prevention , PE&A - Public Education & Awareness , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	Approx . 35k residents live within or near the 100 YR Floodplain. Approx. 400 live within proximity to floodway.	ma-FL-KC-70, ma-FL-KC-110, ma-FL-KC-283



Problem No.	Hazard	Area of Concern	Mitigation Alternatives	Primary Agency	Problem Description	Related MA
ps-FL-KC-178	Flood	Victim	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	High Potential Loss Facilities within 100-YR Flood Zone: 11 - Child Care Centers 9 – In-Home Child Care Facilities 9 – Special Needs Facilities	ma-FL-KC-110, ma-FL-KC-70
ps-FL-KC-179	Flood	Threat	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	Based on input from the Golden Hills Community Service District, 2,100-7,500 persons could be impacted by floods in this area. Certain areas of the District’s water system and roads in two road maintenance districts could be affected. Areas could be isolated from emergency services and experience loss of power service, power, and natural gas.	ma-FL-KC-110, ma-FL-KC-70, ma-FL-KC-284
ps-FL-KC-180	Flood	Threat	PPRO - Property Protection , SP - Structural Projects	County of Kern	South Lake – The area along the southeast shore of Lake Isabella has several residential developments constructed on active alluvial fans.	ma-FL-KC-70, ma-FL-KC-283, ma-FL-KC-110
ps-FL-KC-181	Flood	Threat	PPRO - Property Protection , SP - Structural Projects	County of Kern	Lynch Canyon/Mountain Mesa – This residential and commercial area, along the south shore of Lake Isabella, is constructed on an active alluvial fan.	ma-FL-KC-283, ma-FL-KC-70, ma-FL-KC-110
ps-FL-KC-182	Flood	Threat	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	Cache Creek – Pg. 4 of Kern Co. Flood Hazard Mitigation Plan details issues w/ this waterway. https://www.dropbox.com/s/544jltkd9vf6sy4/Kern%20County%20Flood%20Hazard%20Mitigation%20Plan%20%281998%29.pdf?dl=1	ma-FL-KC-303
ps-FL-KC-183	Flood	Threat	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	Little Dixie Wash – Pg. 4 of Kern Co. Flood Hazard Mitigation Plan details issues w/ this waterway. https://www.dropbox.com/s/544jltkd9vf6sy4/Kern%20County%20Flood%20Hazard%20Mitigation%20Plan%20%281998%29.pdf?dl=1	ma-FL-KC-303
ps-FL-KC-184	Flood	Threat	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	Ridgecrest Washes – Pg. 4 of Kern Co. Flood Hazard Mitigation Plan details issues w/ this waterway. https://www.dropbox.com/s/544jltkd9vf6sy4/Kern%20County%20Flood%20Hazard%20Mitigation%20Plan%20%281998%29.pdf?dl=1	ma-FL-KC-303



Problem No.	Hazard	Area of Concern	Mitigation Alternatives	Primary Agency	Problem Description	Related MA
ps-FL-KC-185	Flood	Threat	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	According to the Wheeler Ridge-Maricopa Water Storage District and Kern County Roads Department the following public roads have flood problems, some of which could use improvements to prevent recurrent damage: David Rd at Grapevine Creek and El Paso Creek Sebastian Rd at Grapevine Creek and El Paso Creek Laval Rd at Grapevine Creek Red Rock Randsburg Rd near Red Rock Canyon State Park Copus and Valpredo Rds near the junction of Highway 99 and Interstate 5 Wheeler Ridge Road and Rancho Road near El Paso and Tejon Creek Frazier Mtn Park Rd and bridges along Cuddy Creek has erosion concerns	ma-FL-KC-99
ps-FL-KC-204	Flood	Threat	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	Sandy Creek (Taft/Ford City area) –Pg. 3 of Kern Co. Flood Hazard Mitigation Plan details issues w/ this waterway. https://www.dropbox.com/s/544jltkd9vf6sy4/Kern%20County%20Flood%20Hazard%20Mitigation%20Plan%20%281998%29.pdf?dl=1	ma-FL-KC-284, ma-FL-KC-285
ps-FL-KC-206	Flood	Threat	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	The Southern Stream Group – Pg. 3 of Kern Co. Flood Hazard Mitigation Plan details issues w/ this waterway. https://www.dropbox.com/s/544jltkd9vf6sy4/Kern%20County%20Flood%20Hazard%20Mitigation%20Plan%20%281998%29.pdf?dl=1	ma-FL-KC-99, ma-FL-KC-202
ps-FL-KC-207	Flood	Threat	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	Poso Creek – Pg. 3 of Kern Co. Flood Hazard Mitigation Plan details issues w/ this waterway. https://www.dropbox.com/s/544jltkd9vf6sy4/Kern%20County%20Flood%20Hazard%20Mitigation%20Plan%20%281998%29.pdf?dl=1 Also has potential to break across HWY 99 and create backwater flooding issues as a result of debris and flow impediment.	ma-FL-KC-82, ma-FL-KC-244
ps-FL-KC-208	Flood	Threat	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	Caliente Creek – Pg. 3 of Kern Co. Flood Hazard Mitigation Plan details issues w/ this waterway. https://www.dropbox.com/s/544jltkd9vf6sy4/Kern%20County%20Flood%20Hazard%20Mitigation%20Plan%20%281998%29.pdf?dl=1	ma-FL-KC-99, ma-FL-KC-202, ma-FL-KC-304



Problem No.	Hazard	Area of Concern	Mitigation Alternatives	Primary Agency	Problem Description	Related MA
ps-FL-KC-209	Flood	Threat	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	Upper Caliente Creek – Pg. 3 of Kern Co. Flood Hazard Mitigation Plan details issues w/ this waterway. https://www.dropbox.com/s/544jltkd9vf6sy4/Kern%20County%20Flood%20Hazard%20Mitigation%20Plan%20%281998%29.pdf?dl=1	ma-AH-KC-153, ma-FL-KC-304
ps-FL-KC-210	Flood	Threat	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	North Fork of the Kern River (Kernville) – Pg. 3 of Kern Co. Flood Hazard Mitigation Plan details issues w/ this waterway. https://www.dropbox.com/s/544jltkd9vf6sy4/Kern%20County%20Flood%20Hazard%20Mitigation%20Plan%20%281998%29.pdf?dl=1	ma-FL-KC-303
ps-FL-KC-211	Flood	Threat	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	Lower Kern River/Buena Vista Lake – Pg. 3 of Kern Co. Flood Hazard Mitigation Plan details issues w/ this waterway. https://www.dropbox.com/s/544jltkd9vf6sy4/Kern%20County%20Flood%20Hazard%20Mitigation%20Plan%20%281998%29.pdf?dl=1	ma-FL-KC-303
ps-FL-KC-212	Flood	Threat	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	Onyx – Pg. 4 of Kern Co. Flood Hazard Mitigation Plan, details issues w/ this waterway. Kelso Creek also has a role in this problem area. https://www.dropbox.com/s/544jltkd9vf6sy4/Kern%20County%20Flood%20Hazard%20Mitigation%20Plan%20%281998%29.pdf?dl=1	ma-FL-KC-303
ps-FL-KC-213	Flood	Threat	PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	Kelso Creek – Pg. 4 of the Kern Co. Flood Hazard Mitigation Plan, details issues w/ this waterway. https://www.dropbox.com/s/544jltkd9vf6sy4/Kern%20County%20Flood%20Hazard%20Mitigation%20Plan%20%281998%29.pdf?dl=1	ma-FL-KC-303
ps-FL-KC-214	Flood	Impact	PRV - Prevention , PE&A - Public Education & Awareness , NRP - Natural Resource Protection , SP - Structural Projects	County of Kern	Properties in the area of Kelso Creek have a total value of approx. \$7.5 million, and many properties are not floodproofed to the County's standards. Flooding could affect more than 200 residents in the area. Portions of Kelso Creek Road are at risk with an average cost of repairs of approximately \$80,000 each time it floods.	ma-FL-KC-70, ma-FL-KC-283



4.5.3 Dam Failure Hazard Profile

Dam failures in the United States typically occur in one of four ways:

- Overtopping of the primary dam structure, which accounts for 34 percent of all dam failures, can occur due to inadequate spillway design, settlement of the dam crest, blockage of spillways, and other factors.
- Foundation defects due to differential settlement, slides, slope instability, uplift pressures, and foundation seepage can also cause dam failure. These account for 30 percent of all dam failures.
- Failure due to piping and seepage accounts for 20 percent of all failures. These are caused by internal erosion due to piping and seepage, erosion along hydraulic structures such as spillways, erosion due to animal burrows, and cracks in the dam structure.
- Failure due to problems with conduits and valves, typically caused by the piping of embankment material into conduits through joints or cracks, constitutes 10 percent of all failures. (Federal Emergency Management Agency, 2019)



Many dam failures in the United States have been secondary results of other disasters, such as earthquakes, landslides, extreme storms, massive snowmelt, equipment malfunction, structural damage, foundation failures, and sabotage. Poor construction, lack of maintenance and repair, and deficient operational procedures are preventable or correctable by a program of regular inspections. Terrorism and vandalism are serious concerns that all operators of public facilities must plan for; these threats are under continuous review by public safety agencies. (*Id.*) Dam inundation zones are shown in Figure 4-24.

Levees

Levees are a common form of flood protection throughout the Kern County. Figure 4-25 displays the levee system in Kern County. A levee is built parallel to a body of water in order to protect life and property on the other side by channeling the water away during flooding.

Levees do not provide full protection from flooding. They are designed to provide a specific level of flood protection and large flood events can cause levees to be overtopped or fail. Levee failure is most likely during large flood events where a large surge of water leads to erosion of the soil that constitutes the levee itself.

4.5.3.1 Plans, Policies, and Regulatory Environment

1972 National Dam Safety Act

The potential for catastrophic flooding due to dam failures led to passage of the 1972 National Dam Safety Act, Pub. Law No. 92-367. The National Dam Safety Program requires a periodic engineering analysis of every major dam in the country. The goal of this FEMA-monitored effort is to identify and mitigate the risk of dam failure so as to protect the public lives and property.



FERC Dam Safety Program

The Federal Energy Regulatory Commission (FERC) has the largest dam safety program in the United States. FERC cooperates with a large number of federal and state agencies to ensure and promote dam safety and, more recently, homeland security. There are 3,036 dams that are part of regulated hydroelectric projects in the FERC program. Two-thirds of these are more than 50 years old. (Federal Energy Regulatory Commission, 2011) As dams age, concern about their safety and integrity grows, so oversight and regular inspection are important. FERC staff inspects hydroelectric projects on an unscheduled basis to investigate the following:

- Potential dam safety problems
- Complaints about constructing and operating a project
- Safety concerns related to natural disasters
- Issues concerning compliance with the terms and conditions of a license.

Every five years, an independent consulting engineer, approved by the FERC, must inspect and evaluate projects with dams higher than 10 meters (32.8 feet), or with a total storage capacity of more than 2,000 acre-feet. (*Id.*)

FERC staff monitors and evaluates seismic research in geographic areas where there are concerns about seismic activity. This information is applied in investigating and performing structural analyses of hydroelectric projects in these areas. FERC staff also evaluates the effects of potential and actual large floods on the safety of dams. During and following floods, FERC staff visits dams and licensed projects, determines the extent of damage, if any, and directs any necessary studies or remedial measures the licensee must undertake. The FERC publication *Engineering Guidelines for the Evaluation of Hydropower Projects* guides the FERC engineering staff and licensees in evaluating dam safety. The publication is frequently revised to reflect current information and methodologies.

The FERC requires licensees to prepare emergency action plans and conducts training sessions on how to develop and test these plans. The plans outline an early warning system if there is an actual or potential sudden release of water from a dam due to failure. The plans include operational procedures that may be used, such as reducing reservoir levels and reducing downstream flows, as well as procedures for notifying affected residents and agencies responsible for emergency management. These plans are frequently updated and tested to ensure that everyone knows what to do in emergency situations. (*Id.*)

U.S. Army Corps of Engineers Dam Safety Program

The U.S. Army Corps of Engineers ("Corps") is responsible for safety inspections of some federal and non-federal dams in the United States that meet the size and storage limitations specified in the National Dam Safety Act. The Corps has inventoried such dams and surveyed each state and federal agency's capabilities, practices, and regulations regarding design, construction, operation, and maintenance of the dams. The Corps develops guidelines for inspection and evaluation of dam safety.



California Division of Safety of Dams

California's Division of Safety of Dams, a division of the Department of Water Resources, monitors the dam safety program at the state level. When a new dam is proposed, Division staff inspects the site. The Division reviews dam applications and building plans to ensure that the dam is designed to meet minimum requirements and that the design is appropriate for known geologic conditions. It also inspects construction to ensure that the work is done in accordance with the approved plans. The Division inspects constructed dams on an annual basis to ensure that it is performing as intended and is not developing problems. Roughly a third of these inspections include in-depth instrumentation reviews. The Division periodically reviews the stability of dams and their major appurtenances in light of improved design approaches and requirements, as well as new findings regarding earthquake hazards and hydrologic estimates in California. (Cal. Dep't of Water Resources, 2019)

Senate Bill 92: Dam Safety

Senate Bill 92 was signed into law on June 27th, 2017 and it provides new requirements focused on dam safety. Specifically, it requires dam owners to submit inundation maps to the Department of Water Resources. After they have been approved, the dam owner must then submit an emergency action plan (EAP) to Cal OES. These need to be approved by Cal OES, and resubmitted every 10 years. (California Office of Emergency Services, 2020)

Kern County General Plan

The 2004 Kern County General Plan includes many policies, implementation measures, and goals in the Land Use and Safety Elements that limit development occurring in inundation zones and mitigate impacts from such development.

Policies around dam failure include limited development in inundation zones, generally forbidding structures to be built without emergency response and evacuation plans or without inundation mitigation capabilities. The Kern County General Plan is currently being updated and will consider this MJHMP Update as it continues to shape policies around dam failure mitigation and protection.



4.5.3.2 Past Events

No dams have failed in Kern County to date. As the risk assessment for Kern County illustrates, the chances of a dam failure area low, but the consequences of such are quite severe.

The most recent concerning dam failure in California was the 2017 collapse of a spillway on the Oroville Dam in Butte County, California. Oroville Dam is the largest facility within the State Water Project in California; the dam stores 3.5 million acre-feet of water, and serves as important flood control for the Feather River. In 2017, after substantial runoff from the Sierra Nevadas, Lake Oroville was full, and the spillway was opened to release extra water downstream.



Figure 4-23. Oroville Dam Spillway after 2017 failure.

Source: <https://www.watereducation.org/aquapedia/oroville-dam>

“Spillways” are dam safety features that allow water to overtop the dam if the reservoir fills too quickly. Spillway overflow events, often referred to as “design failures,” result in increased discharges downstream and increased flooding potential.

The force of the release gouged a large crater in the concrete spillway and required the California Department of Water Resources (DWR) to halt water releases via that conduit. The high lake level then created fear that erosion would compromise the integrity of the auxiliary spillway and flood the city of Oroville and surrounding communities. Thousands were evacuated, and eventually runoff receded without further issue. Ultimately, an independent analysis concluded that poor design and construction and inadequate state oversight contributed to the collapse of the concrete spillway. (Water Education Foundation, 2020)

The Oroville Dam spillway failure triggered inspection of 93 dam spillways across California through the new Spillway Re-evaluation Program. (Cal. Dep't of Water Resources, 2019)



4.5.3.3 Location

According to California Department of Water Resources Division of Dam Safety and USACE National Inventory of Dams (NID), there are 25 dams in Kern County, shown in Table 4-23. These dams are rated for hazard potential according to the descriptors in Table 4-22. FEMA developed the classification system shown in for potential dam failures. California DWR Division of Safety of Dams (DSOD) includes a fourth category “Extremely High”. This hazard potential classification system categorizes dams based on the probable loss of human life and the impacts on economic, environmental, and lifeline interests. Improbable loss of life exists where persons are only temporarily in the potential inundation area.

Figure 4-24 shows inundation zones for select dams in Kern County. Areas of the County most threatened by dam inundation are those within the Central Valley.

Figure 4-25 displays the levee system in Kern County. During large flood events, a levee failure could impact populations, properties, and infrastructure within levee inundation zones.

Table 4-22: FEMA & DSOD Hazard Potential Classification

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None expected	Low and generally limited to owner
Significant	None expected	Yes
High	Probable. One or more expected	Yes (but not necessary for this classification)
Extremely High	One or more and inundating an area of 1,000+ population	Inundation of facilities/infrastructure, posing significant threat to public safety determined case-by-case by DSOD

Source: Federal Guidelines for Dam Safety- Hazard Potential Classification Systems for Dams, April 2004, DSOD Jurisdictional Dams

Table 4-23: Dams in Kern County

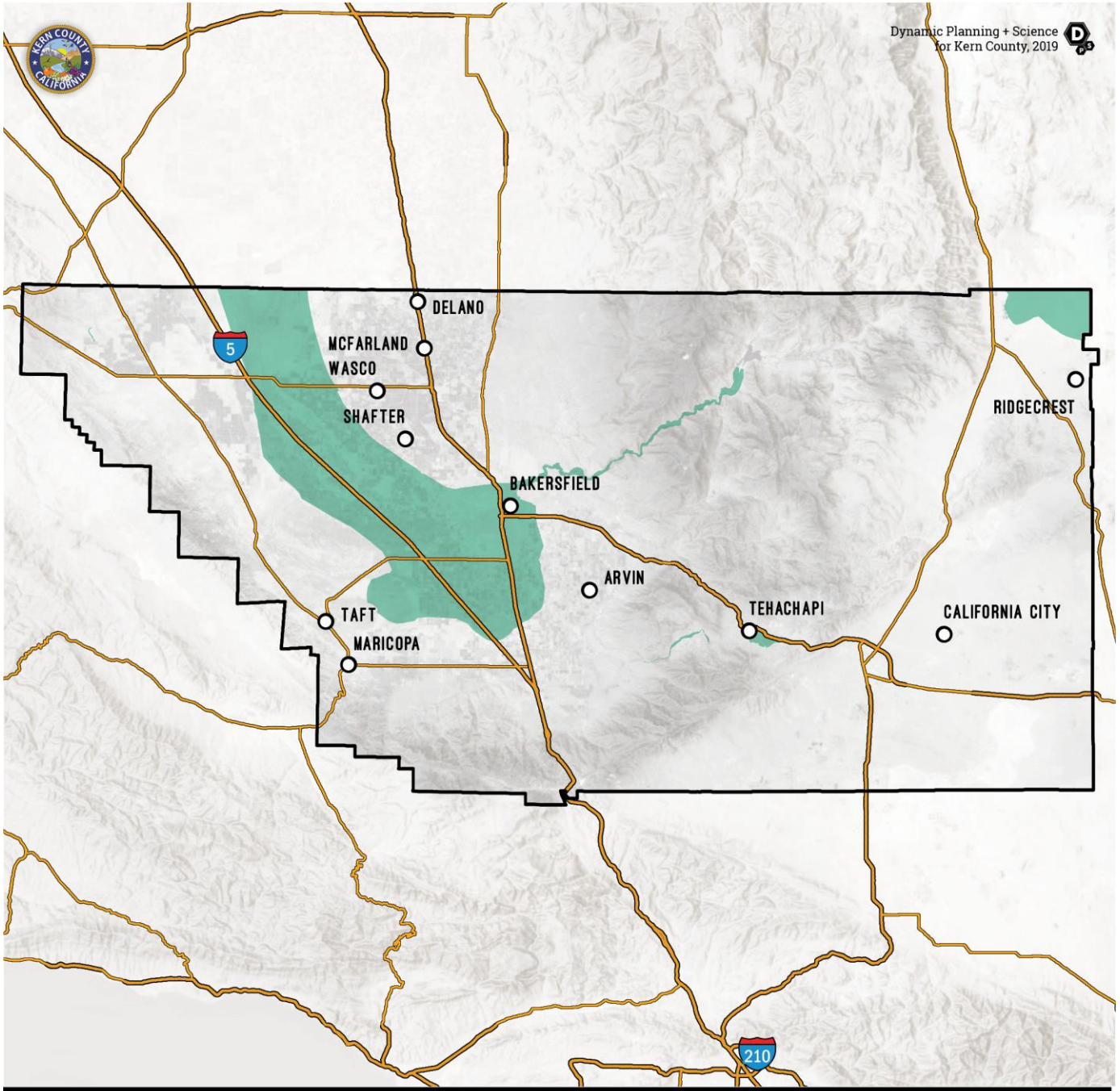
DWR ID	NID ID	Dam Name	Owner	Year Built	Hazard
No. 1083-2	CA01213	Antelope	Tehachapi Cummings County Water District	1987	H+
No. 738-6	CA01498	Bap Pond 5	Rio Tinto	2008	L
No. 738-7	CA01552	Bap Pond 6	Rio Tinto	2012	L
No. 738-8	CA10410	Bap Pond 7	Rio Tinto	Unknown	L
No. 738-5	CA01430	Bap Ponds 1, 2, 3, 4	Rio Tinto	2003	L
No. 1051-0	CA00884	Berrenda Mesa	Berrenda Mesa Water District	1967	S
No. 737-0	CA00722	Big Four Ranch	Kern-Tulare Water District	1970	S
No. 1083-3	CA01310	Blackburn	Tehachapi Cummings County Water District	1991	H
No. 738-4	CA01190	Borax Solar Evaporation Ponds	Rio Tinto	1984	L



DWR ID	NID ID	Dam Name	Owner	Year Built	Hazard
No. 738-0	CA01099	Boron Tails Pond	Rio Tinto	1975	L
No. 738-3	CA01178	Boron Tails Pond 6	Rio Tinto	1980	L
No. 732-0	CA00717	Buena Vista	J.G. Boswell Company & Tenneco West	1890	S
No. 735-2	CA00721	Buena Vista	Kern County Parks and Recreation	1973	S
No. 104-2	CA00429	Diversion No. 1	Southern California Edison	1906	H
	CA01558	Fresh Water Impoundment	Oil-Dri Corporation of America	Unknown	H
	CA01559	Fresh Water Pond	CALMAT	Unknown	H
No. 2011-2	CA01181	Irrigation Reservoir	City of Bakersfield	1980	H
	CA10106	Isabella Dam	CESPK	1953	H
No. 1083-0	CA00587	J.C. Jacobsen	Tehachapi Cummings County Water District	1973	H
No. 735-0	CA00720	Kern River County Park	Kern County Parks and Recreation	1959	H
	CA01614	Kern River No. 1 Forebay	Southern California Edison	Unknown	S
	CA01595	Rio Bravo Canal	Olcese Water District	1988	S
	CA01595	Rio Bravo Diversion	Olcese Water District	1989	L
No. 734-0	CA00718	Tejon Storage 1	Tejon Ranch Company	1946	L
No. 734-2	CA00729	Tejon Storage 2	Tejon Ranch Company	1956	L

Note: Hazard Definitions: L – Low; S – Significant; H – High; H+ – Extremely High

Source: *DWR Jurisdictional Dams & USACE National Inventory of Dams*



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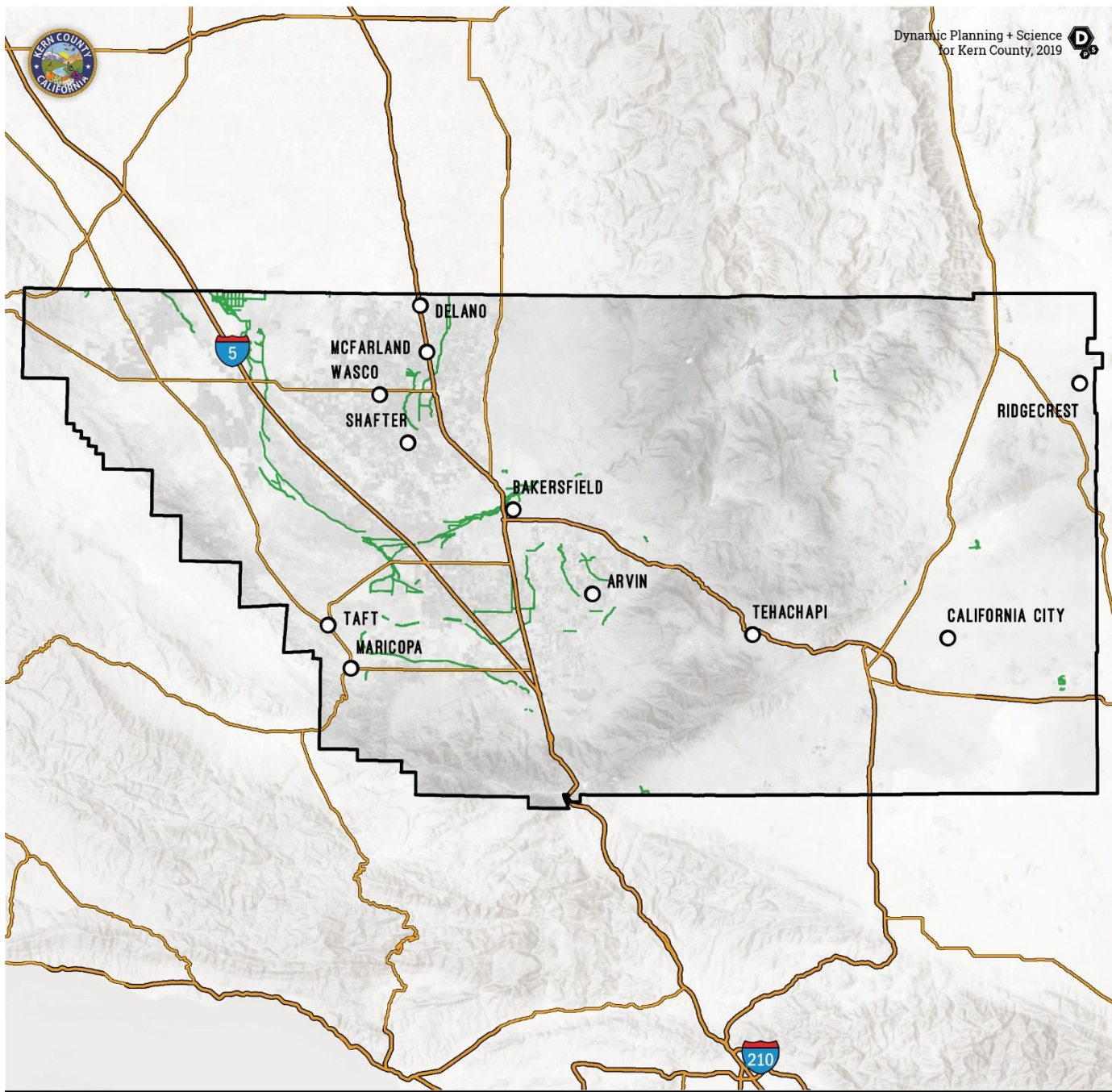
DAM INUNDATION ZONES KERN COUNTY

*Data sources: Cal OES.

MAP LEGEND

INUNDATION ZONE

Figure 4-24: Dam Inundation Exposure



LEVEES - NFHL (FEMA) KERN COUNTY

*Data sources: FEMA

MAP LEGEND

- COUNTY OF KERN
- LEVEE - NFHL

Figure 4-25 Kern County Levee System



4.5.3.4 Severity and Extent

Dam failure can be catastrophic to all life and property downstream. The potential loss of life and property is difficult to quantify. For example, the FEMA hazard potential classification system in Table 4-22 does not contemplate the improbable loss of life of the occasional recreational user of the river and downstream lands, passer-by, or non-overnight outdoor user of downstream lands. In any classification system, all possibilities cannot be defined. High usage areas of any type should be considered appropriately. Judgment and common sense must ultimately be a part of any decision on classification. Further, no allowances for evacuation or other emergency actions by the population should be considered because emergency procedures should not be a substitute for appropriate design, construction, and maintenance of dam structures.

4.5.3.5 Frequency/ Probability of Future Occurrences

The probability of any type of dam failure is low in today's regulatory and dam safety oversight environment. Dam failure events usually coincide with events such as earthquakes, landslides, and excessive rainfall and snowmelt.

4.5.3.6 Warning Time

Warning time for dam failure depends on the cause of failure. In an event of extreme precipitation or massive snowmelt, evacuations can be planned with sufficient time. In the event of a structural failure due to earthquake, there may be no warning time. A dam's structural type also affects warning time. Earthen dams do not tend to fail instantaneously. Once a breach is initiated, discharging water erodes the breach until the reservoir water is depleted, or the breach resists further erosion. Concrete gravity dams also tend to have an initial partial breach. The time of breach formation ranges from a few minutes to a few hours. Several participating jurisdictions have established protocols in their emergency operations plans for warning and response to imminent dam failure within the flood warning. These protocols are tied to emergency action plans created by the dam owner.

Developing Emergency Action Plans (EAPs) for all high and significant hazard potential dams for Kern County is critical to reducing the risks of loss of life and property damage from dam failures. The EAP contains procedures and information to assist the dam owner in issuing early warning and notification messages to emergency management authorities. The EAP also contains inundation maps to identify the areas subject to flooding in the unlikely event of dam failure.



EAPs are critical in identifying areas downstream from dams requiring warning and evacuation in the event of dam failure. Documented cases have demonstrated that warning and evacuation time for EAPs can dramatically influence the loss of life. Loss of life can vary from 0.02 percent of the persons-at-risk when the warning time is 90 minutes to 50 percent when less than 15 minutes, (Graham, Assessing the Threat to Life from Dam Failure, 1988) One USGS report states that the average number of fatalities per dam failure is 19 times greater when there is little to no warning. (U.S. Geological Survey, 1985) Dam breach inundation studies usually assume one of two failure scenarios:

- Flows from a dam failure during “fair weather” or “sunny day” conditions with the reservoir at the normal pool level and receiving normal inflow (usually insignificant). A fair weather failure is generally considered to have the most potential for loss of human life, primarily due to the element of surprise.
- Flows from a dam failure during flood conditions or the inflow design flood. Failure during flood conditions is considered to show the upper limit of inundation and to have less potential for loss of human life because the downstream population is “on alert.” The flood conditions scenario is more expensive to analyze due to the additional cost for the necessary watershed and spillway studies.

Inundation mapping shows a continuous “line of inundation” identifying the area potentially at risk in event of dam failure. It starts at the dam and continues downstream to a point where the breach flood no longer poses a risk to life and property damage, such as a large river or reservoir with the capacity of storing the flood waters. The need to consider the “domino effect” should be made on a case-by-case basis if the assumed failure of a dam would cause the failure of any downstream dams.



4.5.3.7 Secondary Hazards

Dam failure can cause severe downstream flooding, depending on the magnitude of the failure. Other potential secondary hazards of dam failure are landslides around the reservoir perimeter, bank erosion on the rivers, and destruction of downstream habitat.

4.5.3.8 Dam Failure Vulnerability Assessment

The primary danger associated with dam failure is high velocity flooding downstream of the dam and limited warning times for evacuation. Vulnerability varies by community and depends on the particular dam profile and the nature and extent of the failure. Vulnerable populations are present directly below the dam and may include those who are incapable of escaping the area within the allowable time frame. This population includes the elderly and young who may be unable to self-evacuate from the inundation area. Vulnerable populations also include those who would not have adequate warning from a television or radio emergency warning system. Dam inundation zones created by Cal OES were used in conjunction with the inventory listed in Table 4-23 to develop at risk populations and loss estimations for dam failure.

4.5.3.8.1 Exposure Analysis

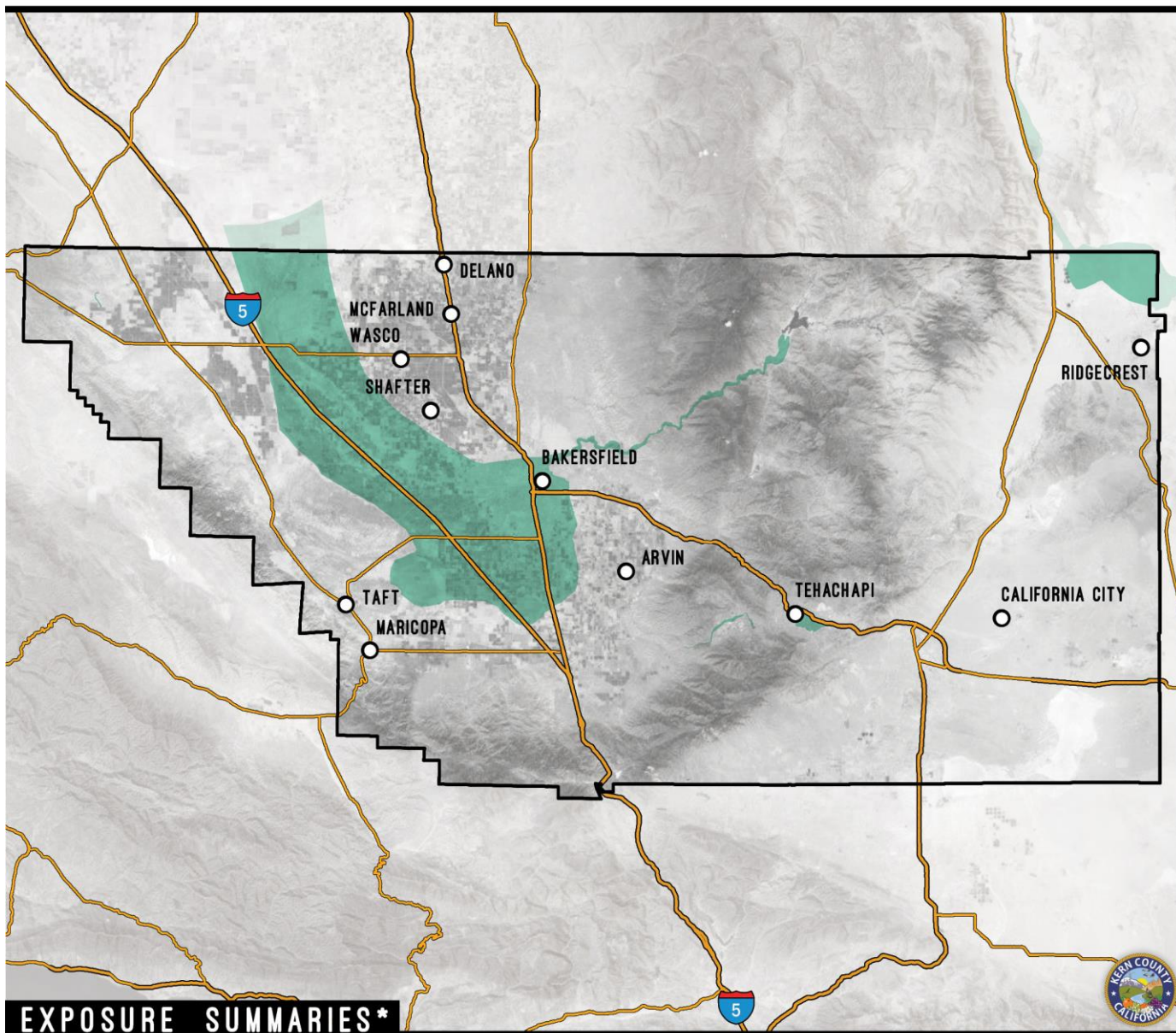
4.5.3.8.2 Population

Vulnerable populations are all populations downstream from dam failures that are incapable of escaping the area within the allowable time frame. This population includes the elderly and young who may be unable to get themselves out of the inundation area. The vulnerable population also includes those who would not have adequate warning from a television, radio emergency warning system, have not registered with reverse 911, or do not have cell phones that can receive amber alerts. The potential for loss of life is affected by the capacity and number of evacuation routes available to populations living in areas of potential inundation. The entire population in a dam failure inundation zone is exposed to the risk of a dam failure. The estimated population exposed to dam inundation is summarized in Figure 4-26 and Table 4-24.



DAM INUNDATION VULNERABILITY & EXPOSURE SNAPSHOT

KERN COUNTY



EXPOSURE SUMMARIES*

POPULATION		PARCEL		PARCEL VALUE		CRITICAL INFRASTRUCTURE		
COUNT	(%)	COUNT	(%)	IMPROVEMENT	(%)	COUNT	(%)	LINEAR MILEAGE
100,612	34%	24,411	27%	\$3,356,526,800	31%	10	20%	
				\$1,678,343,900	31%	207	29%	
						1,258	22%	2,605
								17%

INUNDATION ZONE

MAP LEGEND

*Exposure summaries include all dam inundation areas. Hazard data source: Cal OES.
(%) - Percent of respective category totals for jurisdiction.

Dynamic Planning + Science
for Kern County, 2019

Figure 4-26: Dam Failure Vulnerability Snapshot Map



Table 4-24: Population Exposure to Dam Failure (Unincorporated County)

	Total Population
Unincorporated County	299,935

Dam Inundation Zone	Population Count	% of Total
Antelope Kern	1,101	0.37%
Berranda Mesa	-	0.00%
Blackburn	1,393	0.46%
South Haiwee	184	0.06%
Isabella	98,408	32.81%
JC Jacobsen	62	0.02%
Total*	100,621	33.55%

*Total population is not equal to sum of all dam inundation zones due to dissolved overlapping inundation areas.

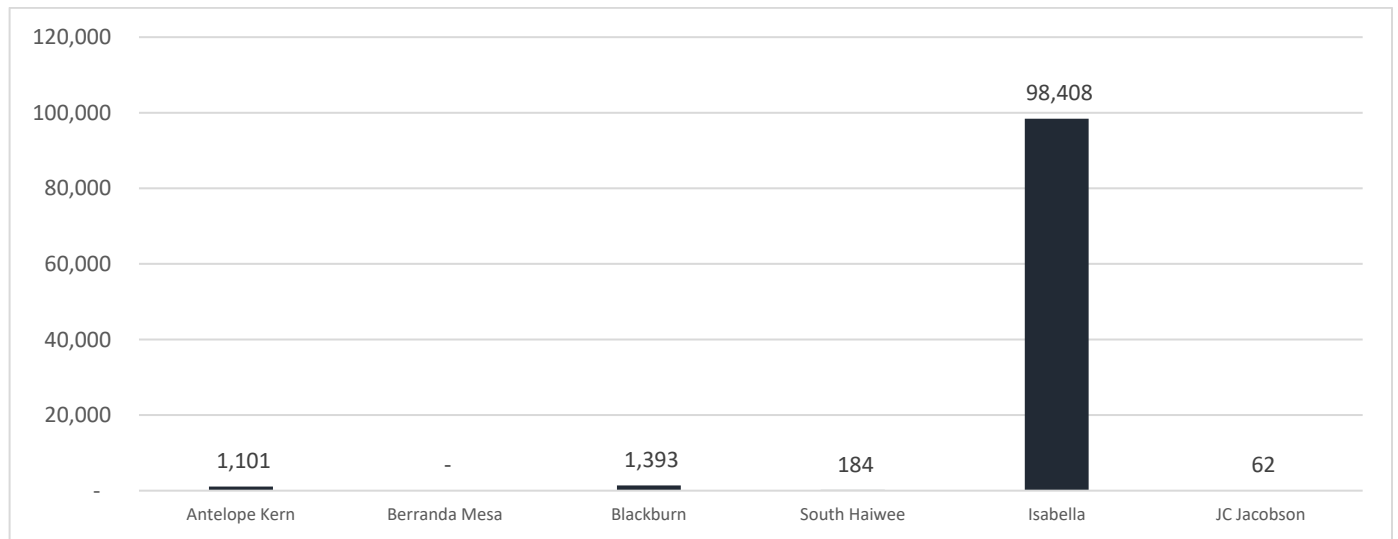


Figure 4-27 Population Exposure to Dam Inundation by Zone

4.5.3.8.3 Property

Vulnerable properties are those closest to the dam inundation area. These properties would experience the largest, most destructive surge of water. Low-lying areas where water would collect are also vulnerable. Transportation routes, discussed below, are also vulnerable to dam inundation and have the potential to be eliminated or compromised, creating isolation issues. Vulnerable populations may not be able to withstand a large water surge. Utilities such as overhead power, cable, and phone lines could also be vulnerable. Loss of these utilities could create additional isolation issues for the inundation areas. Table 4-25 below displays parcel values exposed to dam inundation.



Table 4-25: Parcel Values at Risk from Dam Inundation (Unincorporated County)

	Total Parcels	Total Market Value (\$)	Total Content Value (\$)	Total Value (\$)
Unincorporated County	91,455	\$ 10,906,675	\$ 5,453,338	\$ 16,360,013

Dam Inundation Zone	Parcel Count	% of Total	Market Value Exposure (\$)	Content Value Exposure (\$)	Total Exposure (\$)	% of Total
Antelope Kern	22	0.0%	\$5,407.08	\$ 2,703.54	\$ 8,110.61	0.05%
Berrenda Mesa	1	0.0%	\$ -	\$-	\$ -	0.00%
Blackburn	19	0.0%	\$ 2,173.95	\$ 1,086.97	\$ 3,260.92	0.02%
South Haiwee	-	0.0%	\$ -	\$-	\$ -	0.00%
Isabella	24,363	26.6%	\$ 3,347,387.22	\$ 1,673,693.61	\$5,021,080.83	30.69%
JC Jacobsen	9	0.0%	\$ 1,547.71	\$ 773.85	\$ 2,321.56	0.01%
Dam Inundation Area*	24,411	26.7%	\$ 3,356,366	\$ 1,678,183	\$ 5,034,549	30.8%

Currency in Thousands

**Totals are not equal to sum of all dam inundation zones due to dissolved overlapping inundation areas.*

4.5.3.8.4 Critical Facilities & Lifelines

Low-lying areas are vulnerable to dam inundation, especially transportation routes. This includes all roads, railroads, and bridges in the flow path of water, which could be eliminated or compromised in a dam inundation event. The most vulnerable critical facilities are those in poor condition that would have difficulty withstanding a large surge of water. Utilities such as overhead power lines and communication lines could also be vulnerable. Loss of these utilities could create additional compounding issues for emergency management officials attempting to conduct evacuation and response actions. Table 4-26 and Table 4-27 summarizes critical infrastructure exposed to dam failure in Kern County.

Table 4-26: Critical Infrastructure Points in Dam Inundation Zones (Unincorporated County)

Infrastructure Type	TOTAL FEATURE COUNT	Antelope Kern	Berrenda Mesa	Blackburn	South Haiwee	Isabella	JC Jacobsen
Essential Facility	10	-	-	-	-	10	-
EOC	-	-	-	-	-	-	-
Fire Station	8	-	-	-	-	8	-
Hospital	1	-	-	-	-	1	-
Police Station	-	-	-	-	-	-	-
Sheriff Station	1	-	-	-	-	1	-
High Potential Loss	1	-	-	-	-	1	-
Adult Residential facility	21	-	-	-	-	21	-
Child Care Center	33	-	-	-	-	33	-



Infrastructure Type	TOTAL FEATURE COUNT	Antelope Kern	Berrenda Mesa	Blackburn	South Haiwee	Isabella	JC Jacobsen
Dam	5	-	-	-	-	5	-
Family Child Care Home	-	-	-	-	-	-	-
Foster Family Agency	-	-	-	-	-	-	-
Historic Building	-	-	-	-	-	-	-
Home Care Organization	-	-	-	-	-	-	-
Library	3	-	-	-	-	3	-
Residential Child Care	-	-	-	-	-	-	-
Residential Elder Care	12	-	-	-	-	12	-
School	40	-	-	-	-	40	-
County Insured Asset*	28	-	-	-	-	28	-
Cooling Center	2	-	-	-	-	2	-
Healthcare Facility	11	-	-	-	-	11	-
Special Needs Facility	52	-	-	-	-	52	-
City Hall	-	-	-	-	-	-	-
Historic Site	-	-	-	-	-	-	-
Transportation and Lifeline	-	-	-	-	-	-	-
Airport	-	-	-	-	-	-	-
Bridge	107	-	-	4	-	103	-
Power Plant	19	-	-	-	-	19	-
Substation	23	-	-	-	-	23	-
Transmission Line Tower	1070	-	-	-	13	1055	2
NG Facility	29	-	-	-	-	29	-
Wind Turbine	-	-	-	-	-	-	-
Bus Facility	-	-	-	-	-	-	-
Potable Water Facility	-	-	-	-	-	-	-
Waste Water Facility	-	-	-	-	-	-	-
Oil Facility	9	-	-	-	-	9	-
Railroad Facility	1	-	-	-	-	1	-
Grand Total	1475	-	-	4	13	1456	2

* These insured assets may include critical infrastructure already represented in other Infrastructure Types.



Table 4-27: Miles of Critical Infrastructure (Linear) in Dam Inundation Zones (Unincorporated County)

Infrastructure Type (linear)	TOTAL DAM EXPOSURE	Antelope Kern	Berranda Mesa	Blackburn	South Hatwee	Isabella	JC Jacobson
Levee	267.96	-	-	-	-	268.0	-
NG Pipeline	242.46	-	-	-	-	241.1	1.4
Railroad	54.22	2.6	-	0.0	-	51.6	-
Street	1613.76	6.9	-	17.8	127.9	1457.6	5.0
<i>4WD trail</i>	2.39	-	-	-	2.3	0.0	-
<i>4WD trail, major</i>	-	-	-	-	-	-	-
<i>Alley</i>	0.64	-	-	-	-	0.6	-
<i>Cul-de-sac</i>	1.15	-	-	-	0.4	0.8	-
<i>Driveway</i>	21.97	-	-	-	-	22.0	-
<i>Interstate</i>	123.44	3.0	-	4.5	-	115.9	-
<i>Local road</i>	513.79	1.3	-	5.3	26.5	479.2	2.0
<i>Local road, major</i>	424.38	1.3	-	5.1	18.2	397.8	2.8
<i>Primary highway</i>	12.07	-	-	-	-	12.1	-
<i>Ramp</i>	21.66	-	-	-	0.0	21.6	-
<i>Road, parking area</i>	0.35	-	-	-	-	0.3	-
<i>Service road</i>	1.41	-	-	-	-	1.4	-
<i>State/county highway</i>	311.81	1.3	-	2.8	-	307.6	0.2
<i>State/county highway, major</i>	0.02	-	-	-	-	0.0	-
<i>Thoroughfare, major</i>	177.96	-	-	-	80.5	97.5	-
<i>Walkway</i>	0.69	-	-	-	-	0.7	-
Transmission Line	426.55	0.9	-	4.4	5.2	415.8	0.5
Grand Total	3792.15	10.3	-	22.1	133.1	2434.0	6.8

4.5.3.8.5 Future Trends in Development

Flooding due to a dam failure event is likely to exceed the special flood hazard areas regulated through local floodplain ordinances. The County and participating jurisdictions should consider the dam failure hazard when permitting development in mapped dam inundation zones and downstream of high hazard and significant hazard dams in the County. Low hazard dams could become significant or high hazard dams if development occurs below them.



4.5.3.9 Dam Failure Hazard Problem Statements

As part of the mitigation action identification process, the Planning Committee for the County and for each jurisdiction identified issues and weaknesses, also called problem statements, for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and flood data. Dam failure hazard problem statements are listed in Table 4-28; problem statements for all other participating jurisdictions are accessed in Volume 2 of this plan.

Identifying these common issues and weaknesses assists the Planning Committee in understanding the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. Projects or actions have been developed to mitigate each problem identified. See Table 5-6 for a full list of mitigation actions and corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-28 and Table 5-6.

Table 4-28 Dam Failure Problem Statements

Problem No.	Hazard	Area of Concern	Mitigation Alternatives	Primary Agency	Problem Description	Related MA
ps-DF-KC-252	Dam Failure	Victim	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness , ES - Emergency Services , SP - Structural Projects	County of Kern	There are approx. 100,000 people and 24,000 parcels within the dam inundation zone in the unincorporated county	ma-DF-KC-384
ps-DF-KC-253	Dam Failure	Impact	PPRO - Property Protection , PE&A - Public Education & Awareness , ES - Emergency Services , SP - Structural Projects	County of Kern	There are approx. 213 critical infrastructure facilities and 2.5 miles of transportation and lifelines within the dam inundation zone in the unincorporated county	ma-DF-KC-384
ps-DF-KC-254	Dam Failure	Victim	PPRO - Property Protection , PE&A - Public Education & Awareness , ES - Emergency Services , SP - Structural Projects	County of Kern	Cascading effects of dam inundation could include loss of power and blocked access for evacuation routes	ma-DF-KC-384



4.5.4 Earthquake Hazard Profile

Earthquake is the sudden shaking of the ground caused by the passage of seismic waves through Earth's rocks. Seismic waves are produced when some form of energy stored in Earth's crust is suddenly released, usually when masses of rock straining against one another suddenly fracture and "slip." Earthquakes associated with this type of energy release are called tectonic earthquakes. The energy also can be released by elastic strain, gravity, chemical reactions, or even the motion of massive bodies. Earthquakes occur most often along geologic *faults*, narrow zones where rock masses move in relation to one another. (United States Geological Survey, n.d.)



Earthquakes have different properties depending on the type of fault that causes them. See Figure 4-28. The usual fault model has a "strike" (that is, the direction from north taken by a horizontal line in the fault plane) and a "dip" (the angle from the horizontal shown by the steepest slope in the fault). The lower wall of an inclined fault is called the footwall. Lying over the footwall is the hanging wall. When rock masses slip past each other parallel to the strike, the movement is known as strike-slip faulting. Movement parallel to the dip is called dip-slip faulting. In dip-slip faults, if the hanging-wall block moves downward relative to the footwall block, it is called "normal" faulting; the opposite motion, with the hanging wall moving upward relative to the footwall, produces reverse or thrust faulting. (*Id*)

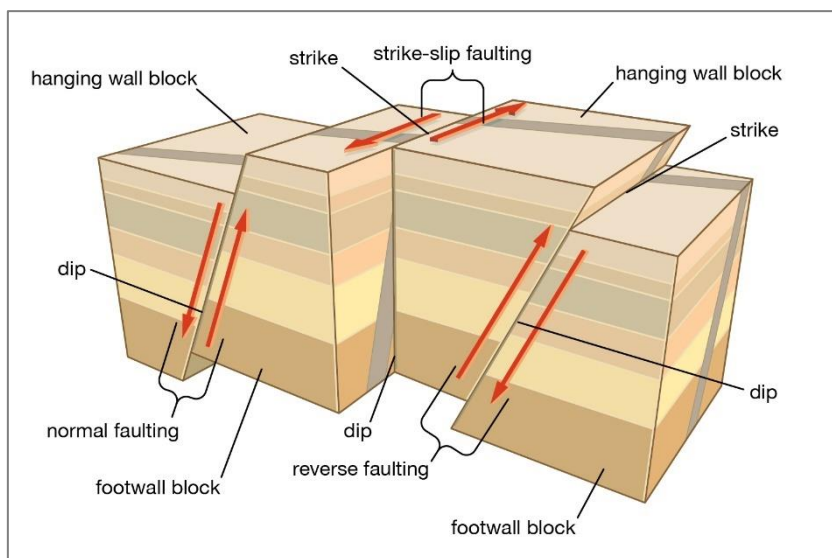


Figure 4-28: Earthquake Faulting

As a fault rupture progresses along or up the fault, rock masses are flung in opposite directions and thus spring back to a position where there is less strain. (*Id*)

Soil Liquefaction

Soil liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. Soil liquefaction and related phenomena have been responsible for tremendous amounts of damage in historical earthquakes around the world. Soil liquefaction occurs when material that is ordinarily a solid behaves like a liquid. Saturated or partially-saturated soil substantially loses strength and stiffness in response to an applied stress such as shaking during an earthquake or other sudden change in stress condition. The phenomenon is most often observed in saturated, loose, low-density or uncompacted, sandy soils. Loose sand tends to compress when a load is applied. Dense sands, by contrast, tend to expand in volume or 'dilate'. If the soil is saturated by water, which often occurs when



soil is below the water table or sea level, then water fills the pore spaces between soil grains. (United States Geological Survey, n.d.)

Artificial Induction

Earthquakes are sometimes caused by human activities, including the injection of fluids into deep wells, pumping of ground water, the excavation of mines, and the filling of large reservoirs. In fluid injection, the slip is thought to be induced by premature release of elastic strain, as in the case of tectonic earthquakes, after fault surfaces are lubricated by the liquid. (Encyclopedia Britannica, 2020)

Earthquake Classifications

Earthquakes are typically classified in one of two ways: by the amount of energy released, measured as magnitude; or by the impact on people and structures, measured as intensity. (United States Geological Survey, n.d.)

Magnitude

The most common method for measuring earthquakes is magnitude, which measures the strength of earthquakes. While majority of scientists currently use either the Mw Scale or Modified Mercalli Intensity (MMI) Scale to measure an earthquake, the Richter scale is the most well-known measurement for earthquake magnitude. The magnitude of an earthquake is related to the total area of the fault that ruptured, as well as the amount of offset (displacement) across the fault. As shown in Table 4-29, there are seven earthquake magnitude classes, ranging from great to micro. A magnitude class of great can cause tremendous damage to infrastructure, compared to a micro class, which results in minor damage to infrastructure. (Id)

Earthquake Magnitude Classes		
Magnitude Class	Magnitude Range (M = Magnitude)	Description
Great	M > 8	Tremendous damage
Major	7 <= M < 7.9	Widespread heavy damage
Strong	6 <= M < 6.9	Severe damage
Moderate	5 <= M < 5.9	Considerable damage
Light	4 <= M < 4.9	Moderate damage
Minor	3 <= M < 3.9	Rarely causes damage.
Micro	M < 3	Minor damage

Table 4-29: Moment Magnitude Scale



Intensity

The effects of an earthquake in a particular location are measured by intensity. Earthquake intensity decreases with increasing distance from the epicenter of the earthquake. The Modified Mercalli Intensity value assigned to a specific site after an earthquake has a more meaningful measure of severity to the nonscientist than the magnitude because intensity refers to the effects experienced at that place. (United States Geological Survey)

The **lower** numbers of the intensity scale generally deal with the manner in which the earthquake is felt by people. The **higher** numbers of the scale are based on observed structural damage. Structural engineers usually contribute information for assigning intensity values of VIII or above. Table 4-30 is an abbreviated description of the levels of Modified Mercalli intensity. *(Id)*

Table 4-30: Modified Mercalli intensity level descriptions

Intensity	Shaking	Description/Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Source: USGS, Abridged from *The Severity of an Earthquake*, USGS General Interest Publication 1989-288-913



Ground Motion

Earthquake hazard assessment is also based on expected ground motion. This involves determining the annual probability that certain ground motion accelerations will be exceeded, then summing the annual probabilities over the time period of interest. The most commonly-mapped ground motion parameters are the horizontal and vertical peak ground accelerations (PGA) for a given soil or rock type. Instruments called accelerographs record levels of ground motion due to earthquakes at stations throughout a region. These readings are recorded by state and federal agencies that monitor and predict seismic activity. (Pacific Northwest Seismic Network)

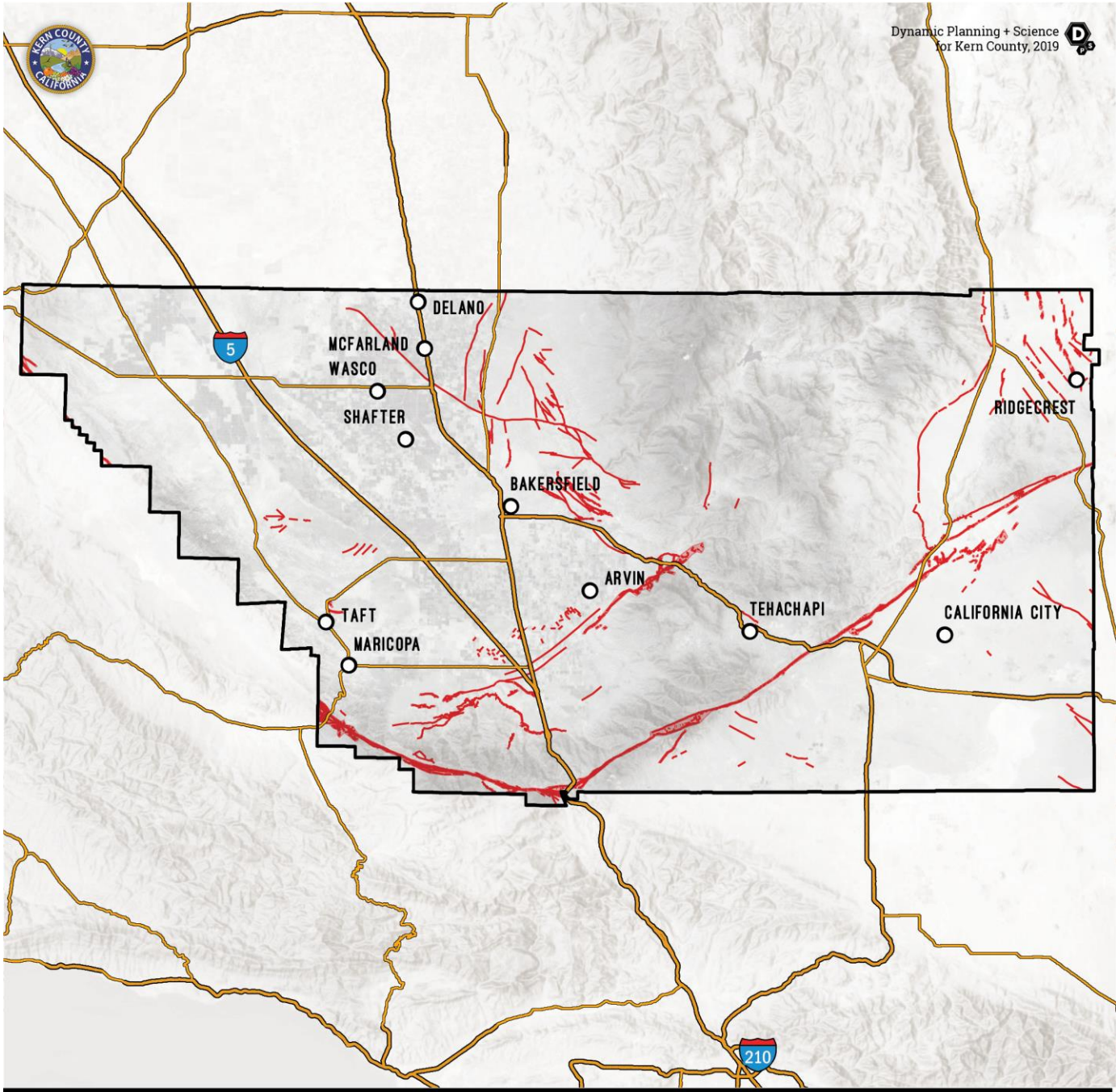
Maps of PGA values form the basis of seismic zone maps that are included in building codes such as the International Building Code. Building codes that include seismic provisions specify the horizontal force due to lateral acceleration that a building should be able to withstand during an earthquake. PGA values are directly related to these lateral forces that could damage “short period structures” such as single-family dwellings. Longer-period response components determine the lateral forces that damage larger structures with longer natural periods such as apartment buildings, factories, high-rises, bridges. Table 4-31 lists damage potential and perceived shaking by PGA factors, compared to the Mercalli scale. (USGS)

Table 4-31: Modified Mercalli Scale and Peak Ground Acceleration

Modified Mercalli Scale	Perceived Shaking	Potential Structure Damage		Estimated PGA (%g)
		Resistant Buildings	Vulnerable Buildings	
I	Not Felt	None	None	<0.17%
II-III	Weak	None	None	0.17% - 1.4%
IV	Light	None	None	1.4% - 3.9%
V	Moderate	Very Light	Light	3.9% - 9.2%
VI	Strong	Light	Moderate	9.2% - 18%
VII	Very Strong	Moderate	Moderate/Heavy	18% - 34%
VIII	Severe	Moderate/Heavy	Heavy	34% - 65%
IX	Violent	Heavy	Very Heavy	65% - 124%
X - XII	Extreme	Very Heavy	Very Heavy	>124%

Note: PGA measured in percent of g, where g is the acceleration of gravity

Sources: USGS, 2008; USGS, 2010



**REGIONAL FAULT LINES
 KERN COUNTY**

*Data sources: USGS.

MAP LEGEND

- QUATERNARY FAULTS (USGS)
- EARTHQUAKE FAULT ZONE OF REQUIRED INVESTIGATION (CGS)

Figure 4-29: Zones of Required Investigation

Quaternary faults are those active faults that have been recognized at the surface and which have evidence of movement in the past 1.6 million years - the duration of the Quaternary Period.



4.5.4.1 Plans, Policies, and Regulatory Environment

Alquist-Priolo Earthquake Fault Zoning Act and Seismic Hazards Mapping Act (1972)

The 1971 San Fernando Earthquake resulted in the destruction of numerous structures built across its path. This led to passage of the Alquist-Priolo Earthquake Fault Zoning Act in 1972. This Act prohibits the construction of buildings for human occupancy across active faults in the State of California. Similarly, extensive damage caused by ground failures during the 1989 Loma Prieta Earthquake focused attention on decreasing the impacts of landslides and liquefaction. This led to the creation of the Seismic Hazards Mapping Act, which increases construction standards at locations where ground failures are probable during earthquakes. Figure 4-29 displays these zones of required investigation in Kern County.

2019 California Building Standards Code

The 2019 California Building Code, adopted by Kern County in January 2020, includes materials requirements, construction methods, and maintenance standards for earthquake protection and resiliency.

Kern County General Plan

The 2004 Kern County General Plan includes many policies, implementation measures, and goals in the Safety Element that limit development occurring in earthquake fault lines and mitigate impacts from such development.

Policies around earthquakes include limited development near earthquake fault lines, generally forbidding structures for human occupancy that are located near active fault lines and determining the liquefaction potential of different sites more broadly. The Kern County General Plan is currently being updated and will consider this MJHMP Update as it continues to shape policies around earthquake mitigation and protection.



4.5.4.2 Past Events

Numerous earthquakes have occurred in and near Kern County over the last twenty years. *See* Table 4-32 for earthquake events 4.5 magnitude or greater since 2000. Ridgecrest experienced 6.4 and 7.1 magnitude earthquakes on July 4th and 5th of 2019 which was the largest earthquake in southern California since 1999. The July 2019 earthquake resulted in significant damage to homes in the Ridgecrest area where some homes were ripped off foundations. No deaths or major building damage resulted from the July 2019 earthquake. ([KSBY News, 2019](#))

Table 4-32: Earthquakes in Kern County 4.5 Magnitude or Greater Since 2000

Date	Location	Magnitude
1/25/2003	20km NE of Arvin	4.9
9/29/2004	25km SSW of Bodfish	5.0
4/16/2005	20km ESE of Maricopa	4.6
9/22/2005	14km NW of Grapevine	4.7
2/24/2016	6km SSW of Wasco	4.9
7/4/2019	200km NE of Los Angeles near Ridgecrest	6.4
7/5/2019	11 km from 7/4/2019 earthquake (in San Bernardino County)	7.1

Source: USGS

4.5.4.3 Location

The Alquist-Priolo Act established earthquake fault zones in California. These Alquist-Priolo Earthquake Fault Zones encompass surface traces of active faults that have a potential for future surface fault rupture and are mapped across California. These zones have been established by the State Geologist and indicate an active fault within the zone. The fault may pose a risk to existing or future structures from a surface fault rupture. The major faults include the San Andreas fault system running north and south on the western portion of the County, several smaller faults of the Sierra Nevadas to the west of the San Andreas fault, and the Garlock and Ridgecrest faults to the east. Figure 4-29 shows the location of fault zones as well as the underlying quaternary faults near the County.



4.5.4.4 Frequency/ Probability of Future Occurrences

This plan utilizes two mapping tools for understanding the frequency and probability of an earthquake occurring at different faults in and around Kern County: 1) the Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3)(see Figure 4-30) and 2) the Earthquake Shaking Potential based on the USGS National Seismic Hazard Model (see Figure 4-31). Both mapping tools are described in more detail below.

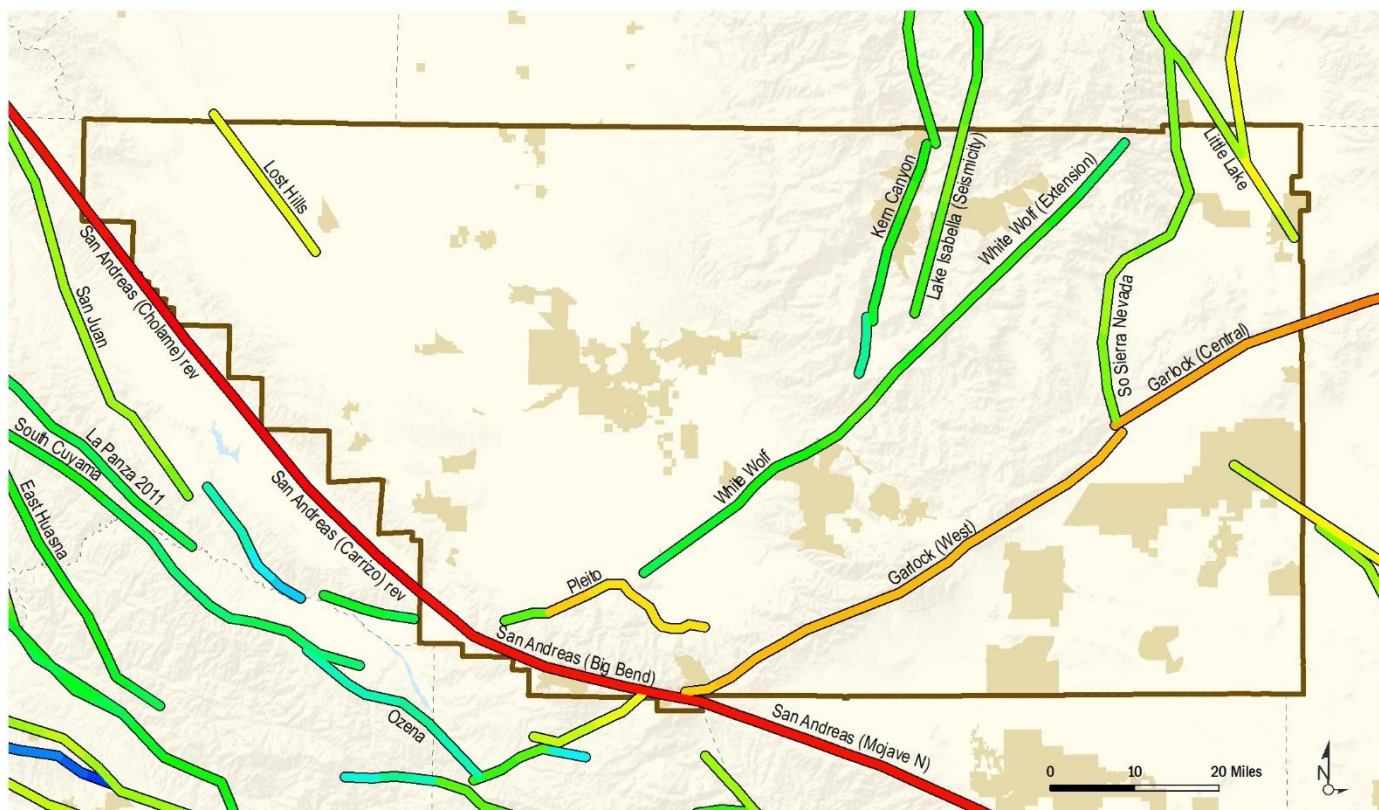
Importantly, these probabilistic maps were used to determine the earthquake scenario used for the vulnerability analysis. While the Risk Assessment Mapping Platform (RAMP) contains exposure and damage estimations around the 7.2 M White Wolf scenario, this plan focuses on the South San Andreas Mojave North scenario, because it is the scenario with the highest likelihood of severe shaking and of producing a magnitude 6.7 earthquake within 30 years. See Figure 4-32 for an overview map of the scenario and Section 4.5.4.4.3 for further explanation on why this scenario was chosen.

According the California State Hazard Mitigation Plan, earthquakes large enough to cause moderate damage to structures—those of 5.5 Magnitude (M.) or larger—occur three to four times a year statewide. Strong earthquakes of 6 to 6.9 M. strike on an average of once every two to three years. Major earthquakes of 7 to 7.9 M. occur in California about once every 10 years.

4.5.4.4.1 30-Year Earthquake Probability (UCERF3)

Probability of earthquake events is based on the approximate location of earthquake faults within and outside the Kern County region. The Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3)⁷ is a comprehensive model of earthquake occurrence for California. It represents the best available science for authoritative estimates of the magnitude, location, and likelihood of potentially damaging earthquakes in California. According to UCERF3 and as shown in Figure 4-30, the San Andreas fault has a 10% to 100% probability of occurrence within 30 years, the highest probability affecting the County. A study by the USGS indicates that the Big Bend section of the San Andreas fault near Tejon Pass is overdue for a strong or major earthquake. (Scharer, 2017) On average, an earthquake occurs in this area every 100 years, with the most recent 7.9 Fort Tejon earthquake occurring in 1857. (Id.) The Garlock Central and West faults have close to a 5% chance of an occurrence within thirty years, with many other faults having less than a 1% chance of annual occurrence.

⁷ Quaternary faults are those active faults that have been recognized at the surface and which have evidence of movement in the past 1.6 million years - the duration of the Quaternary Period.



UCERF3 Fault Probabilities

NOTE: Fault Locations are uncertain by up to several km
www.wgcep.org/UCERF

30 Year M \geq 6.7 Probability



Figure 4-30 Fault Probability Map for Kern County

4.5.4.4.2 Earthquake Shaking Potential

The Earthquake Shaking Potential Map, Figure 4-31, shows potential seismic shaking from anticipated future earthquakes. It is probabilistic in the sense that the analysis takes into consideration the uncertainties in the size and location of earthquakes and the resulting ground motions that can affect a particular site. (CGS, 2020) It is also useful in understanding the probability of severe shaking in different locations throughout the County, as discussed in Section 4.5.4.5.

The map is expressed in terms of probability of exceeding a certain ground motion. The map shows a 2% probability of exceeding one second of ground motion in 50 years. Earthquake shaking potential in California is calculated based on the USGS National Seismic Hazard Model and in partnership with California Geological Survey (CGS). Earthquake shaking potential also considers historic earthquakes, slip rates on major faults, deformation throughout the region, and the potential for amplification of seismic waves by near-surface geologic materials. (CGS, 2020)



The map depicts a range of lower hazard to higher hazard probability, where higher hazard areas are those regions near major, active faults that will on average experience stronger earthquake shaking more frequently. This intense shaking can damage even strong, modern buildings. Lower hazard areas are those regions that are distant from known, active faults that will experience lower levels of shaking less frequently. In most earthquakes, only weaker, masonry buildings would be damaged. However, very infrequent earthquakes could still cause strong shaking in those locations. (D. Branum, 2016)

The shaking potential is calculated as the level of ground motion that has a 2% chance of being exceeded in 50 years, which is the same as the level of ground-shaking with about a 2500-year average repeat time. Relatively long-period (1.0 second) earthquake shaking is shown. Long-period shaking affects tall, relatively flexible buildings, but also correlates well with overall earthquake damage. Although the greatest hazard is in areas of highest intensity as shown in Figure 4-31, no region is immune from potential earthquake damage. (*Id.*)

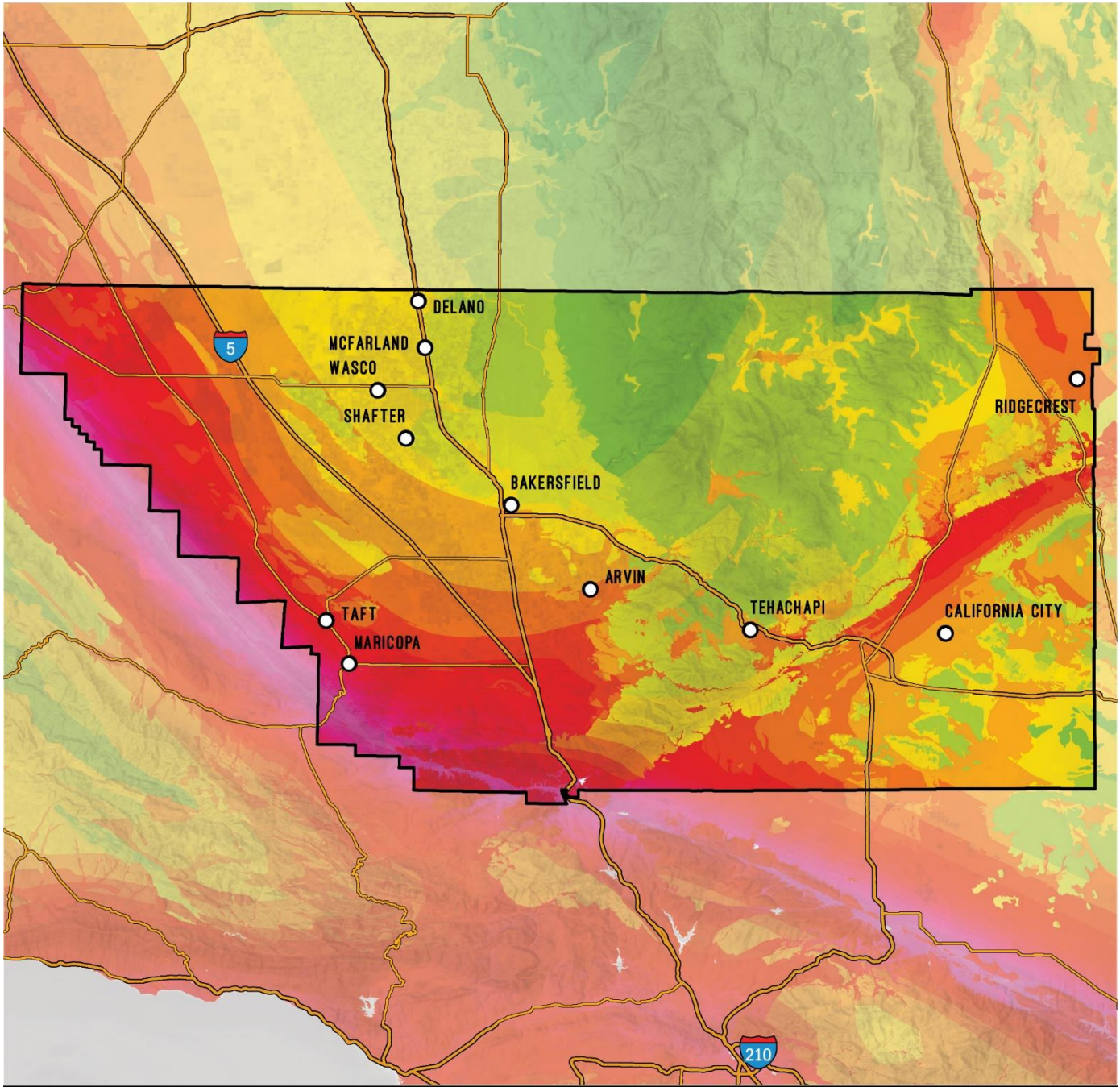
The potential for earthquake ground shaking, as defined by the U.S. National Seismic Hazard Model, is used by engineers to design buildings for larger ground motions than what we think will occur during a 50-year interval, which will make buildings safer than if they were only designed for the ground motions that we expect to occur in the next 50 years. (USGS, 2018 United States (Lower 48) Seismic Hazard Long-term Model, 2020)

4.5.4.4.3 S. San Andreas Mojave N. Earthquake Scenario

The South San Andreas Mojave North earthquake scenario was chosen from a range of regional, scenario-based shakemaps available from USGS for the vulnerability analysis. The shakemap data consist of peak ground velocity, peak ground acceleration, peak spectral accelerations in an earthquake scenario. The San Andreas fault has the highest probability of an earthquake greater than 6.7 M. within Kern County, with a greater than 10% annual probability. See Figure 4-30. Likewise, the most significant shaking potential depicted in the ShakeMap in Figure 4-31 centers around the San Andreas fault system

The RAMP mapping tool also displays the 7.2 M White Wolf scenario which would occur along the white wolf fault line, displayed in Figure 4-30. The White Wolf scenario was one of the scenarios included in the 2014 MJHMP and also matches the 7.7 M Bakersfield earthquake of 1952. (United States Geological Survey, 1984) This plan chose to highlight the South San Andreas Mojave scenario in the vulnerability analysis over the White Wolf scenario because it has a higher probability of occurring and has a higher shaking potential, as displayed in Figure 4-30 and Figure 4-31.

Section 4.5.4.8.1 analyzes the County's exposure to this scenario and Section 4.5.4.8.2 details damage estimation to residential properties and County facilities for this scenario.



EARTHQUAKE SHAKING POTENTIAL KERN COUNTY

*Data sources: California Geological Survey MS48 (Revised 2016)
Earthquake Shaking Potential for California

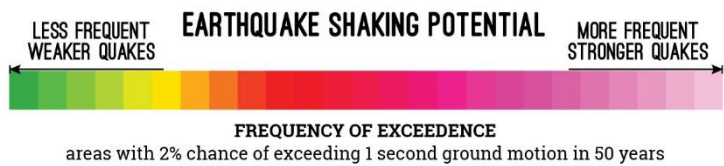
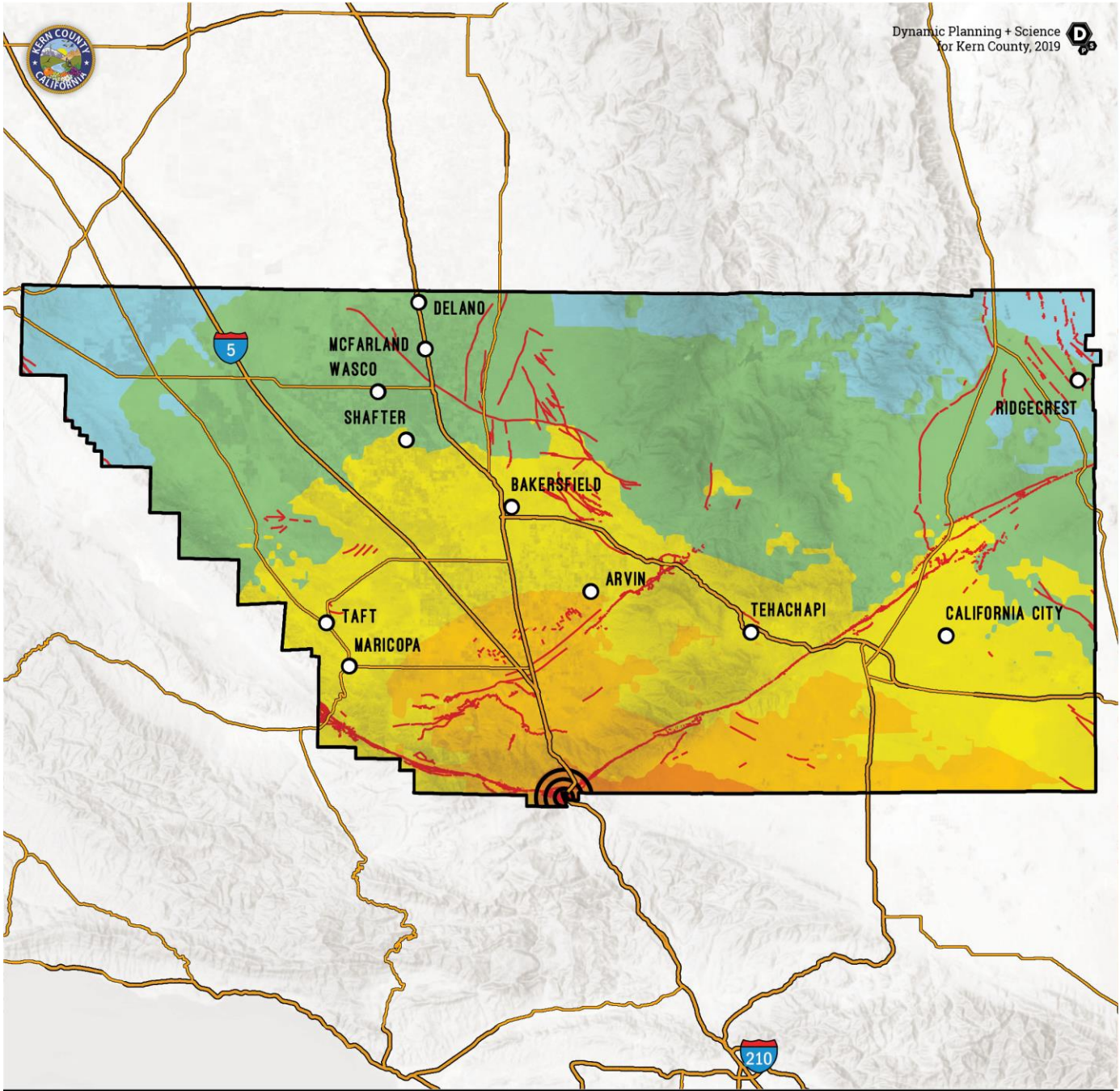


Figure 4-31: Earthquake Shaking Potential



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**EQ - S. SAN ANDREAS MOJAVE N.
KERN COUNTY**

*Data sources: USGS.



Figure 4-32. Earthquake Scenario, S. San Andreas Mojave N.



4.5.4.5 Severity and Extent

As we know from past events, even a “moderate” earthquake occurring in or near the Kern County region could result in deaths, casualties, property and environmental damage, and disruption of normal services and activities. The severity of the event could be aggravated by collateral emergencies such as fires, hazardous material spills, utility disruptions, landslides, transportation emergencies, and the possible failure of the Kern County dams.

Neither the occurrence of an earthquake nor the severity can be predicted. Instead, scientists can only calculate the probability that a significant earthquake will occur in a specific area within a certain number of years.

The probabilistic Earthquake Shake Potential Map, Figure 4-31, illustrates the areas of the County most likely to experience an earthquake exceeding one second of ground motion in 50 years, which aids in understanding locations in Kern County with the greatest probability of experiencing a severe earthquake. The greatest probability of a severe earthquake focuses around the San Andreas fault. This is merely a probability, as the same map also illustrates that most of the County is susceptible to moderate-to-severe earthquakes depending on the location, intensity, and magnitude of the earthquake.

4.5.4.6 Warning Time

There is currently no reliable way to predict the day or month that an earthquake will occur at any given location. Research is being done with warning systems that use the low energy waves that precede major earthquakes. Seconds and minutes of advance warning can allow people and systems to take actions to protect life and property from destructive shaking. Even a few seconds of warning can enable protective actions specific to various sectors of the population, such as:

- **Public:** Citizens, including schoolchildren, drop, cover, and hold on; turn off stoves, safely stop vehicles.
- **Businesses:** Personnel move to safe locations, automated systems ensure elevator doors open, production lines are shut down, sensitive equipment is placed in a safe mode.
- **Medical services:** Surgeons, dentists, and others stop delicate procedures.
- **Emergency responders:** Open firehouse doors, personnel prepare and prioritize response decisions.
- **Power infrastructure:** Protect power stations and grid facilities from strong shaking.

4.5.4.7 Secondary Hazards

Earthquakes can create the secondary hazards of soil liquefaction and tsunamis. Tsunamis are not applicable to Kern County. Other hazards can also occur from earthquakes and are profiled in other parts of this plan, such as dam failure or wildfires.

Soil Liquefaction

Soil liquefaction occurs when seismic waves pass through saturated granular soil, distorting its granular structure, and causing some of the pore spaces between granules to collapse. Pore-water pressure may also increase sufficiently to cause the soil to behave like a fluid for a brief period and cause deformations.



Soil liquefaction can cause severe damage to property, including damaging pipes, compromising building foundations, and bucking roads and airport runways. Soil liquefaction problems could be present in areas built on unconsolidated river soils.

4.5.4.8 Earthquake Vulnerability Analysis

Earthquakes are a considerable threat to life and property in Kern County. A moderate to severe seismic incident on any fault zones in close proximity to the County is expected to cause:

- Extensive property damage, particularly to pre-1930's unreinforced masonry structures,
- Possible fatalities and injuries,
- Damage to water and sewage systems,
- Disruption of communications systems,
- Broken gas mains and petroleum pipelines,
- Disruption of transportation arteries, and
- Competing requests for regional aid resources.

Community needs would quickly exceed the response capability of the County's emergency management organization, requiring mutual assistance from volunteer and private agencies, the Governor's Office of Emergency Services, and the Federal Emergency Support Functions.

In any earthquake, the primary consideration is saving lives. Time and effort must also be given to providing for people's mental health by reuniting families, providing shelter to the displaced persons, and restoring basic needs and services. A major effort will be needed to remove debris and clear roadways, demolish unsafe structures, assist in reestablishing public services and utilities, and provide continuing care and temporary housing for affected citizens.

After any earthquake there will be a loss of income both in private and public sectors. Individuals can lose wages due to businesses inability to function because of damaged goods or facilities. Due to business losses, Kern County and the cities in the planning area will lose revenue. Economic recovery from even a minor earthquake is critical.

4.5.4.8.1 Earthquake Exposure

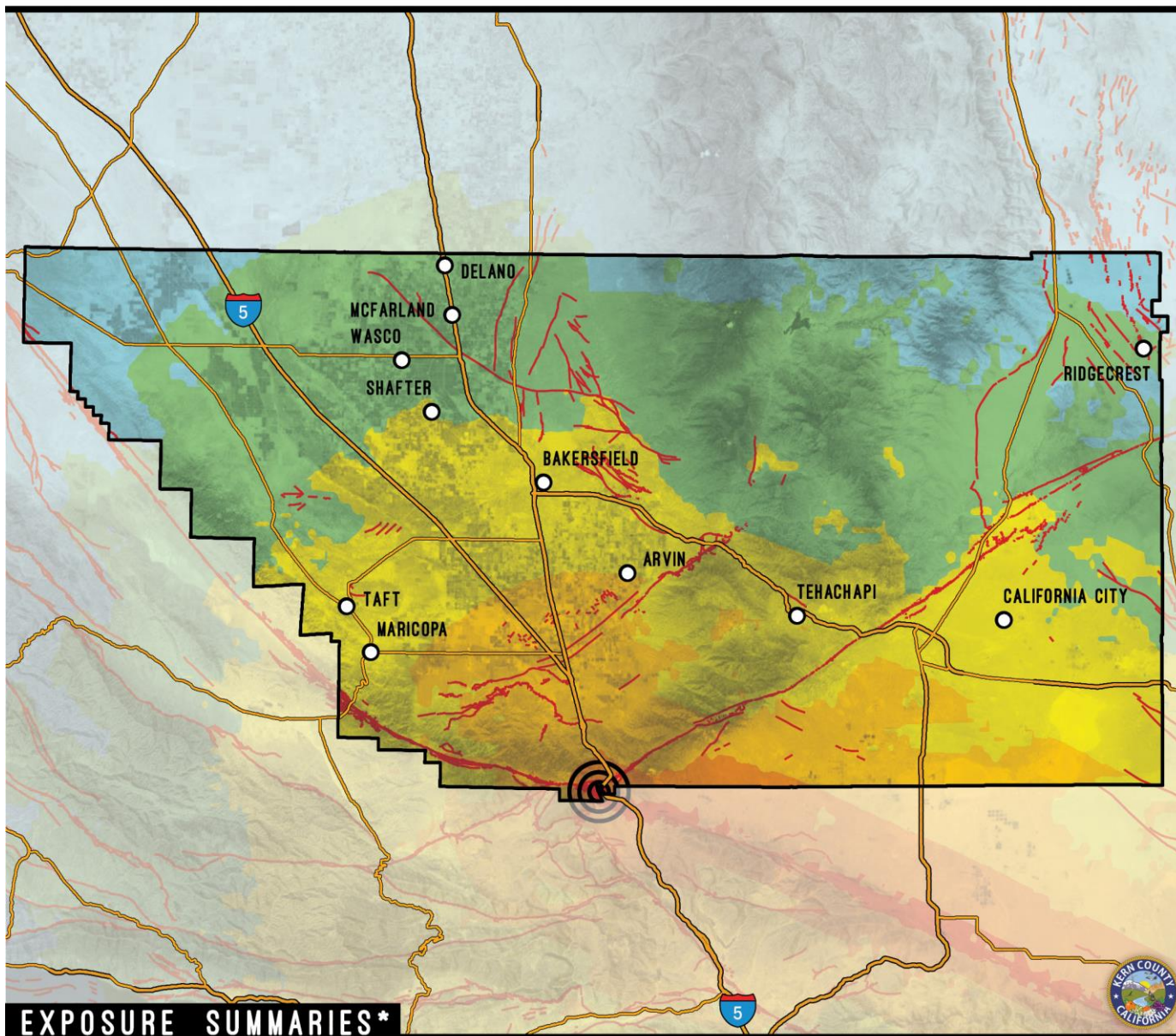
The exposure analysis for Kern County centers on an earthquake scenario produced from the South San Andreas Mojave North Faultline. As discussed in Section 4.5.4.4, this scenario is the highest probability for a severe earthquake and severe shaking in Kern County.

An exposure analysis was conducted to develop earthquake vulnerability data throughout Kern County using the methods outlined in Section 4.4. To develop earthquake exposure data for the County, asset inventories for people, property, and critical facilities were superimposed with earthquake shaking intensity data from the USGS.



EQ - S. SAN ANDREAS MOJAVE N. VULNERABILITY & EXPOSURE

KERN COUNTY



EXPOSURE SUMMARIES*

POPULATION		PARCEL		PARCEL VALUE		CRITICAL INFRASTRUCTURE	
COUNT		COUNT		IMPROVEMENT		COUNT	
254,106	85%	77,923	85%	\$9,672,907,618	89%	34	69%
				\$4,837,003,809	89%	556	77%
						3,868	68%
						9,425	62%



*Exposure summaries include strong, very strong, and severe MMI classes. Hazard data source: USGS.
(%) - Percent of respective category totals for jurisdiction.

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Figure 4-33 S. San Andreas Mojave N. Exposure and Snapshot Map



Population

Figure 4-34 and Table 4-33 summarize population exposure results for the S. San Andreas Mojave N. scenario. The entire population of Kern County is potentially exposed to direct and indirect impacts from earthquakes. The degree of exposure depends on many factors, including the age and construction type of dwellings, the soil types on which their homes are constructed, and proximity to fault location. Whether directly or indirectly impacted, the entire population will have to deal with the consequences of earthquakes to some degree. Business interruption could keep people from working, road closures could isolate populations, and loss of functions of utilities could impact populations that suffered no direct damage from an event itself. (United States Geological Survey, 1981)

Figure 4-34: Population Exposure to S. San Andreas Mojave N. Scenario (Unincorporated County)

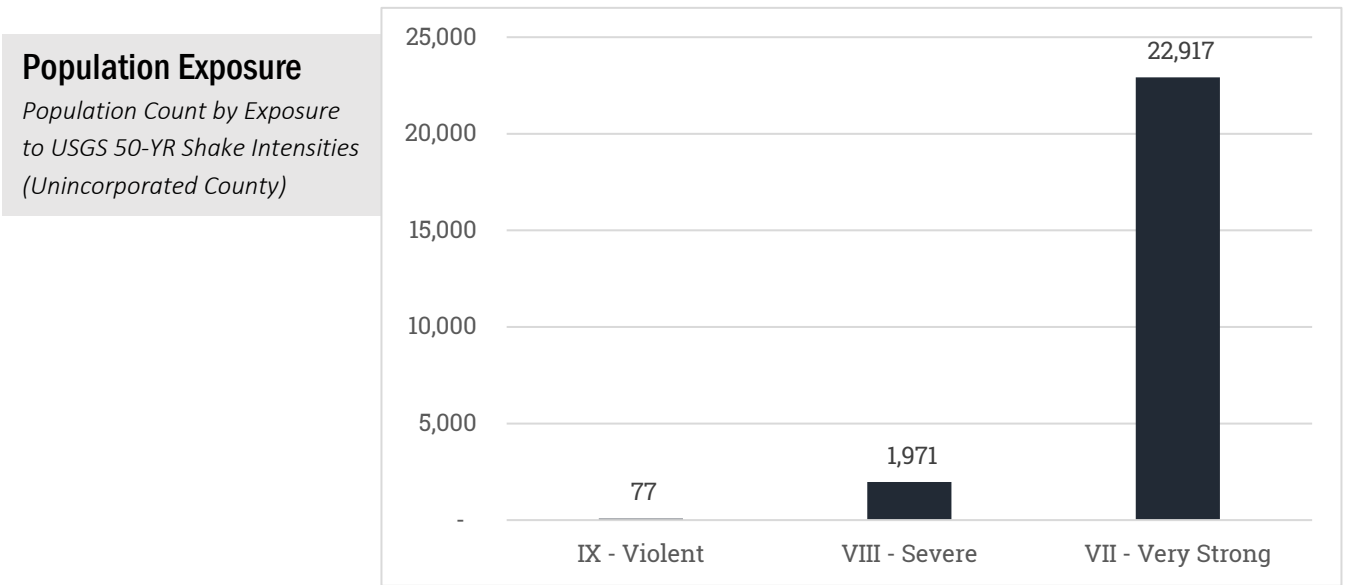


Table 4-33: Population Exposure to S. San Andreas Mojave N. Scenario (Unincorporated County)

	Total Population
Unincorporated County	299,935

Shake Severity Zone	Population Count	% of Total
IX - Violent	77	0.03%
VIII - Severe	1,971	0.66%
VII - Very Strong	22,917	7.64%
Total	24,965	8.32%



Property

An earthquake vulnerability assessment depends on determining two important factors:

- (1) the year in which seismic codes were initially adopted and enforced by the jurisdiction having authority, and
- (2) the year in which seismic codes were improved and enforced.

These are known as benchmark years. (Federal Emergency Management Agency, 2020) The County adheres to the 2019 California Building Code. Table 4-34 provides a listing of code improvements. Benchmark years are indicated in bold. For reference, Table 4-35 provides the definitions of building types.

Table 4-34: Seismic Benchmark Years

Code Edition	Effective Date	Building Type
(2019 CBC)	January 1, 2020	
(2016 CBC)	January 1, 2017	
(2013 CBC)	January 1, 2014	N/A
(2012 IBC)		
(2010 CBC)	January 1, 2011	N/A
(2009 IBC)		
(2007 CBC)	January 1, 2008	N/A
(2006 IBC)		
(2001 CBC)	November 1, 2002	N/A
(1997 UBC)		
(1998 CBC)	July 1, 1999	W1a, S2, S2a, RMI, PC1, PC1a
(1997 UBC)		
(1994 UBC)	January 7, 1996	S1, S1a, C1, C2, C2a, RM2
(1991 UBC)	November 29, 1992	URM
(1988 UBC)	April 29, 1990	S2 & S2a
(1985 UBC)	November 8, 1987	N/A
(1982 UBC)	December 9, 1984	N/A
(1979 UBC)	June 21, 1981	N/A
(1976 UBC)	November 1, 1977	W1 and W2
(1973 UBC)	April 13, 1975	N/A
(1970 UBC)	August 29, 1971	N/A
(1967 UBC)	July 12, 1968	N/A
(1964 UBC)	July 1, 1965	N/A
(1961 UBC)	August 17, 1962	N/A
(1958 UBC)	October 1, 1958	N/A
(1955 UBC)	January 1, 1956	N/A
(1955 UBC)	January 1, 1956	N/A
(1946 UBC)	June 18, 1948	N/A
(1943 UBC)	July 13, 1944	N/A



Code Edition	Effective Date	Building Type
(1940 UBC)	April 4, 1941	N/A
(1937 UBC)	September 10, 1937	N/A
(1930 UBC)	March 20, 1933	N/A

Source: ASCE 41-13. County Building Dept.

Table 4-35: Definitions of FEMA Building Types

FEMA Building Type	Definition
W1	Wood Light Frame
W1A	Wood Light Frame (multi-unit residence)
W2	Wood Frame (commercial and industrial)
S1	Steel Moment Frames
S2	Steel-braced Frames
S3	Steel Light Frames
S4	Steel Frames with concrete shear walls
S5	Steel Frames with infill masonry walls
C1	Concrete Moment Frames
C3	Concrete Frames with infill masonry shear walls
C2	Concrete Shear Walls
PC1	Tilt-Up Concrete shear walls
PC2	Precast Concrete Frames with shear walls
RM1	Reinforced Masonry Walls with flexible diaphragms
RM2	Reinforced Masonry Walls with stiff diaphragms
URM	Unreinforced Masonry Bearing Walls

Building Ages

The California State Building Code Council incorporates significant milestones in building and seismic code requirements that directly affect the structural integrity of development in California. Using these seismic benchmark years, the Steering Committee used county-provided assessor’s data to identify the number of parcels by date of construction or improvement. Table 4-36 shows the results of this analysis. The number of parcels does not reflect the number of total housing units, as many multi-family units and attached housing units are reported on one parcel.



Table 4-36: Age of Structures in Kern County

Time Period	No. of County Parcels with Improvements in Period	Significance of Time Frame
Pre-1933	3,915	Before 1933, there were no explicit earthquake requirements in building codes. State law did not require local governments to have building officials or issue building permits.
1933-1940	5,869	Before the first strong motion recording was made in 1940.
1941-1960	22,488	Prior to when the Structural Engineers Association of California published guidelines on earthquake construction in 1960.
1961-1975	12,790	Prior significant improvements to lateral force requirements in 1975.
1976-1994	27,043	Prior to the Uniform Building Code being amended to include provisions for seismic safety in 1994.
1995 - present	18,058	Seismic code is currently enforced.

Source: Kern County Assessor

Soft-Story Buildings

A soft-story building is a multi-story building with one or more floors that are “soft” due to structural design. If a building has a floor that is 70-percent less stiff than the floor above it, it is considered a soft-story building. These floors can be especially dangerous in earthquakes, because they cannot cope with the lateral forces caused by the swaying of the building during a quake. As a result, the soft story may fail, causing what is known as a *soft story collapse*. Soft stories are typically associated with retail spaces and parking garages, often on the lower stories of a building. A soft story collapse can cause the rest of the building to collapse as well, causing serious structural damage that may render the structure totally unusable.

Soft-story collapse is one of the leading causes of earthquake damage to private residences. The level of vulnerability due to this type of construction within the planning area is not currently known. This type of data should be generated to support future earthquake risk assessments.

Property Value Exposure

An inventory of current market values and content value was completed using County Assessor’s parcel data. GIS was used to create centroids, or points, to represent the center of each parcel polygon, assumed to be the location of the structure for analysis purposes. The centroids were then superimposed with the USGS probabilistic shaking severity zones to determine the at-risk structures. Table 4-37 shows the count of at-risk parcels and their associated building and content exposure values to the S. San Andreas Mojave N. earthquake scenario.



Table 4-37: Parcel Exposure to S. San Andreas Mojave N. Scenario (Unincorporated County)

	Total Parcels	Total Market Value (\$) (000)	Total Content Value (\$) (000)	Total Value (\$) (000)
Unincorporated County	91,455	\$ 10,906,675	\$ 5,453,338	\$ 16,360,013

Shake Severity Zone	Improved Res. Parcel Count	% of Total	Market Value Exposure (\$) (000)	Content Value Exposure (\$) (000)	Total Exposure (\$) (100)	% of Total
IX - Violent	84	0.1%	\$ 12,206	\$ 6,103	\$ 18,309	0.1%
VIII - Severe	1,884	2.1%	\$ 177,763	\$ 88,881	\$266,644	1.6%
VII - Very Strong	9,144	10.0%	\$ 1,305,581	\$ 652,790	\$ 1,958,371	12.0%
Total	11,112	12.2%	\$1,495,549	\$ 747,775	\$ 2,243,324	13.7%

**Currency in Thousands*

Critical Facilities and Infrastructure

Earthquakes pose numerous risks to critical facilities and infrastructure. Seismic risks, or losses, that are likely to result from exposure to seismic hazards include:

- Utility outages.
- Economic losses for repair and replacement of critical facilities, roads, buildings, etc.
- Indirect economic losses such as income lost during downtime resulting from damaged public infrastructure.
- Roads or railroads that are blocked or damaged can prevent access throughout the area and can isolate residents and emergency service providers needing to reach vulnerable populations or to make repairs.

Linear utilities and transportation routes are vulnerable to rupture and damage during and after a significant earthquake event. The cascading impact of a single failure can have affects across multiple systems and utility sectors. Degrading infrastructure systems and future large earthquakes with epicenters near critical regional infrastructure could result in system outages that last weeks for the most reliable systems, and multiple months for others.

All critical facilities in Kern County are exposed to the earthquake hazard. Table 4-38 lists the number of each type of facility in the Violent, Severe, and Very Severe MMI severity zones within the County, described in Table 4-30.



Table 4-38: Critical Facility Exposure to S. San Andreas Mojave N. Scenario (Unincorporated County)

Critical Infrastructure - S. San Andreas Mojave N. Scenario			
Infrastructure Type	IX - Violent	VIII - Severe	VII - Very Strong
Essential Facility	-	2	5
EOC	-	-	-
Fire Station	-	1	4
Hospital	-	-	-
Police	-	-	-
Sheriff	-	1	1
High Potential Loss	1	15	42
Adult Residential facility	-	-	2
Child Care Center	-	2	4
Dam	-	-	4
Family Child Care Home	-	-	10
Foster Family Agency	-	-	-
Historic Building	-	-	-
Home Care Organization	-	-	-
Library	-	1	1
Residential Child Care	-	-	-
Residential Elder Care	-	-	-
School	-	6	8
County Insured Asset*	-	4	8
Cooling Center	-	1	1
Healthcare Facility	1	-	-
Special Needs Facility	-	1	4
City Hall	-	-	-
Historic Site	-	-	-
Transportation and Lifeline	16	89	1536
Airport	-	-	1
Bridge	2	9	44
Power Plant	-	5	31
Substation	-	3	30
Transmission Line Tower	14	70	1342
NG Facility	-	2	18
Wind Turbine	-	-	70
Bus Facility	-	-	-
Potable Water Facility	-	-	-
Waste Water Facility	-	-	-
Oil Facility	-	-	-
Railroad Facility	-	-	-
Grand Total	17	106	1583

* These insured assets may include critical infrastructure already represented in other Infrastructure Types. For more information on these insured assets, see the Damage Estimation at Section 4.5.4.8.2.



HazMat Fixed Facilities

Earthquakes can produce hazardous materials (HazMat) threats at very high levels. Depending on the year of build and construction of each facility containing HazMat, the earthquake-initiated hazardous material release (EIHR) potential will vary. HazMat contained within masonry or concrete structures built before certain benchmark years may be particularly vulnerability.

Utilities

Linear utilities and transportation infrastructure would likely suffer considerable damage in the event of an earthquake. Due to the amount of infrastructure and sensitivity of utility data, linear utilities are difficult to analyze without further investigating individual system components. Table 4-39 provides best available linear utility data; it should be assumed that these systems are exposed to breakage and failure.

Table 4-39: Lifeline Exposure S. San Andreas Mojave N. Scenario (Unincorporated County)

Lifelines (miles) – S. San Andreas Mojave N. Scenario			
Infrastructure Type (Linear)	IX - Violent	VIII - Severe	VII - Very Strong
Levee	-	5.09	92.39
NG Pipeline	0.79	5.73	217.67
Railroad	-	-	19.77
Street	21.12	207.60	1846.22
<i>4WD trail</i>	1.84	5.25	20.78
<i>4WD trail, major</i>	-	0.18	-
<i>Alley</i>	-	2.64	0.59
<i>Cul-de-sac</i>	-	0.54	0.20
<i>Driveway</i>	0.62	1.03	5.24
<i>Interstate</i>	1.75	11.04	92.67
<i>Local road</i>	10.97	121.03	791.37
<i>Local road, major</i>	2.42	53.98	594.14
<i>Primary highway</i>	-	-	-
<i>Ramp</i>	0.75	1.87	15.63
<i>Road, parking area</i>	-	-	2.73
<i>Service road</i>	-	2.42	1.15
<i>State/county highway</i>	2.07	7.46	200.12
<i>State/county highway, major</i>	-	-	-
<i>Thoroughfare, major</i>	0.70	0.15	121.61
<i>Walkway</i>	-	-	-
Transmission Line	5.70	25.85	515.63
Grand Total	27.62	244.28	2691.67



Water Supply Utilities

Kern County's water supply is mostly dependent on snowmelt runoff in the mountains, some of which is captured in reservoirs, and groundwater resources in the Valley and Desert regions. Kern County receives water from external sources that include the State Water Project and Central Valley Project. (Kern County MJHMP, 2014)

The Kern River provides most of the water to Kern County via Lake Isabella. Lake Isabella is on solid ground and expected to be usable after a major earthquake, but any disruption to water deliver infrastructure from an earthquake will affect the ability of Lake Isabella to supply water to populations of Kern County.

Natural Gas Utilities

Several common characteristics of earthquakes and their impacts on natural gas safety are:

- Earthquake ground shaking will generally lead to substantially more instances of building damage than fire ignitions.
- Ground motions that are sufficient enough to damage buildings are the most likely to impact utility and customer gas systems and create a potential for gas-related fire ignitions.
- The number of post-earthquake fire ignitions related to natural gas can be expected to be 20% to 50% of the total post-earthquake fire ignitions.
- The consequences of post-earthquake fire ignitions for residential gas customers are largely financial. A fire ignition only becomes a life safety concern when inhabitants are unable to exit the building following earthquakes. Experience in past earthquakes indicates that egress from earthquake damaged single-family homes is generally possible because of the limited structure height, low numbers of occupants, and multiple direct escape paths through doors and windows. (Earthquake Country Alliance, 2020)
- The potential life safety dangers from post-earthquake fires are considerably more serious in seismically vulnerable apartment or condominium buildings since they provide a greater chance for damaging the structure and trapping the occupants. (United States Geological Survey, 2020)

SoCal Gas and Pacific Gas & Electric, Kern County's natural gas utility providers, are responsible for designing, constructing, maintaining, and operating the natural gas system safely and efficiently. This includes all the facilities used in the delivery of gas to any customer up to and including the point of delivery to the customers' gas piping system. (SoCalGas, 2020) (City of Taft, n.d.)

Gas customers and Kern County residents are responsible for using gas safely on their property and within their buildings and other facilities. Customers meet this responsibility by maintaining their gas appliances in good working condition, assuring that only qualified individuals are engaged to modify or



maintain their gas service and facility piping, and knowing what to do before and after earthquakes to maintain the safe operation of their natural gas service.

The following conditions, when combined, pose the greatest risk for post-earthquake fire damage:

1. Buildings are unoccupied and individuals are not present to mitigate damage to gas systems or control small fires.
2. High building density or dense, fire-prone vegetation.
3. High wind and low humidity weather conditions.
4. Damage to water systems that severely limits firefighting capabilities.
5. Reduced responsiveness of firefighting resulting from impaired communications, numerous requests for assistance, direct damage to fire stations, restricted access because of traffic congestion and damaged roadways, and delays in mutual aid from neighboring fire districts. (Science Daily, 2013)

Telecommunication

Telecommunication systems will be affected by system failure, overloads, loss of electrical power and possible failure of some alternate power systems. Immediately following an event, numerous failures will occur, compounded by system use overloads. This will likely disable up to 80% of the telephone system for one day. County UHF/VHF and microwave radio systems are expected to operate at 40% effectiveness the first 12 hours following an earthquake, increase to 50% for the second 12 hours then begin to slowly decline to approximately 40% within 36 hours.

Microwaves systems will likely be 30% or less effective following a major earthquake. Damage to natural gas facilities serving the Kern County communities will consist primarily of isolated breaks in major transmission lines. Breaks in mains and individual service connections within the distribution system will be significant, particularly near the fault zones. These many leaks pose a fire threat in these susceptible areas of intense ground shaking and/or poor ground near the shoreline. Breaks in the system will affect large portions of the County and restoration of natural gas service could be significantly delayed. (International Telecommunication Union, 2013)

Public Schools

The Field Act was enacted on April 10, 1933, one month after the Long Beach Earthquake in which many schools were destroyed or suffered major damage. Public school construction has been governed by the Field Act since 1933 and enforced by the Division of the State Architect. In any community, public schools constructed under the Field Act after 1978 are likely to be among the safest buildings in which to experience a major earthquake. The Field Act requires:



- School building construction plans to be prepared by qualified California licensed structural engineers and architects.
- Designs and plans to be checked by the Division of the State Architect (DSA) for compliance with the Field Act before a contract for construction can be awarded.
- Qualified inspectors, independent of the contractors and hired by the school districts, to continuously inspect construction and verify full compliance with plans.
- The responsible architects and/or structural engineers to observe the construction periodically and prepare changes to plans (if needed) subject to approval by DSA.
- Architects, engineers, inspectors and contractors to file reports, under penalty of perjury, to verify compliance of the construction with the approved plans emphasizing the importance of testing and inspections to achieve seismically safe construction. Any person who violates the provisions or makes any false statement in any verification report or affidavit required pursuant to the Act, is guilty of a felony.

Private schools are not subject to the Field Act and fall solely under the jurisdiction of the local building departments and their requirements. Private schools are covered under the Private Schools Building Act of 1986, with the legislative intent that children attending private schools be afforded life safety protection similar to that of children attending public schools.

In the late 1960s regulations were put in place to have pre-Field Act (1933) buildings retrofitted, removed from school use or demolished. (Cal. Edu. Code § 15516, Appendix X, 1968) The Field Act also prohibits use of unreinforced masonry buildings as school buildings. Seismic building standards in general were greatly strengthened after significant damage to buildings was observed, especially in the 1971 San Fernando earthquake. The Field Act regulations in place since 1978 are considered adequate for most public school buildings in most cases. (GeoScienceWorld, 2003)

Transportation

Earthquake events can significantly impact bridges and overpasses which often provide the only access to some neighborhoods. Since soft soil regions generally follow floodplain boundaries, bridges that cross water courses are considered vulnerable.

Interstate 5 (I-5) is a major north-south route of the Interstate Highway System in the U.S. state of California. It begins at the Mexico-United States border at the San Ysidro crossing, goes north across the length of California and crosses into Oregon south of the Medford-Ashland metropolitan area. It is the more important and most used of the two major north south routes on the Pacific Coast. I-5 provides vital connectivity for Kern County to other cities and supply hubs in California. I-5 could become impassable after an earthquake event which could isolate the County until road crews are able to complete road restoration. Table 4-39 shows transportation infrastructure exposed to shake severity zones in the event of the S San Andreas Mojave N. earthquake scenario.



4.5.4.8.2 Earthquake Damage Estimation

This section provides estimations of damages to County insured assets and residential buildings in S San Andreas Mojave N. earthquake scenario. This section first looks at overall damages for County insured assets and residential buildings, then looks specifically at potential damage to various County insured assets according to type (e.g., administrative buildings, equipment and services, or recreation).

Hazus Earthquake damage data was generated using a Level 2 Hazus 4.2 analysis. Hazus is a FEMA software product that uses a GIS to analyze multiple factors influencing earthquake damage estimates including peak ground velocity (PGV), peak ground acceleration (PGA) and soil of a given scenario and geographic area. Once the location and size of a hypothetical earthquake is identified, Hazus software estimates the intensity of the ground shaking, the number of buildings damaged, the number of casualties, the damage to transportation systems and utilities, the number of people displaced from their homes, and the estimated cost of repair and clean up.

The parcel data defined in Section 4.4.2 was imported into Hazus as User Defined Facilities (UDF) serving as the basis for replacement and content cost as well as associated damage estimation and loss. The scenarios used for the Kern County Hazus analysis was the S. San Andreas Mojave North.

To understand building damage, damage outputs from Hazus are categorized into slight, moderate, and extensive damage. Ranges of damage are used to provide the user with an understanding of the building's physical condition. Table 4-40 provides a physical description of each damage state.

County assessor data does not include detailed information for tax exempt structures, such as federal and local government buildings. These data were added through the development of GIS data by utilizing insurance schedule tables for each municipality's insured assets.

While there are several limitations to the FEMA Hazus earthquake models, it does allow for potential loss estimation for each building construction category. County wide loss estimation results are summarized by building category type in Table 4-42 for the S San Andreas Mojave North 7.7 magnitude earthquake scenario. It is important to understand that the Hazus loss estimation values for earthquake are categorized in exceedance values. From reviewing Table 4-42, one can infer the probability of structures exceeding extensive damage is relatively low. However, if damage were to occur, the economic loss is averaged and summarized for each building type defined in the software.

Important to note: Loss estimation is worst case scenario. Loss estimation does not include damage to transportation routes, infrastructure, and other public and private utilities located throughout the County. An important concept in loss data is the "probability" of damage to exceed a certain degree. It is unlikely that buildings in County would receive "extensive" damage from earthquake shaking.



Table 4-40: Hazus Building Damage Descriptions

Damage State	Damage Description
Slight	Small plaster cracks at corners of door and window openings and wall/ceiling intersections; small cracks in masonry chimneys and masonry veneers. Small cracks are assumed to be visible with a maximum width of less than 1/8 inch (cracks wider than 1/8 inch are referred to as "large" cracks).
Moderate	Large plaster or gypsum-board cracks at corners of door and window openings; small diagonal cracks across shear wall panels exhibited by small cracks in stucco and gypsum wall panels; large cracks in brick chimneys; toppling of tall masonry chimneys.
Extensive	Large diagonal cracks across shear wall panels or large cracks at plywood joints; permanent lateral movement of floors and roof; toppling of most brick chimneys; cracks in foundations; splitting of wood sill plates and/or slippage of structure over foundations.
Complete	Structure may have large permanent lateral displacement or be in imminent danger of collapse due to cripple wall failure or failure of the lateral load resisting system; some structures may slip and fall off the foundation; large foundation cracks. Three percent of the total area of buildings with Complete damage is expected to be collapsed, on average.



Damage Estimation

Hazus 4.2 was used to estimate the loss potential to residential properties and Government service facilities exposed to S San Andreas Mojave N. earthquake scenario. Hazus reports the damage potential and loss potential from a given earthquake scenario in four categories: slight damage, moderate damage, extensive damage, and economic loss. Economic loss consists of estimations on the cost of repair and replacement to damaged or destroyed buildings and contents, relocation expenses, capital-related income, wage losses, and rental income losses. The results shown in Table 4-41 summarizes residential property loss with county insurance holding data.

Table 4-41: Loss Estimations for S. San Andreas Mojave N. Scenario

Building Type	Average of Potential Damage to Exceed "Slight"	Average of Potential Damage to Exceed "Moderate"	Average of Potential Damage to Exceed "Extensive"	Average Economic Loss for Each Building Category	Sum of Economic Loss	Proportion of Loss (%)
County Insured Assets						
Government Service [†]	12.6%	4.7%	1.0%	\$ 59,161	\$ 19,700,776	14.1%
Emergency Response ^{††}	10.5%	4.2%	1.3%	\$ 10,058	\$ 663,816	0.5%
Residential						
Single Family	9.0%	1.3%	0.1%	\$ 1,394	\$ 108,691,550	77.8%
Mobile Home	9.5%	1.1%	0.1%	\$ 898	\$ 1,705,888	1.2%
Multi Family Duplex	9.9%	1.7%	0.2%	\$ 872	\$ 7,034,332	5.0%
Multi Family 3-4 Units	9.4%	1.5%	0.1%	\$ 1,033	\$ 1,840,423	1.3%
Multi Family 5-9 Units	11.9%	2.8%	0.2%	\$ 610	\$ 14,638	0.0%
Multi Family 10-19 Units	4.1%	0.3%	0.0%	\$ 826	\$ 1,652	0.0%
Multi Family 20-49 Units	3.5%	0.3%	0.0%	\$ 5,658	\$ 28,291	0.0%
Total					\$ 139,681,366	

[†]Government Services includes: admin, airport, animal, building, bus, correctional, equipment, golf course, health, leased, library, misc, museum, office, park, recreation, relay, shop, storage, vacant, veterans, warehouse, water, yard

^{††}Emergency Response includes Sherriff Offices and Fire Departments

Note: Total Inventory Values
 1 - Building Replacement Costs = \$11,868,231,028.60
 2 - Content Replacement Costs = \$5,673,439,613.70
 3 - Total Value = \$17,541,670,642.30



Damage Estimation for County Owned Property

Hazus 4.2 was used to estimate the loss potential to county facilities exposed to the S. San Andreas Mojave N. earthquake scenario. Hazus reports the damage potential and loss potential from a given earthquake scenario in four categories: slight damage, moderate damage, extensive damage, and economic loss. Economic loss consists of estimations on the cost of repair and replacement to damaged or destroyed buildings and contents, relocation expenses, capital-related income, wage losses, and rental income losses.

County insurance data was obtained and formatted for use in Hazus for a detailed damage estimation. This dataset has additional information including number of floors, building value, content value, and construction type that greatly enhances results from default Hazus database.

The results shown in Table 4-42 summarizes essential facility and high potential loss facilities with county insurance holding data.

Table 4-42: Loss Estimations for S. San Andreas Mojave N. Scenario

Row Labels	Bldg Count	Bldg Cost	Content Cost	Total Value	PD Ex. Slight	PD Ex. Moderate	PD Ex. Extensive	Economic Loss	Loss %
Administrative & Office	68	\$359,226,983	\$118,496,490	\$477,723,473	11.6%	4.0%	0.6%	\$10,931,124	2.3%
Admin	26	\$281,036,365	\$2,180,986	\$283,217,351	9.2%	2.2%	0.2%	\$9,318,203	3.3%
Building	12	\$22,885,686	\$1,192,850	\$24,078,536	10.7%	4.5%	0.9%	\$632,278	2.6%
Office	30	\$55,304,932	\$115,122,654	\$170,427,586	14.1%	5.4%	0.9%	\$980,644	0.6%
Equipment & Storage	51	\$57,237,326	\$5,149,231	\$62,386,557	19.0%	9.7%	2.9%	\$3,617,495	5.8%
Equipment	5	\$127,977	\$3,302,171	\$3,430,148	52.1%	30.2%	7.1%	\$3,389	0.1%
Shop	11	\$41,016,235	\$837,660	\$41,853,895	14.2%	7.6%	2.0%	\$2,515,277	6.0%
Storage	20	\$6,039,390	\$446,971	\$6,486,361	12.1%	4.8%	0.9%	\$663,345	10.2%
Warehouse	6	\$6,387,091	\$526,728	\$6,913,819	15.6%	4.1%	0.3%	\$195,036	2.8%
Yard	9	\$3,666,633	\$35,701	\$3,702,334	23.7%	15.4%	7.8%	\$240,448	6.5%
Other Assets	42	\$6,182,000	\$26,036,768	\$32,218,768	8.4%	2.5%	0.5%	\$175,017	0.5%
Leased	31	\$2,397,883	\$20,982,229	\$23,380,112	7.1%	1.2%	0.1%	\$45,609	0.2%
Misc	3	\$203,622	\$4,770,874	\$4,974,496	27.5%	16.2%	5.5%	\$1,427	0.0%
Relay	4	\$154,576	\$21,384	\$175,960	1.1%	0.1%	0.0%	\$207	0.1%
Vacant	4	\$3,425,919	\$262,281	\$3,688,200	11.1%	4.7%	0.5%	\$127,775	3.5%



Row Labels	Bldg Count	Bldg Cost	Content Cost	Total Value	PD Ex. Slight	PD Ex. Moderate	PD Ex. Extensive	Economic Loss	Loss %
Recreation	107	\$48,550,442	\$8,536,674	\$57,087,116	14.6%	4.9%	0.8%	\$1,056,087	1.8%
Golf Course	3	\$2,927,248	\$3,000	\$2,930,248	8.7%	0.8%	0.0%	\$32,601	1.1%
Museum	76	\$19,615,343	\$6,634,355	\$26,249,698	16.7%	5.8%	1.0%	\$521,824	2.0%
Park	9	\$10,016,887	\$1,409,407	\$11,426,294	5.6%	1.0%	0.1%	\$116,025	1.0%
Recreation	19	\$15,990,964	\$489,912	\$16,480,876	11.8%	3.5%	0.4%	\$385,637	2.3%
Services	121	\$438,023,808	\$56,317,933	\$494,341,741	8.7%	3.1%	0.8%	\$3,582,045	0.7%
Animal	1	\$528,591	\$1,000	\$529,591	16.3%	7.7%	1.2%	\$23,216	4.4%
Correctional	27	\$288,265,742	\$193,074	\$288,458,816	3.7%	1.0%	0.1%	\$1,191,262	0.4%
Fire	47	\$40,345,749	\$4,818,942	\$45,164,691	11.6%	4.6%	1.5%	\$577,059	1.3%
Health	5	\$23,063,560	\$3,690,348	\$26,753,908	10.4%	2.1%	0.1%	\$627,690	2.3%
Library	18	\$57,750,901	\$46,750,699	\$104,501,600	8.5%	2.0%	0.2%	\$680,012	0.7%
Sheriff	19	\$14,114,343	\$351,792	\$14,466,135	7.7%	3.3%	0.9%	\$86,757	0.6%
Veterans	1	\$672,868	\$184,792	\$857,660	4.5%	0.7%	0.0%	\$4,495	0.5%
Warehouse	1	\$1,038,472	\$50,193	\$1,088,665	17.7%	4.1%	0.3%	\$32,328	3.0%
Water	2	\$12,243,582	\$277,093	\$12,520,675	11.6%	5.0%	0.7%	\$359,227	2.9%
Transportation	10	\$52,335,358	\$5,564,962	\$57,900,320	15.5%	7.4%	2.0%	\$1,002,824	1.7%
Airport	9	\$52,334,358	\$5,563,962	\$57,898,320	10.3%	3.2%	0.4%	\$1,002,561	1.7%
Bus	1	\$1,000	\$1,000	\$2,000	62.4%	44.7%	16.2%	\$263	13.2%
Grand Total	399	\$961,555,917	\$220,102,058	\$1,181,657,975	12.2%	4.6%	1.0%	\$20,364,592	1.7%

4.5.4.9 Future Trends in Development

Land use in the planning area will be directed by general plans adopted under California's General Planning Law. The safety elements of the general plans establish standards and plans for the protection of the community from hazards. The information in this plan provides the participating partners a tool to ensure that there is no increase in exposure in areas of high seismic risk. Development in the planning area will be regulated through building standards and performance measures so that the degree of risk will be reduced. The geologic hazard portions of the planning area are heavily regulated under California's General Planning Law. The International Building Code establishes provisions to address seismic risk.



4.5.4.10 Earthquake Hazard Problem Statements:

As part of the mitigation action identification process, the Planning Committee for the County and for each jurisdiction identified issues and weaknesses, also called problem statements, for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and flood data. Earthquake problem statements for all participating jurisdictions are listed in Table 4-43; problem statements for all other participating jurisdictions are accessed in Volume 2 of this plan.

Identifying these common issues and weaknesses assists the Planning Committee in understanding the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. See Table 5-6 for a full list of mitigation actions and the corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-43 and Table 5-6.

Table 4-43 Earthquake Problem Statements

Problem No.	Hazard	Area of Concern	Mitigation Alternatives	Primary Agency	Problem Description	Related MA
ps-EQ-KC-242	Earthquake	Impact	PPRO - Property Protection , SP - Structural Projects	County of Kern	Older construction and particularly unreinforced masonry (URM) buildings within the County will pose hazards during earthquakes.	ma-EQ-KC-102, ma-EQ-KC-295, ma-AH-KC-111
ps-EQ-KC-243	Earthquake	Impact	PPRO - Property Protection , SP - Structural Projects	County of Kern	Historic buildings can be more susceptible to ground shaking since many of these buildings have weakened with age and were built before the use of building codes.	ma-EQ-KC-295, ma-EQ-KC-296, ma-EQ-KC-297, ma-EQ-KC-307
ps-EQ-KC-244	Earthquake	Impact	PPRO - Property Protection , PE&A - Public Education & Awareness , SP - Structural Projects	County of Kern	The following County assets are located in severe or violent shakes zone for the S. San Andreas Mojave N. EQ scenario: Pine Mtn Fire Station, Kern Co. Fire Station 55, Frazier Park Branch Kern Co. Library, Frazier Park Rec Bldg, Frazier Park Fire Station, Wanda Kirk Branch Kern Co. Library, Hummel Hall Community Center, Rosamond Fire Station, Rosamond Rec Center, Search and Rescue Desert Unit, and Lebec Maintenance Yard. Table 4-42 in Vol. 1 also lists damage estimation of County facilities for this EQ scenario	ma-EQ-KC-295, ma-EQ-KC-296, ma-EQ-KC-307



Problem No.	Hazard	Area of Concern	Mitigation Alternatives	Primary Agency	Problem Description	Related MA
ps-EQ-KC-245	Earthquake	Impact	PPRO - Property Protection , PE&A - Public Education & Awareness , SP - Structural Projects	County of Kern	The following County assets are located in severe shake zones for the 7.2 white wolf EQ scenario: Kern Co. Fire Station 55, Tejon Fire Station, Park Home (KCAC) special needs facility, DAI Break residential facility, Bear Valley Fire Station, Kern Co. Fire Station 16, Keene Fire Station, Kern Co. Fire Station 11, Book Mobile 1 Library.	ma-EQ-KC-295, ma-EQ-KC-296, ma-EQ-KC-307
ps-EQ-KC-246	Earthquake	Impact	PPRO - Property Protection , SP - Structural Projects	County of Kern	The following County bridges have been identified as poor quality by the County and could be severely damaged by an earthquake: East of Harbor Rd. (#50C0261) .5 Mi N/O Rnd Mtn Rd. (#50C0085) 2.9 Mi E State HWY 43 (#50C0118) .6 Mi N of RTE 178 (#50C0195) E of Buena Vista Dr. (#50C0018)	ma-EQ-KC-305
ps-EQ-KC-247	Earthquake	Victim	PPRO - Property Protection , PE&A - Public Education & Awareness , NRP - Natural Resource Protection	County of Kern	Shallow ground water near planned development areas in south Bakersfield should be evaluated for liquefaction potential.	ma-EQ-KC-306
ps-EQ-KC-248	Earthquake	Impact	PPRO - Property Protection , SP - Structural Projects	County of Kern	Tenant improvements and building remodels, including non-structural retrofits, may not have included seismic upgrades	ma-EQ-KC-296



4.5.5 Wildfire Hazard Profile

A wildfire is any uncontrolled fire occurring on undeveloped land that requires fire suppression. Wildfires can be ignited by lightning or by human activity such as smoking, campfires, equipment use, and arson. The 2018 California State Hazard Mitigation Plan provides the following definition of wildfires:



any free-burning vegetative fire that initiates from an unplanned ignition, whether natural (e.g., lightning) or human-caused (e.g., powerlines, mechanical equipment, escaped prescribed fires), where the management objective is full suppression. (CalOES, 2018, p. 507)

Wildfires are costly, putting lives and property at risk and compromising rivers and watersheds, open space, timber, range, recreational opportunities, wildlife habitats, endangered species, historic and cultural assets, scenic assets, and local economies. Vulnerability to flooding increases due to the destruction of forest and ground cover within watersheds. The potential for significant damage to life and property increases in areas where development is adjacent to densely vegetated areas, known as wildland urban interface (WUI) areas. (Federal Emergency Management Agency, 2020)

While some fires are allowed to burn naturally in order to maintain or restore the health of forest lands, out of control wildfires need to be prevented through cooperative, community, and land management planning. (United States Forest Service, n.d.)

4.5.5.1 Local Conditions Relating to Wildfire

Kern County spans the southern extent of the Central Valley floor. The County is flanked by the southern slope of the coastal mountain ranges to the west and the southern slope of the eastern Sierra Nevada to the east, both mountain ranges are surrounded by and intermingled with steep, hilly, grassy, wooded terrain—areas highly susceptible to wildfires. Such fires expose residential and other development within the County to an increased risk of conflagration, or extensive fire which destroys a great deal of land or property. The hilly/mountainous terrain on the east and west side of the Central Valley strongly influences both wildland fire behavior and fire suppression capabilities.

Wind is also a significant factor in the spread of fire, as fires spread faster, and burning embers are carried with the wind to adjacent exposed areas. In densely-populated areas, flying ember production is the principal driver of wildfire. A related concern in built-out areas is the relative density of vegetative fuels that can serve as sites for new spot fires within the urban core and spread to adjacent structures.



4.5.5.2 Plans, Policies, and Regulatory Environment

Wildfire Protection Responsibility in California

Local, state, tribal, and federal organizations all have legal and financial responsibility for wildfire protection. In many instances, two fire organizations have dual primary responsibility on the same parcel of land—one for wildfire protection and the other for structural fire protection. To address wildfire jurisdiction responsibilities, in 1981 the California State Legislature outlined various wildfire responsibilities, described below, in Cal. Pub. Res. Code § 4291.5 and Cal. Health & Safety Code § 13108.5:

- **Federal Responsibility Areas (FRAs)**—FRAs are fire-prone wildland areas that are owned or managed by a federal agency such as the U.S. Forest Service, National Park Service, Bureau of Land Management, U.S. Fish and Wildlife Service, or U.S. Department of Defense. Primary financial and rule-making jurisdiction authority rests with the federal land agency. In many instances, FRAs are interspersed with private land ownership or leases. Fire protection for developed private property is usually the responsibility of the relevant local government agency, not the federal land management agency.
- **State Responsibility Areas (SRAs)**—SRAs are lands in California where the California Department of Forestry and Fire Protection (CAL FIRE) has legal and financial responsibility for wildfire protection. CAL FIRE administers fire hazard classifications and building standard regulations in these areas. SRAs are defined as lands that:
 - are in the unincorporated county areas,
 - are not federally-owned,
 - have wildland vegetation cover rather than agricultural or ornamental plants,
 - have row crops or seasonal crops, or
 - have watershed, range, or forage values.

CAL FIRE adopts SRA boundaries and updates them every 5 years. Where SRAs contain structures or development, the relevant local government agencies have fire protection responsibility for those improvements.

- **Local Responsibility Areas (LRAs)**—LRAs include land in cities, cultivated agriculture lands, unincorporated non-flammable areas, and lands that do not meet the criteria for SRA or FRA. LRA fire protection is typically provided by city or county fire departments, fire protection districts, or by CAL FIRE under contract to local governments. LRAs may still include areas of flammable vegetation and WUI.

In 2012, as part of local General Plan requirements, California began requiring local governments in State Responsibility Areas (SRAs) and Very High Fire Hazard Severity Zones (VHFHSZ) to:

- Update their general plan safety elements to recognize specific wildfire risks in such areas,
- Adopt special findings when approving subdivisions in such areas, and



- Use wildfire safety guidelines and California Environmental Quality Act (CEQA) initial study wildfire hazards checklist updates issued by the Governor’s Office of Planning and Research (OPR) when those become available. Cal. Gov. Code § 65040.20 and § 65302.5.

For further information on the details and implications of these Safety Element requirements, see Progress Summaries 3.F and 8.A of the 2018 California State Hazard Mitigation Plan.

Healthy Forests Restoration Act (2003)

The federal Healthy Forests Restoration Act (HFRA) appropriates funding to address five main sub-categories of the National Fire Plan (NFP): preparedness, suppression, reduction of hazardous fuels, burned-area rehabilitation, and state and local assistance to firefighters. Kern County Community CWPPs have integrated these sub-categories through the following four best practices:

1. identifying and prioritizing fuels reduction opportunities across the landscape,
2. addressing structural ignitability,
3. assessing community fire suppression capabilities, and
4. collaborating with stakeholders.

California Fire Code (2016)

Kern County has adopted the 2016 Edition of the California Fire Code to safeguard the public health, safety, and general welfare from the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures, and premises, and to provide safety and assistance to fire fighters and emergency responders during emergency operations. Section (§17.32) of the Kern County Fire Code applies the 2016 California Fire Code which describes what is required for a Fire Protection Plan, applicable to all new development within the Wildland-Urban Interface Fire Area. It stipulates that such a plan address water supply, access, fire resistance of buildings, fire protection systems and equipment, defensible space and vegetation management.

California Building Standards Code (2019)

The 2019 California Building Code, adopted by the County in 2020, includes materials and construction methods for exterior wildfire exposure and standards of quality for fire-resistant buildings. See Cal. Building Codes, Chapter 7a (2019).

Hazardous Environmental Conditions in Kern County Code, §17.32

The Kern County Code aids in enforcing wildfire prevention strategies via its regulation of potentially hazardous environmental conditions (§17.32). When the Fire Chief determines that hazardous environmental conditions necessitate restricted use of open flame or other ignition sources, the Fire Chief is authorized to prohibit the use or ignition of any such materials.



Required Operational Permits in Kern County Code, §17.32

An operational permit is required to ignite or cause to be ignited tumbleweeds, agricultural waste, or other combustible material. This is stipulated in the Rules and Regulations of the Air Pollution Control District with jurisdiction.

4.5.5.3 Past Events

There are four major factors that contribute to historic wildfire events:

1. Extreme vegetation diversity
2. Diverse fire weather and fire behavior
3. Dynamic fire history
4. Complex land use patterns

From 2010-2018 there were 22 wildfires burning over 2,000 acres in Kern County. These events are listed in Table 4-44 and displayed in Figure 4-36.

Table 4-44: Wildfire Events in Kern County 2000 Acres or Greater 2000-2018

Date	Name	Size in Acres	Cause
8/3/2018	Tarina Fire	3,516	Tarina Fire
7/7/2017	Hawk Fire	2,940	Hawk Fire
8/16/2016	Cedar Fire	29,101	Cedar Fire
6/23/2016	Erskine Fire	48,008	Erskine Fire
8/18/2014	Way Fire	3,882	Way Fire
6/13/2014	Shirley Fire	2,546	Shirley Fire
5/16/2013	Grand Fire	4,345	Grand Fire
8/10/2012	Jawbone Complex Fire	12,015	Jawbone Complex Fire
9/23/2011	65 Fire	2,003	65 Fire
9/11/2011	Cattle Fire	2,130	Cattle Fire
9/10/2011	Black Fire	2,578	Black Fire
9/10/2011	Knob Fire	2,710	Knob Fire
9/10/2011	Indian Fire	3,069	Indian Fire
9/10/2011	North Fire	3,439	North Fire
9/10/2011	Reed Fire	5,900	Reed Fire
9/10/2011	Breckenridge Complex Fire	25,223	Breckenridge Complex Fire
9/10/2011	Comanche Fire	25,939	Comanche Fire
9/4/2011	Canyon Fire	14,585	Canyon Fire
6/21/2011	Quinn Fire	3,139	Quinn Fire
6/19/2011	Antelope Fire	5,069	Antelope Fire
9/12/2010	Canyon Fire	9,336	Canyon Fire
7/25/2010	Bull Fire	16,448	Bull Fire
6/28/2008	Piute Fire	37,346	Piute Fire



Date	Name	Size in Acres	Cause
6/24/2007	White Fire	12,432	White Fire
12/7/2006	Westside Fire	4,025	Westside Fire
8/13/2006	Quail Fire Fire	4,770	Quail Fire Fire
8/7/2006	Cottonwood Fire	2,344	Cottonwood Fire
7/22/2006	Ridge Fire	2,417	Ridge Fire
9/3/2005	Gorman Fire	2,516	Gorman Fire
6/15/2002	Borel Fire	3,418	Borel Fire
8/1/2000	King Fire	5,106	King Fire

Recent Large Wildfire Events

Erskine Fire (2016)

The Erskine fire occurred near Lake Isabella in 2016. An investigation revealed that the fire began as a result of a private power line that wore down as it repeatedly rubbed against a tree. Ultimately, the Erskine Fire consumed approximately 48,008 acres and destroyed more than 280 residences. It was the most devastating fire in Kern County history and was California’s second largest wildfire in 2016. (Kotowski, 2016)

Comanche Fire Complex (2011)

The Comanche Fire Complex consisted of four fires that burned in the Tehachapi Mountains just five miles southeast of Arvin in September, 2011. The fires started from lightning strikes and grew to 29,000 acres as wind fueled the growth. Evacuations were ordered for nearby residents while crews worked to control the fire.

Bull Fire (2010)

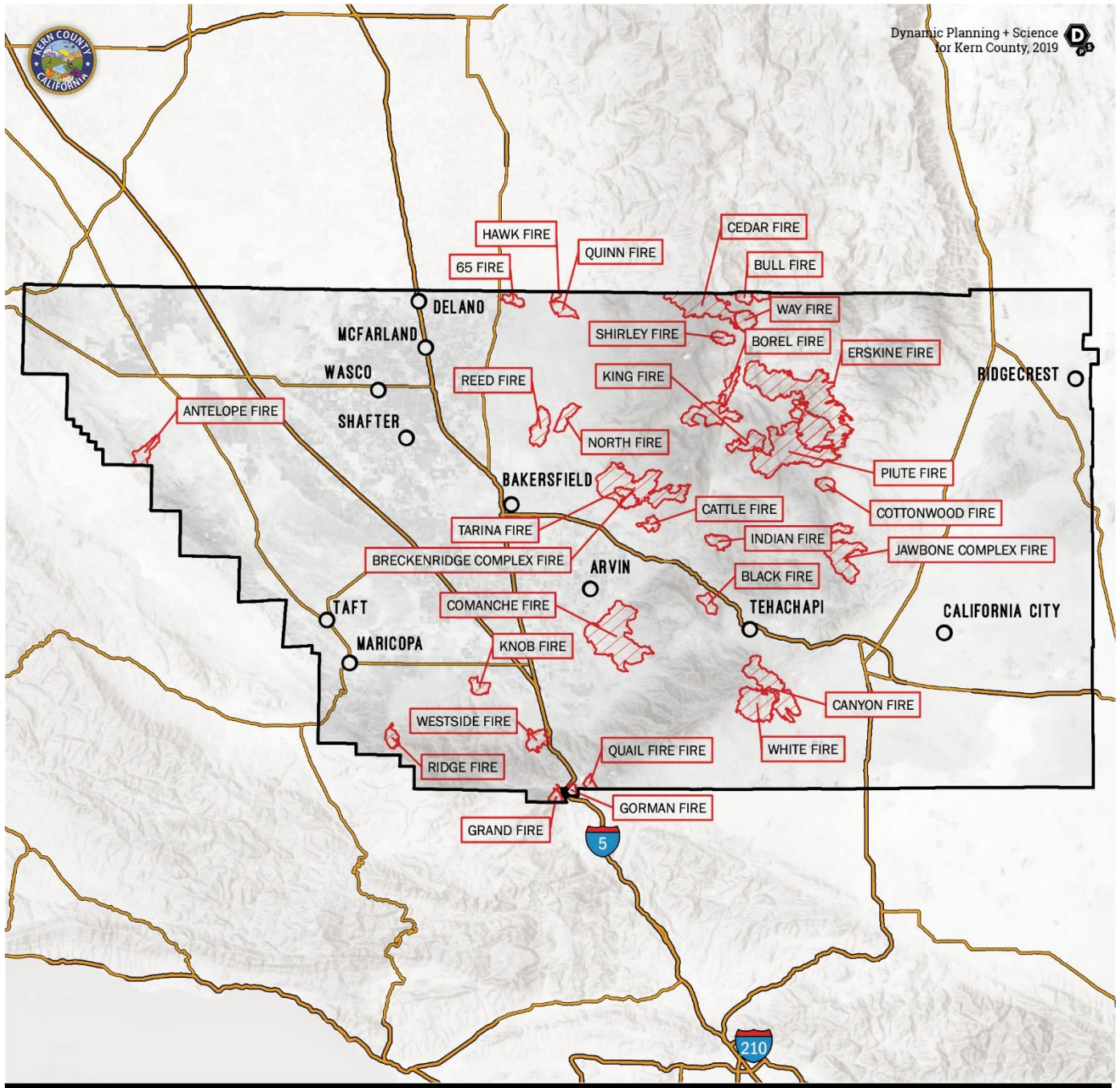
The Bull Fire was a human caused fire that occurred in a remote area at the bottom of Bull Run Creek Canyon in July, 2010. The Bull Fire threatened the communities of Riverkern and Kernville as the fire spread down the Bull Run Creek drainage and across the Kern River Canyon. The fire grew to over 16,000 acres, destroyed 16 structures, and was the largest wildfire of the 2010 California wildfire season. (CalFire, 2010)



Figure 4-35: 2016 Erskine Fire

Photo: Michael Cuffe (Patch, June, 2016)

See Figure 4-36 for locations of these historic fires.



Dynamic Planning + Science
for Kern County, 2019

HISTORIC FIRE OCCURRENCE KERN COUNTY

*Data sources: Cal Fire.

MAP LEGEND

— JURISDICTION

 FIRE PERIMETER

Figure 4-36: Historic Fire Occurrence Map (Fires Greater than 2,000 acres, 2000-2018)



4.5.5.4 Fire Hazard Severity Zones (FHSZs)

The County's hilly areas contain the major wildland fire hazard risks for residential structures and other development, characterized by steep slopes, poor fire suppression delivery access, inadequate water supply and highly flammable vegetation.

To help better refine areas of wildfire concern, CAL FIRE establishes and maps **Fire Hazard Severity Zones (FHSZ)**, or areas of significant fire hazards based on factors such as fuel, weather, terrain, and the number of days of moderate, high and extreme fire hazard. These zones define the application of various mitigation strategies to reduce risk associated with wildfires.

The FHSV model inputs frequency of fire weather, ignition patterns, expected rate-of-spread, and past fire history. It also accounts for flying ember production based on the area of influence where embers are likely to land and cause ignitions. The FHSZ model also is built from existing data and hazard constructs, and thus does not necessarily take into consideration significant land use and structural resiliency. The geography, weather patterns and vegetation in the planning area provide ideal conditions for recurring wildfires. See Figure 4-37 and Figure 4-38 for wildfire return intervals and fire severity zones. These maps are the basis for this wildfire risk assessment.

4.5.5.5 Frequency/ Probability of Future Occurrences

Generally, Kern County faces a wildland fire threat each and every year. Fire conditions arise from a combination of hot weather, an accumulation of vegetation, and low moisture content in the air. These conditions, when combined with high winds and years of drought, increase the potential for a wildfire to occur. Urban wildfires often occur in those areas where development has expanded into the rural areas. A fire along this **wildland urban interface (WUI)** can result in major losses of property and structures. Generally, there are three major factors that sustain wildfires and allow for predictions of a given area's potential to burn: fuel, topography, and weather.

Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and volume. Fuel sources are diverse and include everything from dead tree needles and leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Man-made structures and other associated combustibles may be considered fuel sources. The type of prevalent fuel directly influences the behavior of wildfire. Light fuels such as grasses burn quickly and serve as a catalyst for fire spread. The volume of available fuel is described in terms of Fuel Loading. Certain areas in and surrounding Kern County are extremely vulnerable to fires as a result of dense grassy vegetation combined with a growing number of structures being built near and within wildland areas.

An area's topography affects its susceptibility to wildfire spread. Fire intensities and rates of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The natural arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.



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.

Wind is the most treacherous weather factor. The greater a wind, the faster a fire will spread, and the more intense it will be. Winds can be significant in Kern County. However, it should be noted that the winds generally occur during the winter storm season, not during the summer fire season. In addition to high winds, wind shifts can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides.

Recent drought conditions also have increased the threat of wildfire. (Kern County MJHMP, 2014) The majority of past wildfire events in Kern County were in the late summer months (typically July through September). Frequency of wildfire events may increase because of increasingly drier conditions caused by climate change. Fire risk will also continue to grow as more people build in WUI areas, which increases fuel loads and the risk of human-caused fires.

As seen in Figure 4-36, fire occurrences are the most common in mountainous areas in the central and eastern portion of Kern County. The probability of a wildfire occurring in Kern County is highly likely (100% annual chance).

4.5.5.6 Severity and Extent

The severity of the wildland fire hazard is determined by the relationship between three factors: fuel classification, topographic slope, and critical fire weather frequency. Critical fire weather conditions occur in periods of relative low humidity, high heat and high winds. Smoke and air pollution from wildfires can be a health hazard, especially for sensitive populations including children, the elderly and those with respiratory and cardiovascular diseases. Wildfire may also threaten the health and safety of those fighting the fires. First responders are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke. In addition, wildfire can lead to ancillary impacts such as landslides in steep ravine areas and flooding due to the impacts of silt in local watersheds.

4.5.5.7 Warning Time

Regardless of the circumstances around the start of a wildfire, response time can be rapid and warning time short. Wildfires are often caused by humans, intentionally or accidentally. There is no way to predict when one might break out.

The Fourth of July can be a time of heightened concern and outreach around wildfires, since fireworks can cause fires and usage is high. Dry seasons and droughts greatly increase fire likelihood. Dry lightning may trigger wildfires. Severe weather can be predicted, so special attention can be paid during weather events that may include lightning or wind events. Reliable National Weather Service lightning warnings are available on average 24 to 48 hours prior to a significant electrical storm. (California Fire, 2019)



If a fire does break out and spread rapidly, residents may need to evacuate within days or hours. A fire's peak burning period generally is between 1 p.m. and 6 p.m. Once a fire has started, fire alerting is reasonably rapid in most cases. The rapid spread of cellular and two-way radio communications in recent years has contributed to a significant improvement in warning time. (*Id*)

4.5.5.8 Secondary Hazards

Wildfires can generate a range of secondary effects, which in some cases may cause more widespread and prolonged damage than the fire itself. Fires can cause direct economic losses in the reduction of harvestable timber and indirect economic losses in reduced tourism and commerce. Wildfires cause the contamination of reservoirs, destroy transmission lines, and contribute to flooding. They strip slopes of vegetation, exposing them to greater amounts of runoff, weakening soils, and causing slope failures. Major landslides can occur several years after a wildfire. Most wildfires burn hot and for long durations that can bake soils, especially those high in clay content, thus creating hydrophobic soils that repel water. When it rains in burned areas, more soil washes off the hills and into roads, ditches, and streams and increases flooding. (*Id*)

4.5.5.9 Climate Change Impacts

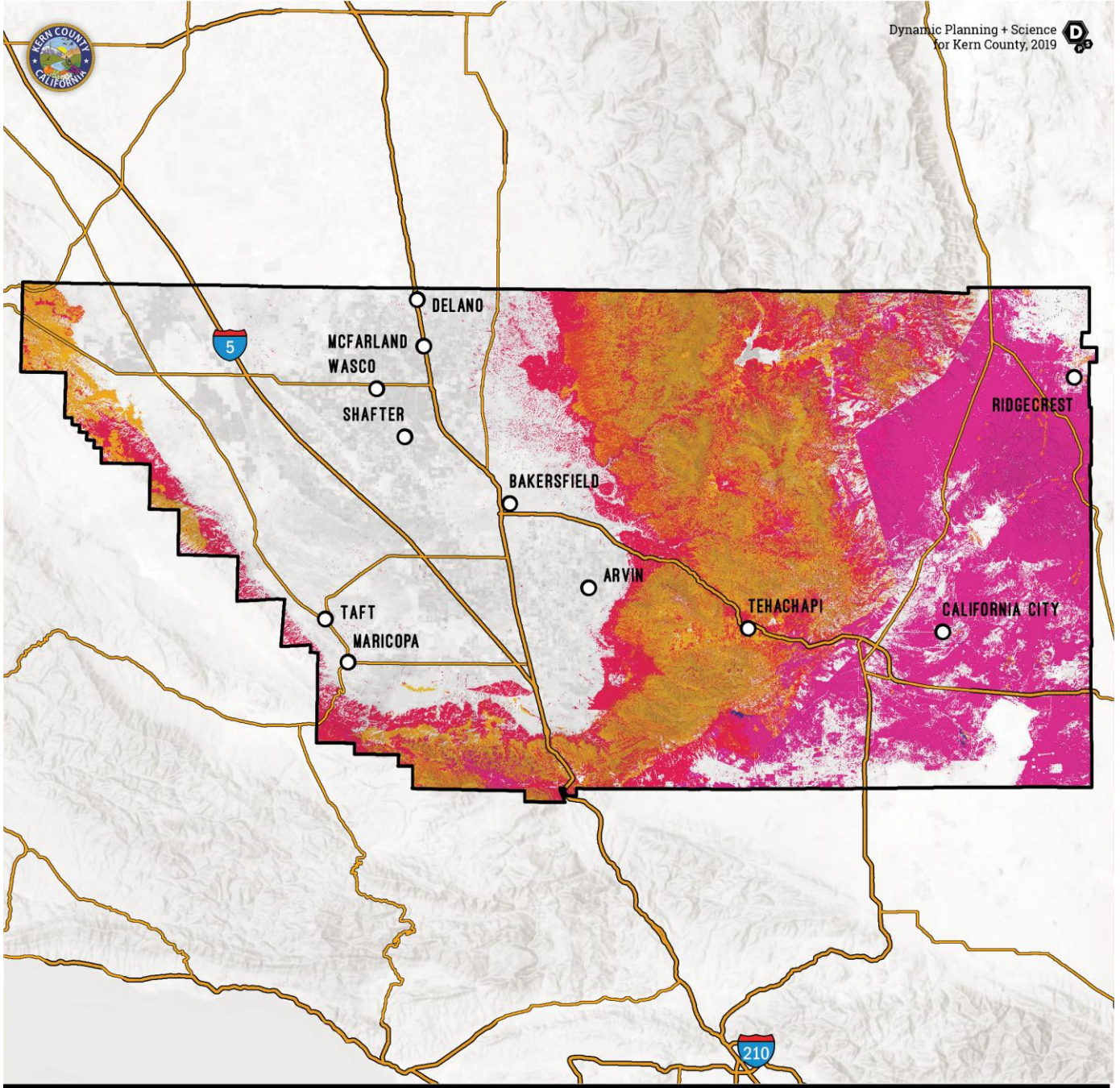
Fire in western ecosystems is determined by climate variability, local topography, and human intervention. Climate change has the potential to affect multiple elements of the wildfire system: fire behavior, ignitions, fire management, and vegetation fuels. Hot, dry spells create the highest fire risk. Drought and increased temperatures intensify wildfire danger by warming and drying out vegetation. Climate change also may increase winds that spread fires. Faster fires are harder to contain, and thus are more likely to expand into residential neighborhoods.

A changing climate is expected to subject forests to increased stress due to drought, disease, invasive species, and insect pests. These stressors are likely to make forests more vulnerable to catastrophic fire. While periodic fires are natural processes and fulfill an important ecological function, catastrophic fire events that cannot be contained or managed can cause serious threats to homes and infrastructure, especially for properties located at the wildland-urban interface. Moreover, rain events are predicted to become more severe in our changing climate, and post-fire flooding could worsen as well.

It is predicted that Kern County will see higher daily temperatures, more heatwaves, increased wildfires, and a diminished snowpack within this century, as a result of climate change. The eastern edge of Kern County is projected to experience an increase in wildfire risk of 4 to 6 times current fire season averages by the year 2050. (Advancement Project California, 2019)



Dynamic Planning + Science
for Kern County, 2019

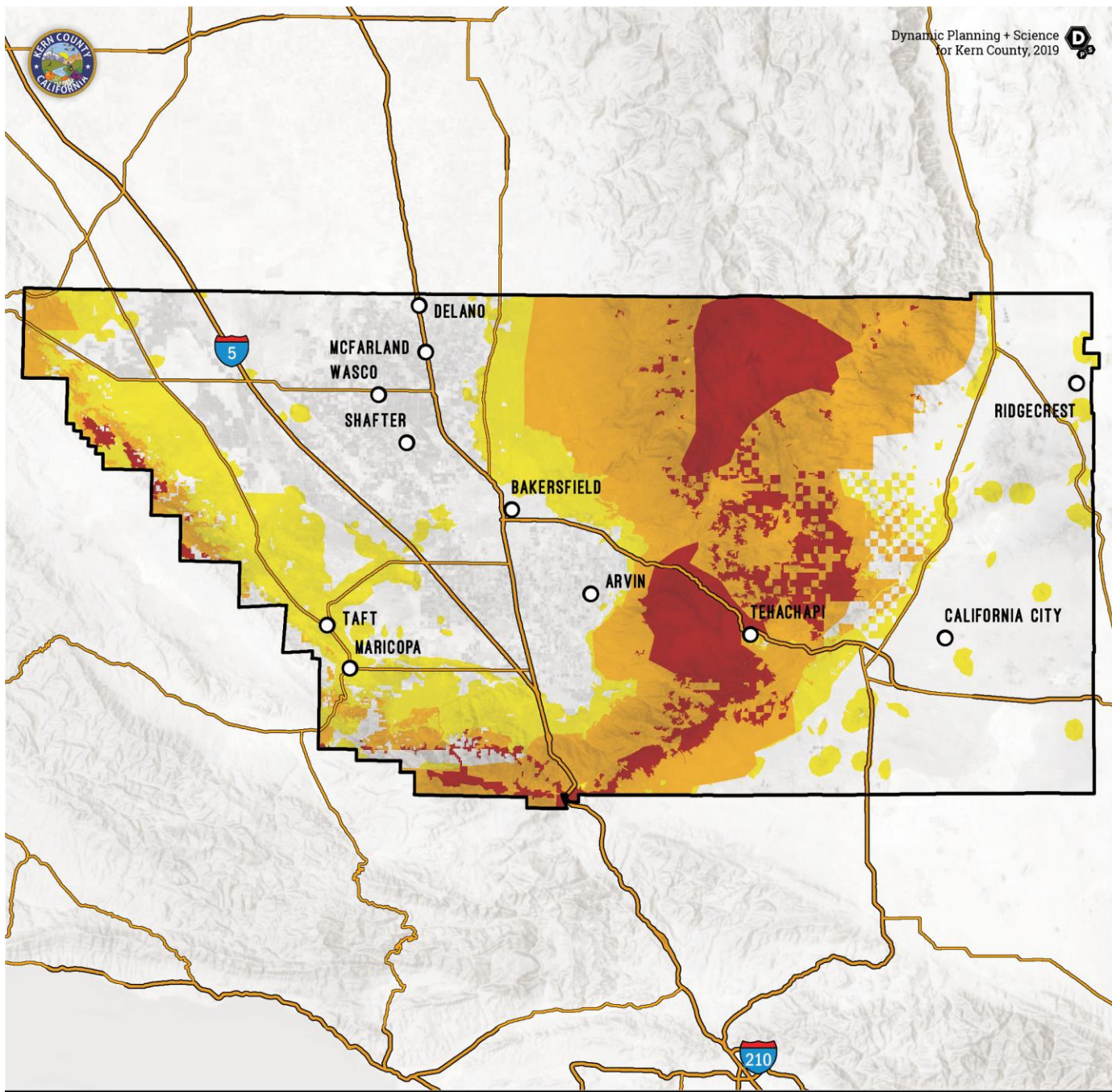


WILDFIRE RETURN INTERVALS KERN COUNTY

*Data sources: USGS LANDFIRE.



Figure 4-37: Wildfire Return Intervals



WILDFIRE SEVERITY ZONES KERN COUNTY

*Data sources: Cal Fire, CPUC.

MAP LEGEND



Figure 4-38: Wildfire Severity Zones



4.5.5.10 Wildfire Vulnerability Analysis

This section describes vulnerabilities to wildfire in terms of population, property, and infrastructure. Wildfire population, parcel value, critical facilities and lifeline exposure numbers were generated by overlaying the inventory outlined in Section 4.4 with CalFire Wildfire Hazard Severity Zones. Figure 4-40 shows a snapshot of wildfire vulnerability in Kern County. All data sources have a level of accuracy acceptable for planning purposes. Details for each snapshot can be found in this section.

4.5.5.10.1 Population

Smoke and air pollution from wildfires can be a severe health hazard, especially for sensitive populations including children, the elderly, and those with respiratory and cardiovascular diseases. Smoke generated by wildfire contain visible and invisible emissions that contain particulate matter such as soot, tar, water vapor, and minerals; gases such as carbon monoxide, carbon dioxide, and nitrogen oxides; and toxics such as formaldehyde, benzene. Emissions from wildfires depend on the type of fuel, the moisture content of the fuel, the efficiency or temperature of combustion, and the weather. Public health impacts associated with wildfire include difficulty in breathing, odor, and reduction in visibility. First responders likewise are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke. (EPA)

Wildfire is of greatest concern to populations residing in the moderate, high and very high fire hazard severity zones. U.S. Census Bureau block data was used to estimate populations within the CAL FIRE identified hazard zones. See Figure 4-40, Figure 4-39, and Table 4-45 for detail on populations residing in wildfire risk areas.



Table 4-45 Populations Exposed to Wildfire Risk (Unincorporated County)

	Total Population
Unincorporated County	299,935

Wildfire Severity Zone	Population Count	% of Total
Very High Intensity	19,903	6.64%
High Intensity	11,453	3.82%
Moderate Intensity	40,614	13.54%
Total	71,970	24.00%

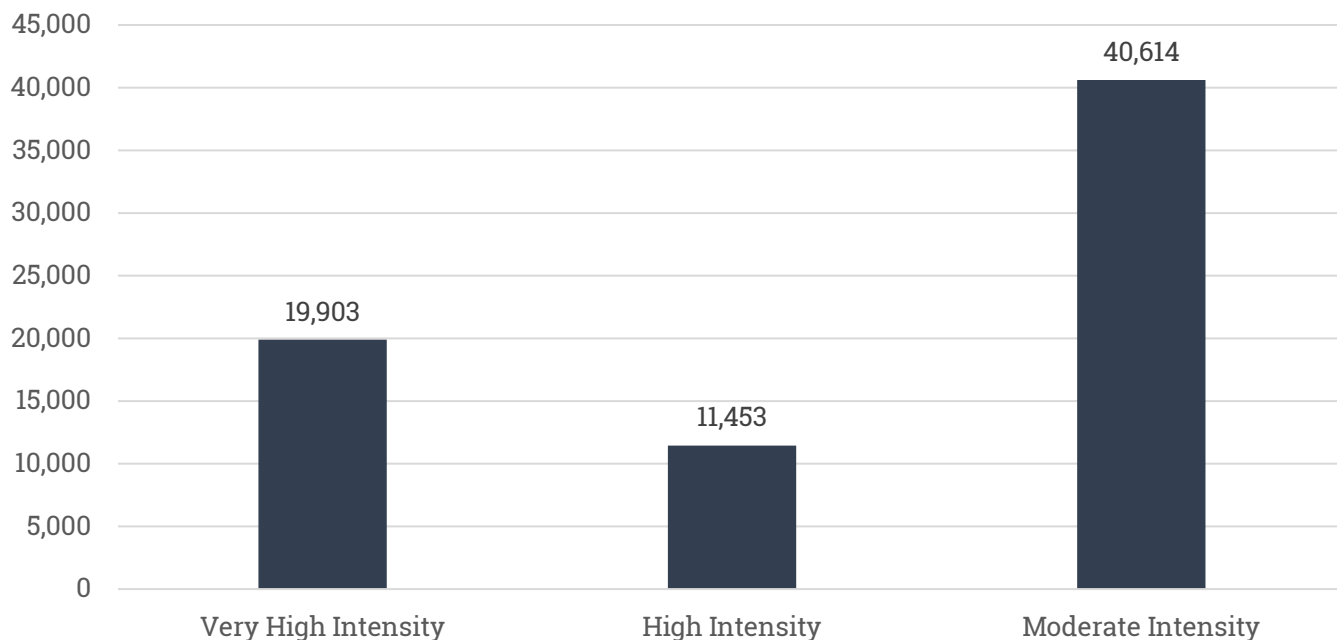
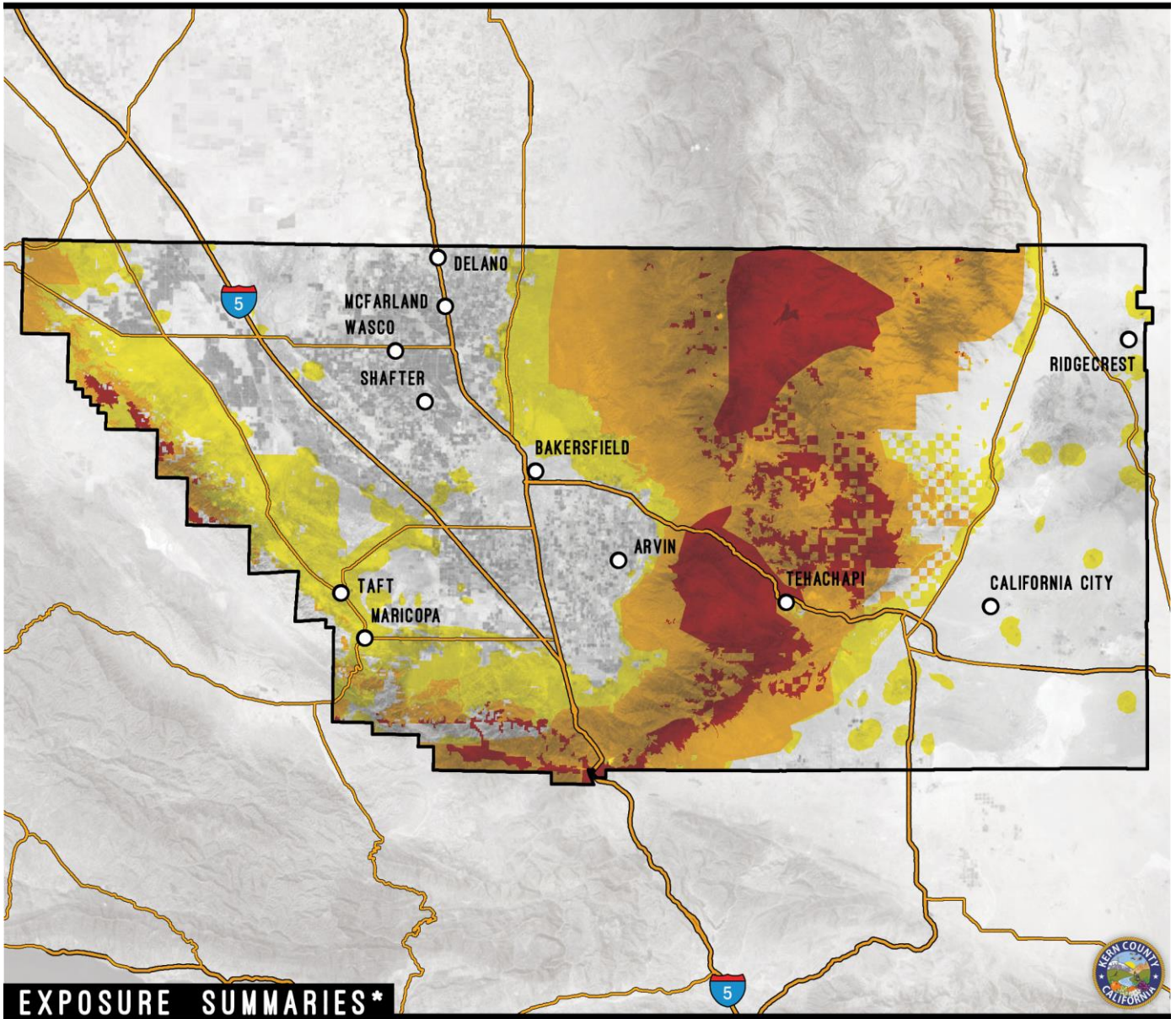


Figure 4-39 Population Exposed to Wildfire Risk



WILDFIRE VULNERABILITY & EXPOSURE SNAPSHOT

KERN COUNTY



EXPOSURE SUMMARIES*

POPULATION		PARCEL		PARCEL VALUE		CRITICAL INFRASTRUCTURE		
COUNT		COUNT		IMPROVEMENT		COUNT		
31,356	10%	23,615	26%	\$3,108,015,208	28%	Essential Facilities	18	37%
				CONTENT		High Potential Loss	148	21%
				\$1,554,381,104	28%	Transportation & Lifeline	1,223	22%
							3,074	20%
<p>MAP LEGEND</p> <p>MODERATE</p> <p>HIGH</p> <p>VERY HIGH</p>								
<p>*Exposure summaries include high and very high LRA and SRA zones. Hazard data source: Cal Fire, CPUC. (%) - Percent of respective category totals for jurisdiction.</p>						<p>LINEAR MILEAGE</p>		
						<p>Dynamic Planning + Science for Kern County, 2019</p>		

Figure 4-40: Exposure Wildfire Vulnerability and Snapshot Map



4.5.5.10.2 Property

This Section calculates the considerable assets at risk of wildfire in those severity zones. See Table 4-46, which utilizes County parcel information to calculate exposure. In some cases, a parcel will be within in multiple fire threat zones, and for this exercise every parcel with a square footage value greater than zero was developed in some way. Only improved parcels were analyzed.

Table 4-46: Residential Buildings and Content within Wildfire Severity Zones (Unincorporated County)

	Total Parcels		Total Market Value (\$)	Total Content Value (\$)	Total Value (\$)	
Unincorporated County	91,455		\$ 10,906,675	\$5,453,338	\$ 16,360,013	

Fire Hazard Severity Zone	Parcel Count	% of Total	Market Value Exposure (\$)	Content Value Exposure (\$)	Total Exposure (\$)	% of Total
Very High	21,750	23.8%	\$ 1,459,089	\$21,750	\$1,480,839	9.1%
High	1,865	2.0%	\$ 94,545	\$ 1,865	\$96,410	0.6%
Moderate	14,434	15.8%	\$874,469	\$14,434	\$ 888,903	5.4%
Total	38,049	42%	\$ 2,428,103	\$ 38,049	\$ 2,466,152	15.1%

Currency in Thousands

4.5.5.10.3 Critical Facilities and Infrastructure

Critical facilities of wood frame construction are especially vulnerable during wildfire events; power lines are also at risk from wildfire because some poles are made of wood and are susceptible to burning.

In most cases, roads and railroads are not susceptible to damage from wildfire but create response issues if affected. Fires can create conditions that block or prevent access and can isolate residents and emergency service providers. Wildfire typically does not have a major direct impact on bridges, but it can create conditions in which bridges are obstructed. Many bridges in areas of high to moderate fire risk are important because they provide the only ingress and egress to large areas and in some cases to isolated neighborhoods.

Critical facilities data were overlaid with fire hazard severity zone data to determine the type and number of facilities within each risk classification. Table 4-47 lists the critical facilities in wildfire hazard severity zones for Kern County, and Table 4-48 similarly lists critical infrastructure.



Table 4-47: Critical Facility Exposure to Wildfire Severity Zones (Unincorporated County)

Critical Infrastructure - Wildfire Severity Zone			
Infrastructure Type	Very High	High	Moderate
Essential Facility	12	6	10
EOC	-	-	-
Fire Station	8	4	7
Hospital	1	-	-
Police Station	1	-	1
Sheriff Station	2	2	2
High Potential Loss	119	29	121
Adult Residential facility	3	-	7
Child Care Center	14	-	7
Dam	2	5	6
Family Child Care Home	2	-	-
Foster Family Agency	1	-	-
Historic Building	-	-	-
Home Care Organization	-	-	-
Library	9	3	2
Residential Child Care	-	-	-
Residential Elder Care	8	-	5
School	14	13	17
County Insured Asset*	42	7	57
Cooling Center	2	-	-
Healthcare Facility	7	-	4
Special Needs Facility	15	1	16
City Hall	-	-	-
Historic Site	-	-	-
Transportation and Lifeline	163	1060	1474
Airport	-	-	1
Bridge	45	36	85
Power Plant	4	37	67
Substation	11	29	83
Transmission Line Tower	99	914	1163
NG Facility	2	8	57
Wind Turbine	-	34	15
Bus Facility	-	-	-
Potable Water Facility	1	1	-
Waste Water Facility	1	1	-
Oil Facility	-	-	3
Railroad Facility	-	-	-
Grand Total	294	1095	1605

* These insured assets may include critical infrastructure already represented in other Infrastructure Types.



Table 4-48: Lifelines in Wildfire Severity Zones (Unincorporated County)

Lifelines (miles) - Wildfire Severity Zone			
Infrastructure Type (Linear)	Very High	High	Moderate
Levee	1.50	4.23	123.97
NG Pipeline	55.01	90.02	420.74
Railroad	28.64	16.77	47.12
Street	1262.59	1172.69	1720.92
<i>4WD trail</i>	16.87	66.15	29.75
<i>4WD trail, major</i>	0.18	0.03	0.04
<i>Alley</i>	1.08	2.68	0.50
<i>Cul-de-sac</i>	0.38	0.51	0.88
<i>Driveway</i>	6.36	2.37	14.52
<i>Interstate</i>	32.04	41.76	69.46
<i>Local road</i>	701.45	456.30	528.57
<i>Local road, major</i>	290.16	359.01	568.40
<i>Primary highway</i>	2.88	6.81	135.59
<i>Ramp</i>	6.09	3.99	15.00
<i>Road, parking area</i>	0.52	-	0.60
<i>Service road</i>	0.35	2.10	1.88
<i>State/county highway</i>	196.69	220.79	240.02
<i>State/county highway, major</i>	-	-	0.42
<i>Thoroughfare, major</i>	6.95	6.93	114.60
<i>Walkway</i>	0.57	3.26	0.69
Transmission Line	127.12	315.15	643.23
Grand Total	1474.87	1598.86	2955.97

4.5.5.11 Changes in Development and Future Trends

Fuel reduction projects are ongoing on federal, state, and private lands in Kern County. Such projects include vegetation management, broadcast burning, pre-commercial thinning, and the removal of dead, dying, and diseased trees. The Kern County Fire Hazard Reduction Program (FHRP) is a joint effort between the Kern County Fire Department, Cal Fire, Kern County Code Enforcement, and property owners to ensure fire safe communities within the County. The goal of the program is to provide sufficient defensible space around homes and other structures to improve the safety of the public and emergency personnel, as well as increase the chance of a home's survival in the event of fires. Having heavy accumulations of fuel, and/or dry fuel poses a significant risk to a specific property, neighboring properties, and fire personnel. While inspections are typically done once a year, after June 1 in preparation for fire season, a property can receive an inspection at any time if it is deemed to be a hazard. (Kern County Fire Department, n.d.)



4.5.5.12 Wildfire Problem Statements

As part of the mitigation action identification process, the Planning Committee for the County and for each jurisdiction identified issues and weaknesses, also called problem statements, for their respective facilities. The problem statements were based on the risk assessment and vulnerability analysis which utilizes the RAMP mapping tool and flood data. Wildfire problem statements for all participating jurisdictions are listed in Table 4-49; problem statements for all other participating jurisdictions are accessed in Volume 2 of this plan.

Identifying these common issues and weaknesses assists the Planning Committee in understanding the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. See Table 5-6 for a full list of mitigation actions and the corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-49 and Table 5-6.

Table 4-49 Wildfire Problem Statements

Problem No.	Hazard	Area of Concern	Mitigation Alternatives	Primary Agency	Problem Description	Related MA
ps-WF-KC-232	Wildfire	Impact	PPRO - Property Protection, PE&A - Public Education & Awareness, NRP - Natural Resource Protection	County of Kern	The Alta Sierra CWPP (link below) details fire hazards requiring mitigation for the continued protection of the WUI throughout the area: https://www.dropbox.com/s/nfk6320d3j5vg2l/Alta%20Sierra%20CWPP%201204.pdf?dl=1	ma-WF-KC-183, ma-WF-KC-184, ma-WF-KC-287
ps-WF-KC-233	Wildfire	Impact	PPRO - Property Protection, PE&A - Public Education & Awareness, NRP - Natural Resource Protection	County of Kern	The Kern Valley CWPP (link below) details fire hazards requiring mitigation for the continued protection of the WUI throughout the area: https://www.dropbox.com/s/5ia29n0nt0by10e/Community%20Wildfire%20Protection%20Plan-February%202012%20Update1.pdf?dl=1	ma-WF-KC-182, ma-WF-KC-183, ma-WF-KC-184
ps-WF-KC-234	Wildfire	Impact	PPRO - Property Protection, PE&A - Public Education & Awareness, NRP - Natural Resource Protection	County of Kern	The Mt. Pinos CWPP (link below) details fire hazards requiring mitigation for the continued protection of the WUI throughout the area: https://www.dropbox.com/s/3vel3cdnk791acm/107658_FSPLT3_4276170.pdf?dl=1	ma-WF-KC-181, ma-WF-KC-183, ma-WF-KC-184



COUNTY OF KERN

Kern Multi-Jurisdiction 2020 MJHMP Update

Problem No.	Hazard	Area of Concern	Mitigation Alternatives	Primary Agency	Problem Description	Related MA
ps-WF-KC-235	Wildfire	Impact	PPRO - Property Protection , PE&A - Public Education & Awareness , NRP - Natural Resource Protection	County of Kern	The Myers Canyon CWPP (link below) details fire hazards requiring mitigation for the continued protection of the WUI throughout the area: https://www.dropbox.com/s/193a92wpj5om8sx/Myers%20CWPP%20081605.pdf?dl=1	ma-WF-KC-288, ma-WF-KC-183, ma-WF-KC-184
ps-WF-KC-236	Wildfire	Impact	PPRO - Property Protection , PE&A - Public Education & Awareness , NRP - Natural Resource Protection	County of Kern	The Greater Tehachapi Area CWPP (link below) details fire hazards requiring mitigation for the continued protection of the WUI throughout the area: https://www.wildfirelessons.net/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=48eaad9b-b2ab-4abc-841e-79dd5320d8dd&forceDialog=1	ma-WF-KC-180, ma-WF-KC-183, ma-WF-KC-184
ps-WF-KC-237	Wildfire	Impact	PPRO - Property Protection , PE&A - Public Education & Awareness , ES - Emergency Services	County of Kern	Not all address markers are compliant. Reflective number signs are needed on all homes and at the road.	ma-WF-KC-289
ps-WF-KC-238	Wildfire	Victim	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness	County of Kern	There are approx. 11 Adult Care Facilities, 15 special needs facilities, and 11 Health Care facilities in Very High Wildfire Severity Zones in mountain communities.	ma-WF-KC-286, ma-AH-KC-104
ps-WF-KC-239	Wildfire	Victim	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness	County of Kern	There are approx. 10 Schools in Very High Wildfire Severity Zones in mountain communities.	ma-WF-KC-286, ma-AH-KC-104
ps-WF-KC-240	Wildfire	Victim	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness	County of Kern	There are approx. 20,000 people living in the very high wildfire intensity zone. Approx. 10,000 in Tehachapi Area. Approx. 7,000 in Lake Isabella Area.	ma-WF-KC-184, ma-WF-KC-183, ma-AH-KC-201



Problem No.	Hazard	Area of Concern	Mitigation Alternatives	Primary Agency	Problem Description	Related MA
ps-WF-KC-241	Wildfire	Threat	PPRO - Property Protection , NRP - Natural Resource Protection	County of Kern	Ongoing fuel mitigation is needed throughout the County. The County has identified the following fuel project priorities: Battalion 1: Bear Valley (Skyline), Water Canyon, Old West Ranch, Alpine, Golden Hills Battalion 5: Pinion Pines, South Frazier, Lake of the Woods, Camp Condor with emphasis on Peak to Peak Charter School, PMC Green Belts Battalion 7: Alta Sierra, Kernville (includes Frontier, Grandview and Burma fuel breaks), Bodfish Phase 1,2, and 3, Pala Ranches, Squirrel Valley	ma-AH-KC-179, ma-WF-KC-231



4.5.6 Drought Hazard Profile

California's water resources have been stressed by periodic drought cycles and, in some places, overuse, creating the need for unprecedented restrictions in water diversions from the Sacramento-San Joaquin Delta in recent years. Climate change is expected to increase drought and extreme weather. While the duration of drought is always in question, it is certain that California and Kern County will continue to be impacted by drought. (California Drought Contingency Plan, 2010)



4.5.6.1 Drought in California

Drought has impacted almost every county in California at one time or another, causing more than \$2.6 billion in damage. Droughts exceeding three years are relatively rare in northern California, the source of much of the state's water supply. The 1929-1934 drought established the criteria commonly used in designing storage capacity and yield for large northern California reservoirs. The driest single year in California's measured hydrologic history was 1977. (California Department of Water Resources, 2015)

Past experience shows that drought impacts in California are felt first by those most dependent on annual rainfall: agencies fighting wildfires, ranchers engaged in dryland grazing, rural residents relying on wells in low-yield rock formations, or small water systems lacking a reliable water source. (*Id*)

Most of California's precipitation comes from storms moving across the Pacific Ocean. The path followed by the storms is determined by the position of an atmospheric high-pressure belt that normally shifts southward during the winter, allowing low pressure systems to move into the state. On average, 75 percent of California's annual precipitation occurs between November and March, with 50 percent occurring between December and February. If a persistent Pacific high-pressure zone takes hold over California mid-winter, the water year tends to be dry. (Western Regional Climate Center, 2020)

A typical water year produces about 100 inches of rainfall over the North Coast, 50 inches of precipitation (combination of rain and snow) over the Northern Sierra, 18 inches in the Sacramento area, and 15 inches in the Los Angeles area. In extremely dry years, these annual totals can fall to as little as one half, or even one third of these amounts. (*Id*)

Kern County's water supply is mostly dependent on snowmelt runoff in the mountains, some of which is captured in reservoirs, and groundwater resources in the Valley and Desert regions. Kern County receives water from external sources that include the State Water Project and Central Valley Project.



4.5.6.2 Plans, Policies, and Regulatory Environment

California Sustainable Groundwater Management Act

On September 16, 2014, Governor Brown signed into law a package of bills (SB1168, AB1739 and SB1319) collectively called the Sustainable Groundwater Management Act (SGMA). SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Kern County currently has one basin, the Kern River Valley Basin, which is categorized as high-medium priority. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, that date will be 2040. For the remaining high and medium priority basins, 2042 is the deadline.

Statewide Emergency Water Conservation Regulations

In 2016, the State Water Resources Control Board (Water Board) adjusted emergency water conservation regulations in recognition of the differing water supply conditions and ongoing drought across the state to comply with an Executive Order from the California Governor declaring a drought emergency. Executive Order B-37-16 Making Water Conservation a California Way of Life updates temporary emergency water restrictions and transitions to permanent, long-term improvements in water use by:

- providing for wiser water use
- Eliminating water waste
- Strengthening local drought resilience
- Improving agricultural water use efficiency and drought planning

In April of 2017, a new Executive Order lifted the drought emergency but retained many of the conservation requirements. Most regulations are still in effect with the exception of water supply “stress test” requirements and conservation standards for urban water suppliers. The temporary restrictions established a baseline of the types of benefits that are possible from water conservation requirements. The Executive Orders are found at:

https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/executive_orders.html

California Water Plan

The California Water Plan presents strategic plan elements including a vision, mission, goals, guiding principles, and recommendations for current water conditions, challenges, and activities. The plan includes future uncertainties and climate change impacts, scenarios for 2050, and a roadmap for improving data and analytical tools needed for integrated water management and sustainability. The California Water Plan was updated most recently in 2018. See: <https://water.ca.gov/Programs/California-Water-Plan>.



4.5.6.3 Past Events

California experienced massive changes over the course of the twentieth century as evidenced by dramatic population increases and land use conversion. (Cal. Dep't of Water Resources, 2015) The California Department of Water Resources has state hydrologic data back to the early 1900s. The hydrologic data show multi-year droughts from 1912 to 1913, 1918 to 1920, 1922 to 1924, 2007-2009, and 2014 to 2017.

The most recent major drought in California spanned 2014-2017. With California facing water shortfalls in the driest year in recorded state history, California State Governor Jerry Brown declared a drought state of emergency on January 17, 2014. In the State of Emergency declaration, Governor Brown directed state officials 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 a greatly expanded water conservation



Figure 4-41. Drought-lowered Lake Isabella in 2015. Photo by Don Barrett, USC News

public awareness campaign. Figure 4-41 shows drought-impacted Lake Isabella in 2015. On April 17, 2017, Brown issued Executive Order B-40-17, officially ending the drought state of emergency in all California counties except Fresno, Kings, Tulare, and Tuolumne.

The National Drought Monitor provides drought data and maps nationally and on a localized, watershed scale. The National Drought Monitor is the product of eleven agencies, from the NDMC, NOAA and USDA, and is available at <http://droughtmonitor.unl.edu/>. The National Drought Monitor categorizes the level of drought from D0 through D4, with D4 being the highest "exceptional drought." Table 4-50 depicts drought classifications and impacts from the level of drought occurrence in California.

Figure 4-42 shows a time series of the level of drought in Kern County from 2000 to 2020 according to the National Drought Monitor as well as the watersheds in Kern County. The National Drought Monitor also classifies drought on a watershed scale (according to hydrologic units established by the US Geological Survey). The participating jurisdiction annexes for those jurisdictions that prioritized drought hazards depict the past twenty years of droughts within applicable watersheds.



Table 4-50. Drought Classifications and Impacts for California

Category	Description	Possible Impacts
D0	Abnormally Dry	<ul style="list-style-type: none"> Soil is dry; irrigation deliver begins early Dryland crop germination is stunted Active fire season begins Winter resort visitation is low; snowpack is minimal
D1	Moderate Drought	<ul style="list-style-type: none"> Dryland pasture growth is stunted; producers give supplemental feed to cattle Landscaping and gardens need irrigation earlier; wildlife patters begin to change Stock ponds and creeks are lower than usual
D2	Severe Drought	<ul style="list-style-type: none"> Producers increase water efficiency methods and drought-resistant crops; Grazing land inadequate Fire season is longer, with high burn intensity, dry fuels, and large fire spatial extent; more fire crews on staff Lake- and river-based tourism declines; boat ramps close Trees are stressed; plants increase reproductive mechanisms; wildlife diseases increase Water temperatures increase; programs to divert water to protect fish begin River flows decrease; reservoir levels are low and banks are exposed
D3	Extreme Drought	<ul style="list-style-type: none"> Livestock need expensive supplemental feed, cattle and horses are sold; little pasture remains Fruit trees bud early; producers begin irrigating in winter Federal water not adequate to meet irrigation contracts, extracting supplemental groundwater is expensive Dairy operations close Fire season lasts year-round; fires occur in typically wet parts of the state; burn bans are implemented Ski and rafting business is low, mountain communities suffer Orchard removal and will drilling company business increase; panning for gold increases Low water levels impede fish migration and cause lower survival rates Wildlife encroach on developed areas; little native food and water is available for bears, which hibernate less Water sanitation is a concern, reservoir levels drop significantly, surface water is nearly dry, flows are very low; water theft occurs Well and aquifer levels decrease; homeowners drill new wells
D4	Exceptional Drought	<ul style="list-style-type: none"> Fields are left fallow; orchards are removed; vegetable yields are low; honey harvest is small; agricultural unemployment is high, food aid is needed Fire season is very costly; number of fires and areas burned are extensive Many recreational activities are affected Fish rescue and relocation begins; pine beetle infestation occurs; forest mortality is high; wetlands dry up; survival of native plants and animals is low; fewer wildflowers bloom; wildlife death is widespread; algae blooms appear Poor air quality affects health; greenhouse gas emissions increase as hydropower production decreases; West Nile outbreaks rise Water shortages are widespread; surface water is depleted; federal irrigation water deliveries are curtailed; water prices are extremely high; wells are dry, more and deeper wells are drilled; water quality is poor

Adapted from U.S. Drought Monitor Drought Classifications and Impacts.

<https://droughtmonitor.unl.edu/Data/StateImpacts.aspx>



DROUGHT SEVERITY TIMELINE

KERN COUNTY

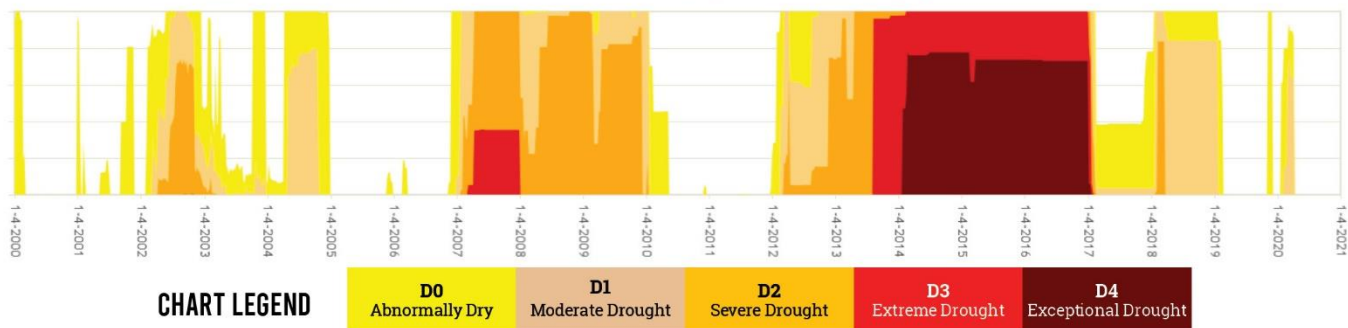
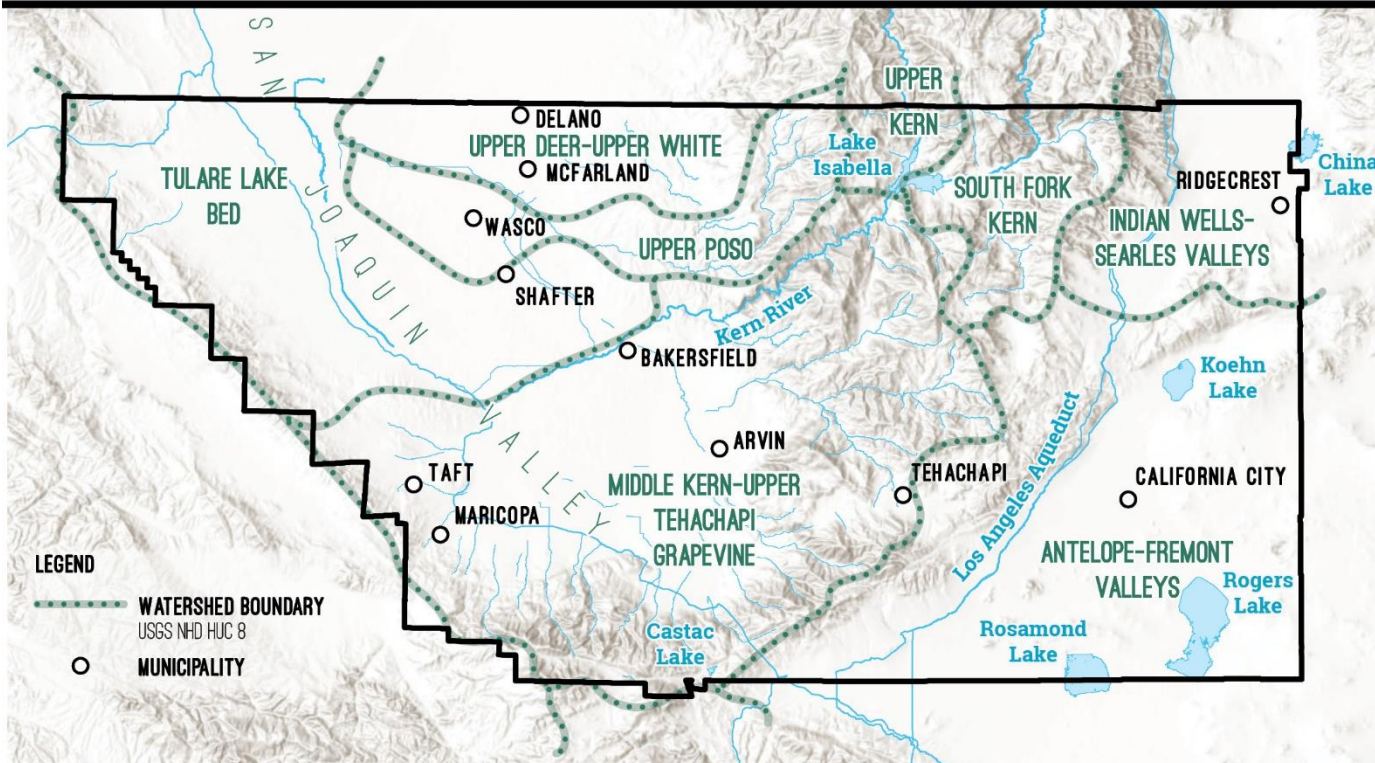


Figure 4-42 Kern County Drought Severity Timeline 2000-2021

Drought is one of the few hazards with the potential to impact the entire population of Kern County directly or indirectly, be it from water restrictions, higher water and food prices, reduced air or water quality, or restricted access to recreational areas. No portion of the County is immune from drought conditions. Lack of winter snowfall in the mountains can eventually lead to agricultural impacts due to decreased stream flows. Droughts of just a few weeks during critical periods of plant development can have disastrous effects on agriculture production. Reduced reservoir storage from decreased runoff in the mountains can lead to water shortages. Droughts that occur in populated areas may not have direct effects to the residents but may increase the threat of wildfire in the wildland urban interface areas.



4.5.6.4 Frequency/Probability of Future Occurrences

Currently there is no data on the probability of drought akin to data for predicting earthquakes or flood probability. Empirical studies conducted over the past century have shown that meteorological drought is never the result of a single cause. It is the result of many causes, often synergistic in nature; these include global weather patterns that produce persistent, upper-level high-pressure systems along the West Coast with warm, dry air resulting in less precipitation.

According to the results of the risk factor exercises for the participating jurisdictions, the probability of drought occurring in Kern County is highly likely (100% annual probability). Figure 4-42 provides a time series from the National Drought Monitor that shows Kern County has been in some form of drought for well over half of the period from 2000 to 2020.

4.5.6.5 Severity and Extent

The severity of a drought depends on the degree of moisture deficiency, the duration, and the size and location of the affected area. The longer the duration of the drought and the larger the area impacted, the more severe the potential impacts. Droughts are not usually associated with direct impacts on people or property, but they can have significant impacts on agriculture, which can impact people indirectly.

The agricultural sector clearly demonstrates the site-specific nature of drought impacts. Agricultural drought impacts are normally felt earliest by those relying on unmanaged water supplies: entities carrying out dryland grazing and non-irrigated crop production, usually grain crops. Impacts to irrigated agriculture depend on the source and nature of the irrigation water supply, whether it be local groundwater, local surface water, or imported surface water, and any water rights or contractual provisions that may be associated with the source. The extent to which producers may mitigate water shortage impacts depends on multiple factors but is heavily influenced by economic considerations. Factors involved in making decisions about mitigating irrigation water shortages include availability and costs of pumping groundwater, price of alternative surface water sources, capital investments associated with maintaining permanent plantings, and status of international crop markets. (California Drought Contingency Plan, 2010)

Unlike most disasters, droughts normally occur slowly but last a long time. On average, the nationwide annual impacts of drought are greater than the impacts of any other natural hazard. They are estimated to be between \$6 billion and \$8 billion annually in the United States and occur primarily in the agriculture, transportation, recreation and tourism, forestry, and energy sectors. Social and environmental impacts are also significant, although it is difficult to put a precise cost on these impacts.

Drought eventually affects groundwater sources but generally not as quickly as surface water supplies; groundwater supplies generally take longer to recover. Reduced precipitation during a drought means that groundwater supplies are not replenished at a normal rate. This can lead to a reduction in groundwater levels and problems such as reduced pumping capacity or wells going dry. Shallow wells are more susceptible than deep wells. Reduced replenishment of groundwater affects streams. Much of the flow in



streams comes from groundwater, especially during the summer when there is less precipitation and after snowmelt ends. Reduced groundwater levels mean that even less water will enter streams when stream flows are lowest.

A drought directly or indirectly impacts all people in affected areas. A drought can result in farmers not being able to plant crops or the failure of planted crops. This results in loss of work for farm workers and those in food processing and wine making jobs. Other water-dependent industries are commonly forced to shut down all or a portion of their facilities, resulting in further layoffs. A drought can harm recreational companies that use water (e.g., swimming pools, water parks, and river rafting companies) as well as landscape and nursery businesses because people will not invest in new plants if water is not available to sustain them.

Table 4-50 described impacts of the various severity levels of drought in California according to the National Drought Monitor classifications.

4.5.6.6 Warning Time

Droughts are climatic patterns that occur over long periods of time. Only generalized warning can take place due to the numerous variables that scientists have not pieced together well enough to make accurate and precise predictions. Predicting drought depends on the ability to forecast precipitation and temperature. Anomalies of precipitation and temperature may last from several months to several decades. How long they last depends on interactions between the atmosphere and the oceans, soil moisture and land surface processes, topography, internal dynamics, and the accumulated influence of weather systems on the global scale. (National Institute of Water and Atmospheric Research, 2016)

4.5.6.7 Secondary Hazards

The secondary hazard most associated with drought is wildfire. A prolonged lack of precipitation dries out vegetation, which becomes increasingly susceptible to ignition as the duration of the drought extends.

4.5.6.8 Drought Vulnerability Analysis

All people, property, and environments in the County planning area would be exposed to the impacts of moderate to extreme drought conditions to some degree.

Drought produces a complex web of impacts that spans many sectors of the economy and reaches well beyond the area experiencing physical drought. This complexity exists because water is integral to the ability to produce goods and provide services. Drought vulnerability of an activity usually depends on its water demand, how the demand is met, and what water supplies are available to meet the demand. California's 2018 Water Plan indicates that water demand in the state will continue to increase.



4.5.6.8.1 Population

The residents of the county rely on healthy watersheds to provide adequate water for domestic and agricultural purposes. Kern County has experienced population growth and is projected to continue grow, with Bakersfield being one of the fastest growing cities in the state. No significant life or health impacts are anticipated as a result of drought within the planning area.

4.5.6.8.2 Property

During drought years, property owners with shallow wells can be impacted by drought with increased demand on groundwater resources. Surface water supplies are often lower, which can reduce available supplies and increase cost. This sometimes encourages growers who historically used surface water to switch to groundwater, which has a permanent impact on the amount of users using groundwater.

No structures will be directly affected by drought conditions, though some structures may become vulnerable to wildfires, which are more likely following years of drought. Droughts can also have significant impacts on landscapes, which could cause a financial burden to property owners. However, these impacts are not considered critical in planning for impacts from the drought hazard.

4.5.6.8.3 Critical Facilities

Critical facilities, as defined for this plan, will continue to be operational during a drought. Critical facility elements such as landscaping may not be maintained due to limited resources, but the risk to the planning area's critical facilities inventory will be largely aesthetic. For example, when water conservation measures are in place, landscaped areas will not be watered and may die. These aesthetic impacts are not considered significant.

4.5.6.9 Future Trends in Development

The County will face challenges in providing sufficient water supplies in the future due to climate change effects, coupled with an increasing population (i.e., mostly in the incorporated areas) and increasing water demand. While the County has already taken steps towards achieving long-term groundwater sustainability, there is still a possibility that water supply availability may change in the future and will need to be further addressed.

A new program is being developed to address drought and future development. It involves Kern County and the expansion of the Willow Springs Water Bank (WSWB). Kern County is the lead for a 2018 FEMA grant of \$15 M. The grant is part of the Hazard Grant Mitigation Program funds allocated to California. It will pay for facilities to pre-deliver water owned by Kern County from Lake Isabella to WSWB. Pre-delivery creates empty space in the reservoir. The empty volume created in Isabella can (1) provide new yield that can be used to mitigate drought, and (2) reduce the water level in Lake Isabella, reducing dam failure risk. WSWB can provide county-wide benefits to address future droughts.



Education is also important to ensure sustainable future trends in development. The Water Association of Kern County exists to inform and educate the public and water community about water issues in Kern County. They are a resource for information on water issues in Kern County and provide tips for water conservation.

Finally, each participating municipality has an established General Plan that includes policies directing land use and dealing with issues of water supply and the protection of water resources. These plans provide the capability at the local level to protect future development from the impacts of drought. All participating municipalities reviewed their general plans as part of their hazard mitigation capability assessments. Deficiencies identified by these reviews can be identified as mitigation actions to increase the capability to deal with future trends in development.

4.5.6.10 Climate Change Impacts

The long-term effects of climate change on regional water resources are unknown, but global water resources are already experiencing the following stresses without climate change:

- Growing populations
- Increased competition for available water
- Poor water quality
- Environmental claims
- Uncertain reserved water rights
- Groundwater overdraft
- Aging urban water infrastructure

With a warmer climate, droughts could increase in severity, frequency, and duration. According to the UC Davis Center for Watershed Sciences, water shortages in 2016 were projected to cost the agricultural industry a total of \$550 million in direct costs and 1,815 in lost jobs. More frequent extreme events such as droughts could end up being more cause for concern than the long-term change in temperature and precipitation averages. (University of California, Davis Center for Watershed Sciences, 2020)

4.5.6.11 Drought Hazard Problem Statements

As part of the mitigation action identification process, the Planning Committee for the County and for each jurisdiction identified issues and weaknesses, also called problem statements, for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and flood data. Drought hazard problem statements for the County are listed in Table 4-51; problem statements for all other participating jurisdictions are accessed in Volume 2 of this plan.

Identifying these common issues and weaknesses assists the Planning Committee in understand the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. Projects or actions have been developed to mitigate each problem identified. See Table 5-6 for a full list of mitigation actions and corresponding problem statements that they address.



Each problem statement is coded with a problem number for cross-referencing between Table 4-51 and Table 5-6.

Table 4-51 Drought Problem Statements

Problem No.	Hazard	Area of Concern	Mitigation Alternatives	Primary Agency	Problem Description	Related MA
ps-DR-KC-215	Drought	Impact	PE&A - Public Education & Awareness	County of Kern	Public education and programming is needed to support the water conservation efforts by WAKC and GSA's	ma-DR-KC-290
ps-DR-KC-216	Drought	Victim	PRV - Prevention , PE&A - Public Education & Awareness , SP - Structural Projects	County of Kern	Groundwater pumping for private wells during drought years has created water quality issues in existing aquifers	ma-DR-KC-291
ps-DR-KC-217	Drought	Victim	PRV - Prevention , PE&A - Public Education & Awareness , SP - Structural Projects	County of Kern	Private wells are at risk of going dry during drought years	ma-DR-KC-291
ps-DR-KC-218	Drought	Threat	PRV - Prevention , NRP - Natural Resource Protection	County of Kern	County buildings and facilities have irrigated landscaping including turf grass	ma-DR-KC-294
ps-DR-KC-219	Drought	Threat	PRV - Prevention , PE&A - Public Education & Awareness	County of Kern	Existing land use/building code does not require or incentivize water conservation measures including requiring the use of low-flow toilets and showerheads	ma-DR-KC-293
ps-DR-KC-220	Drought	Threat	PRV - Prevention	County of Kern	There is an opportunity for the County land use code to include more incentives for developers to implement drought-tolerant landscaping that provides shade and lowers the urban heat island effect	ma-DR-KC-293



4.5.7 Slope Failure Hazard Profile

Landslides, mudflow, debris flow, and rockfall, collectively known as slope failure, may cause damage across the County. They rarely present a threat to human life, but often result in a disruption of everyday services, including emergency response capabilities. Landslides can block transportation routes, dam creeks and drainages, and contaminate water supplies. When these hazards affect transportation routes, they are frequently expensive to clean-up and can have significant economic impacts to the County. (United States Geological Survey, 2004)



For this MJHMP update, three types of slope failure (Landslide, Debris Flow, and Rockfall) were identified as concerns to the County and are briefly described below.

Landslide

The many types of landslides are categorized based on form and type of movement. They range from slow moving rotational slumps and earth flows, which can slowly distress structures but are less threatening to personal safety, to fast-moving rock avalanches and debris flows that are a serious threat to structures and have been responsible for most fatalities during landslide events. Many large landslides are complex and a combination of more than one landslide type. (Bakersfield.com, 2008, p. 341)

Mudflow/Debris Flow

When slope material becomes saturated with water, a debris flow may develop. According to NOAA, debris flow is the most common type of slope failure in Kern County. From a geologic perspective, there are generally two types of debris flows: debris flows related to shallow landslides and post-wildfire debris flows. (United States Geological Survey, 2005)

Debris flows related to shallow landslides occur on hillslope due to soil failure in which soil liquefies and runs downhill. This type of debris flow generally results from a shallow landslide (less than 10 to 15 feet deep) and has a discrete initiation zone depositional area. Shallow landslides tend to occur in winter but are most likely after prolonged periods of heavy rainfall when soil materials are saturated. Debris flows are typically more dangerous because they are fast moving, causing both property damage and loss of life. (*Id*)

Post-wildfire debris flows are a result of post-fire conditions, where burned soil surfaces enhance rainfall runoff that concentrates in a channel and picks up debris as it moves. The post-fire debris flow has a less discrete initiation zone but is similar to a debris flow derived from hillslopes in that it may result in inundation and a detrimental impact on lives and property within its zone of runout and deposition. It can result in downstream flooding. (*Id*)



An example of a catastrophic post-fire debris flow is the event that occurred in Kern County on July 12, 2008, when, significant thunderstorm activity in the mountains above Lake Isabella, tons of water were deposited through the Erskine Creek watershed. See Figure 4-43 for debris flow in the Tehachapi area. (Bakersfield.com, 2008)

Rockfall

Rockfall is the falling of a newly detached mass of rock from a cliff or rock outcrop or a loose rock that erodes out of unconsolidated debris on a hillside and rolls or falls down a very steep slope. Over-steepened slopes such as at roadcuts or in glaciated terrain are susceptible to rockfall due to the steep slopes that are not highly vegetated or benched, which can help attenuate rockfall. Rock outcrops that are highly fractured and/or undercut by weaker rock layers are also susceptible to rockfall. (Colorado Geological Survey, 2020)

Alluvial Fan

Alluvial fans consist of sediment deposits leftover from a flood event. The sediment is carried by a flood and distributed in a fan-like shape. Alluvial fans represent a high risk of natural hazards in the form of debris flow as the deposited soil remains unstable after the flood event.

4.5.7.1 Plans, Policies, and Regulatory Environment

Kern County General Plan

The 2004 Kern County General Plan includes policies and implementation measures in the Land Use and Safety Elements that ensure adequate slope stability for development in areas prone to slope failure and impacts from the potential of slope failure are mitigated.

Policies and implantation measures around slope failure include ensuring effective slope stability for development and developing spatial referents for geologic hazards more generally. The Kern County General Plan is currently being updated and will consider this MJHMP Update as it continues to shape policies around slope failure mitigation and protection.

Regulation of Cut Surfaces in Kern County Code, § 17.28

The Kern County Code discusses the regulation of slope via its Grading Code, § 17.28. It stipulates that the slope of cut surfaces shall be no steeper than is safe for the intended use and shall be no steeper than two (2) units horizontal to one (1) unit vertical, the exception being if the applicant furnishes a soils engineering or an engineering geology report, or both, stating that the site has been investigated and giving an opinion that a cut at a steeper slope will be stable and not create a hazard to public or private property.



4.5.7.2 Past Events

According to NOAA, the most common type of slope failure in Kern County is debris flow, which typically occurs during winter months. Table 4-52 lists the slope failure events that took place in the County since the year 2000.

Table 4-52: Slope Failure Events in Kern County Since 2000

Date	Type of Event	Property Damage Value (\$)	Crop Damage
12/7/2003	Debris Flow	5,000	None reported
2/21/2005	Debris Flow	3,000	None reported
4/24/2005	Debris Flow	3,000	None reported
12/16/2016	Debris Flow	1,000	None reported
9/3/2017	Debris Flow	50,000	None reported
10/3/2018	Debris Flow	1,000	None reported
12/26/2019	Debris Flow	100,000	None reported

Source: NOAA Storm Events Database



Figure 4-43. Mudflow near Tehachapi Mountains

Photo by The Watchers, <https://watchers.news/2015/10/19/massive-mudslide-engulfs-highway-58-near-the-tehachapi-mountains-california/>



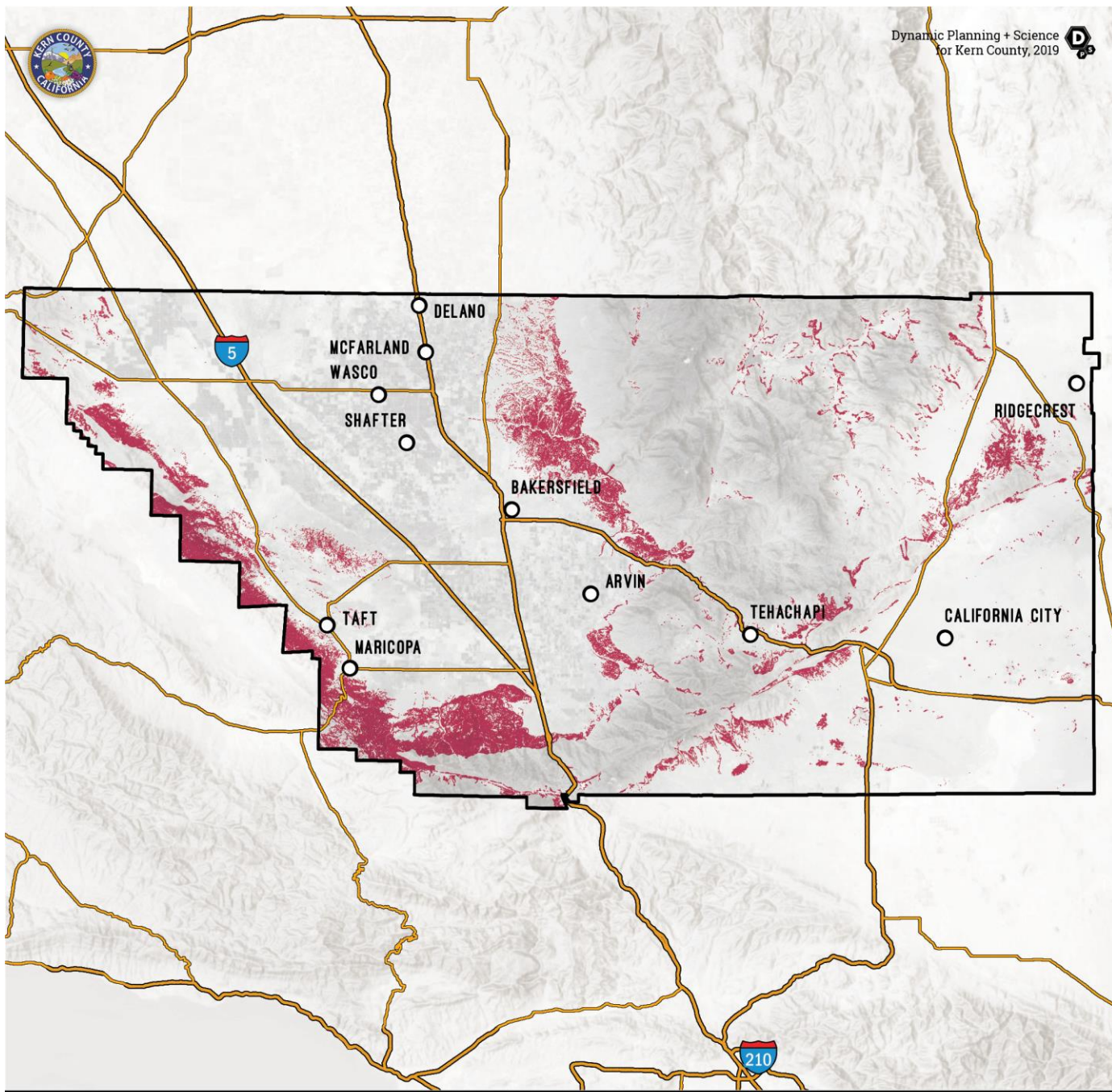
4.5.7.3 Location

The best available predictor of where movement of slides and earth flows might occur is the location of past movements. Past landslides can be recognized by their distinctive topographic shapes, which can remain in place for thousands of years. Most landslides recognizable in this fashion range from a few acres to several square miles. Most show no evidence of recent movement and are not currently active. A small proportion of them may become active in any given year, with movements concentrated within all or part of the landslide masses or around their edges.

Recognizing ancient dormant mass movement sites is important to identify current areas susceptible to flows and slides, because they can be reactivated by earthquakes or by exceptionally wet weather. Those ancient scars also consist of broken materials, frequently involve disruption of groundwater flow, and are vulnerable to construction-triggered sliding.

Kern County does have a history of landslide events that have impacted transportation, access to more remote residences in the unincorporated county, and caused property damage. Figure 4-43 shows a 2015 mudflow adjacent to the Tehachapi Mountains that caused traffic backups on Highway 58.

Figure 4-44 shows low, moderate, and high landslide susceptibility in Kern County. Most of the high susceptibility areas are in the hilly regions bordering the Central Valley. This map should be used with caution, however, as site-specific conditions can make some locations in low to moderate instability areas highly unstable and some high instability locations more stable.



LANDSLIDE SUSCEPTIBILITY KERN COUNTY

*Data sources: CGS.

MAP LEGEND

HIGH LANDSLIDE RISK

Figure 4-44: Landslide Susceptibility



4.5.7.4 Frequency/ Probability of Future Occurrences

Slope failures are most frequently triggered in periods of high rainfall. The hazard is greatest in steeply-sloped areas, although slides may occur on slopes of 15 percent or less if the conditions are right. Slope steepness and underlying soils are the most important factors affecting the landslide hazard. However, surface and subsurface drainage patterns also affect the landslide hazard, and vegetation removal can increase the likelihood of a landslide. (United States Geological Survey, 2004)

Slope failures are often triggered by other natural hazards such as earthquakes, heavy rain, floods, or wildfires, so landslide frequency is often related to the frequency of these other hazards. The probability of slope failure occurring in Kern County is likely (between 10 and 100% annual probability).

4.5.7.5 Severity and Extent

The severity of landslide problems depends upon the local bedrock and soil conditions, including moisture content, slope, and vegetation. Small landslides are common in the County's mountain areas as loose material moves naturally down slope or fires have caused loss of soil-stabilizing vegetative cover. In addition, many human activities tend to make the earth materials less stable and, thus, increase the chance of ground failure. Some of the natural nonseismic causes of ground instability are steam and lakeshore erosion, heavy rainfall, and poor quality natural materials. Human activities contribute to soil instability through grading of steep slopes or overloading them with artificial fill, by extensive irrigation, construction of impermeable surfaces, excessive groundwater withdrawal, and removal of stabilizing vegetation (Kern County General Plan, 2009)

4.5.7.6 Warning Time

Some geologic hazards occur slowly but can have significant property or health consequences, like erosion and some forms of slope movement or land sliding. The identification of those hazards generally takes site-specific analysis to determine if the site soils and geology are susceptible to these hazards and what mitigation is most relevant and prudent for a site. For these types of hazards, warning time is long.

For other hazards, such as debris flows, rockfall, and landslides, warning time is often very short and may not occur at all. Identifying areas where these events are known have occurred, or which have ideal characteristics for these hazards to occur, could help with hazard preparedness when triggering-type events like intense rainfall occur. This identification won't reduce the warning time, but it will make proactive response to potential triggering events more effective. (AGU Publications, 2016)



4.5.7.7 Secondary Hazards

There are some hazards that can trigger or exacerbate slope failure. Flooding, for example, can undercut the toe of a slope which can remove the support for the slope and cause a landslide or rockfall. Wildfires create an immediate hazard of their own and create long-term impacts by altering the soil structure, impeding its ability to absorb moisture, and destroying vegetation that binds the soil with roots and absorbs rainfall and runoff with foliage. Post-wildfire, even small rainfall events can create devastating mudflows, debris flows, and landslides. Areas that are mapped currently as low to moderate risk of these hazards may have high risk after a wildfire.

4.5.7.8 Slope Failure Vulnerability Assessment

Figure 4-45 displays landslide susceptibility for population and infrastructure in Kern County. This section discusses exposure to this vulnerability.

4.5.7.8.1 Population

An estimated 5,769 persons, or 1.92% of the County population, are exposed to slope failure areas, as shown in Table 4-53 below. Population estimates within slope failure areas were generated by analyzing County assessor and parcel data that intersect with landslide hazard areas identified by California Geological Survey. Using GIS, U.S. Census Bureau information was used to intersect slope failure hazards an estimate of population was calculated by weighting the population within each census block and track with the percentage of slope hazard areas.

Table 4-53: Population Exposure to Landslide Susceptibility

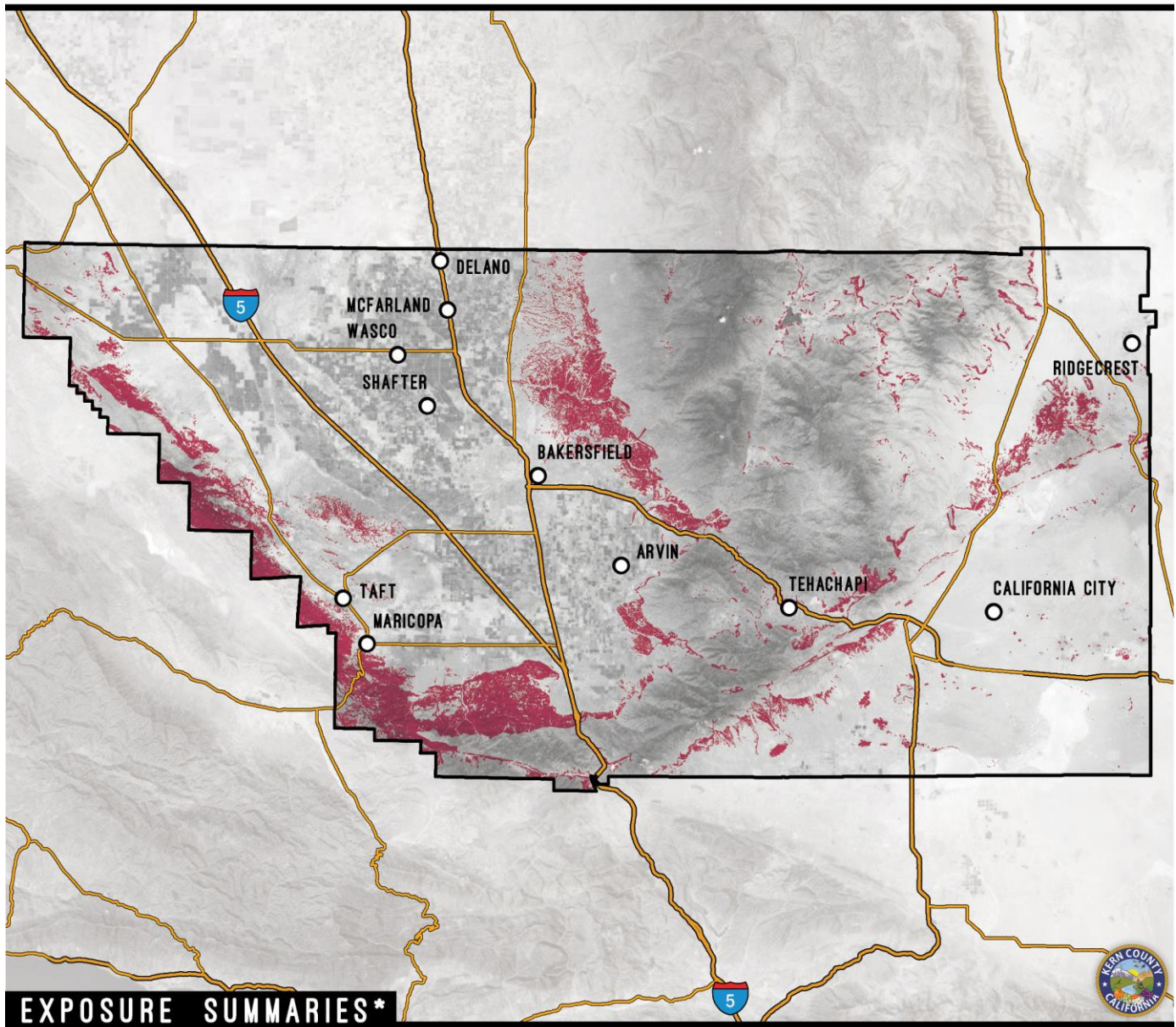
	Total Population
Unincorporated County	299,935

Landslide Susceptibility	Population Count	% of Total
High	5,769	1.92%
Total	5,769	1.92%



LANDSLIDE VULNERABILITY & EXPOSURE SNAPSHOT

KERN COUNTY



EXPOSURE SUMMARIES*

POPULATION		PARCEL		PARCEL VALUE		CRITICAL INFRASTRUCTURE			
COUNT		COUNT		IMPROVEMENT		COUNT			
5,769	2%	1,942	2%	\$276,015,865	3%	Essential Facilities	0	0%	
				CONTENT		High Potential Loss	4	1%	
				\$138,039,432	3%	Transportation & Lifeline	342	6%	331 <small>LINEAR MILEAGE</small>
									2%

HIGH LANDSLIDE RISK

MAP LEGEND

*Exposure summaries include high susceptibility only (class 9+). Hazard data source: CGS.
(%) - Percent of respective category totals for jurisdiction.

Dynamic Planning + Science
for Kern County, 2019

Figure 4-45: Landslide Vulnerability Snapshot



4.5.7.8.2 Property

Table 4-54 shows the number of parcels, market value exposure and content value exposure in the steep-slope risk areas. The predominant zoning classes in cities are single-family, vacant and manufactured homes.

Table 4-54: Property Value Exposed to Landslides.

	Total Parcels	Total Market Value (\$)	Total Content Value (\$)	Total Value (\$)
Unincorporated County	91,455	\$ 10,906,675	\$ 5,453,338	\$ 16,360,013

Landslide Susceptibility	Parcel Count	% of Total	Market Value Exposure (\$)	Content Value Exposure (\$)	Total Exposure (\$)	% of Total
High	1,942	2.1%	\$ 275,953	\$ 137,976	\$ 413,929	2.5%
Total	1,942	2%	\$ 275,953	\$ 137,976	\$ 413,929	2.5%

Currency in Thousands

4.5.7.8.3 Critical Facilities and Infrastructure

Several types of infrastructure are exposed to mass movements, including transportation, water, sewer, and power infrastructure. At this time, all infrastructure and transportation corridors identified as exposed to the landslide hazard are considered vulnerable until more information becomes available. Table 4-55 and Table 4-56 summarize the critical facilities exposed to the slope failure hazard.

Table 4-55: Critical Facility Points with Slope Failure Hazard Risk (Unincorporated County)

Critical Infrastructure - Landslide Susceptibility	
Infrastructure Type	High
Essential Facility	-
EOC	-
Fire Station	-
Hospital	-
Police Station	-
Sheriff Station	-
High Potential Loss	4
Adult Residential facility	-
Child Care Center	-
Dam	2
Family Child Care Home	1
Foster Family Agency	-
Historic Building	-
Home Care Organization	-



Critical Infrastructure - Landslide Susceptibility	
Infrastructure Type	High
Library	-
Residential Child Care	-
Residential Elder Care	-
School	-
County Insured Asset*	1
Cooling Center	-
Healthcare Facility	-
Special Needs Facility	-
City Hall	-
Historic Site	-
Transportation and Lifeline	342
Airport	-
Bridge	9
Power Plant	8
Substation	6
Transmission Line Tower	318
NG Facility	1
Wind Turbine	-
Bus Facility	-
Potable Water Facility	-
Waste Water Facility	-
Oil Facility	-
Railroad Facility	-
Grand Total	346

* These insured assets may include critical infrastructure already represented in other Infrastructure Types.

Table 4-56: Critical Facilities (Linear) with Slope Failure Hazard Risk (Unincorporated County)

Lifelines (miles) - Landslide Susceptibility	
Infrastructure Type (Linear)	High
Levee	0.85
NG Pipeline	28.49
Railroad	7.26
Street	172.44
4WD trail	12.54
4WD trail, major	-
Alley	0.05



Lifelines (miles) - Landslide Susceptibility	
Infrastructure Type (Linear)	High
<i>Cul-de-sac</i>	-
<i>Driveway</i>	0.98
<i>Interstate</i>	4.79
<i>Local road</i>	69.07
<i>Local road, major</i>	41.92
<i>Primary highway</i>	3.10
<i>Ramp</i>	0.45
<i>Road, parking area</i>	-
<i>Service road</i>	-
<i>State/county highway</i>	35.82
<i>State/county highway, major</i>	-
<i>Thoroughfare, major</i>	3.74
<i>Walkway</i>	-
Transmission Line	122.05
Grand Total	331.09

4.5.7.8.4 Lifelines

A significant amount of linear infrastructure (or lifelines) can be exposed to mass movements:

- **Roads**—Access to major roads is crucial to life-safety, response, and recovery operations after a disaster event. Landslides can block egress and ingress on roads, causing isolation for neighborhoods, traffic problems, and delays for public and private transportation. This can result in economic losses for businesses.
- **Bridges**—Landslides can significantly impact bridges, by knocking out bridge abutments or significantly weaken the soil supporting them.
- **Power Lines**—Power lines are generally elevated above steep slopes, but the towers supporting them can be subject to landslides. A landslide could trigger failure of the soil underneath a tower, causing it to collapse and rip down the lines. Power and communication failures due to landslides can create problems for vulnerable populations and businesses.

4.5.7.9 Future Trends in Development

Kern County is equipped to handle future growth within landslide hazard areas. The 2009 Kern County General Plan addresses development in areas susceptible to slope failure.



4.5.7.10 Slope Failure Hazard Problem Statements

As part of the mitigation action identification process, the Planning Committee for the County and for each jurisdiction identified issues and weaknesses, also called problem statements, for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and flood data. Slope failure hazard problem statements are listed in Table 4-57; problem statements for all other participating jurisdictions are accessed in Volume 2 of this plan.

Identifying these common issues and weaknesses assists the Planning Committee in understand the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. Projects or actions have been developed to mitigate each problem identified. See Table 5-6 for a full list of mitigation actions and corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-57 and Table 5-6.

Table 4-57 Slope Failure Problem Statements

Problem No.	Hazard	Area of Concern	Mitigation Alternatives	Primary Agency	Problem Description	Related MA
ps-SF-KC-230	Slope Failure	Impact	PPRO - Property Protection , PE&A - Public Education & Awareness	County of Kern	County transportation routes may be located near high danger landslide areas, which could result in blocked roads and dangerous driving conditions in the event of a landslide. The following County roads pass through high landslide risk areas: Bakersfield-Glennville Rd.; Round Mountain Rd.; Granite Rd.; and Caliente Bodfish Rd	ma-SF-KC-292
ps-SF-KC-231	Slope Failure	Impact	PPRO - Property Protection , PE&A - Public Education & Awareness	County of Kern	The following County bridges are located in high landslide risk areas: Cottonwood Creek (50 0047); Hillside (50 0137); Hillside (50 0140); Hillside (50 0182)	ma-SF-KC-292



4.5.8 Soil Stability Hazard Profile

Hazards associated with soils in Kern County include land subsidence and wind erosion.

Land Subsidence

Land subsidence is a gradual settling or sudden sinking of the Earth's surface due to subsurface movement of earth materials. The main cause of subsidence in California is groundwater pumping. The effects of subsidence include damage to buildings and infrastructure, increased flood risk in low-lying areas, and lasting damage to groundwater aquifers and aquatic ecosystems. Subsidence in Kern County is most often caused by the withdrawal of large volumes of fluids from underground reservoirs, but it can also occur by the addition of surface water to certain types of soils, called hydrocompaction. Subsidence from any cause accelerates maintenance problems on roads, lined and unlined canals, and underground utilities. Subsidence has and will continue to cause gradient changes in canals, causing the need for canal banks to be raised and bridges elevated at significant expense. (USGS, Land Subsidence in California, n.d.)



There are four types of subsidence occurring in Kern County.

- Tectonic subsidence, a long-term, very slow sinking of the valley, which is significant only over a geologic time period.
- Subsidence caused by the extraction of oil and gas. This type of subsidence is still too small to be of serious concern. The State Division of Oil, Gas, and Geothermal Resources monitors subsidence in oil and gas fields and regulates oil and gas withdrawal and repressurizing of the fields.
- Subsidence caused by withdrawal of groundwater in quantities much larger than replacement can occur, causing a decline of the water level. This type of subsidence is of major concern and should be regulated and reduced, especially in urbanizing areas. This practice has lowered the ground level over a large area south of Bakersfield and in other areas of the County.
- Subsidence caused by hydrocompaction of moisture - deficient alluvial deposits. This is a one time densification from collapse of the soil structure in near-surface strata where the rainfall or other moisture has not penetrated during a long period of time. Parts of the California Aqueduct were constructed through and over hydrocompaction deposit after compaction has occurred through ponding. The areas where hydrocompaction exists and suspect areas should be mapped, studied, and evaluated. Any development on these areas of damaging subsidence requires corrective measures. (Kern County General Plan, 2009)

Wind Erosion

Erosion is the general process whereby the materials of the earth's crust are worn down, removed by weathering, and deposited in other places by water or air. Lakeshore erosion is a special problem involving wave action and can be practically eliminated by proper engineering, construction, and soil stabilization through vegetative cover. Alluvial fans that form at the base of mountain foothills are a product of erosion in the watershed above depositing debris on the gentler valley floors, often associated with debris flows. Development in these areas can be subject to inundation from mud to boulder sized particles. Within



urbanized areas, the major problem of erosion is from the continued need to remove sediment from drainage systems and basins. Sedimentation within these systems decreases the volume of flood flows that the system can handle. (Kern County MJHMP, 2014)

Agricultural areas are particularly susceptible to wind erosion between crops, during periods of fallow, when grazed by sheep, or when taken completely out of production. Any process that reduces vegetative cover creates dust control issues. For growers, blowing dust comes from two sources, land you own or lease and the land upwind of it. Sand blowing from upwind may cause your previously stable ground to begin to erode, as high winds pick up loose sand particles and bounce them along the ground. This saltation of sand and other coarse particles sandblasts the soil surface, eroding the stable crust, dislodging additional particles, and causing further erosion. Saltating particles can kill vegetation, scour stable land, and cause dust to be lofted into the air. See Figure 4-46. Wind rarely lifts sand higher than about 3 feet above ground. However, fine dust rises much higher, which eliminates any practical means of capture.

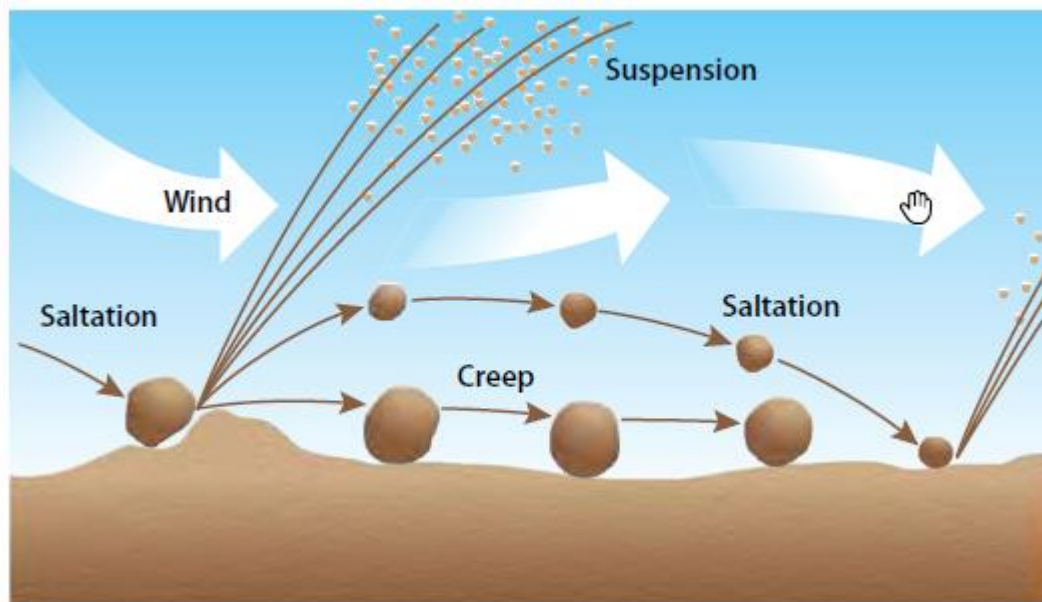


Figure 4-46. Illustration of various stages of erosion.

From Antelope Valley Dustbuster's Agricultural Guide to Controlling Windblown Sand and Dust, 2010, http://www.kernair.org/Documents/Dust_Buster/Dustbusters%20Agricultural%20Guide%2010-25-10.pdf

Growers may choose to implement procedures that control dust, in order to improve visibility, reduce wind erosion and loss of topsoil, minimize damage to roads and structures, and limit health impacts due to poor air quality. Effective dust control methods conserve your topsoil, protect your downwind cropped acreage, and support compliance with air quality regulations. Soils remain viable for production only when soil loss is held below about 5 tons per acre per year. Dust regulations require submittal of a Best Management Practice Plan that includes selection of Practices for Agricultural Operations specifically developed for control of fugitive dust in the Mojave Desert. (Antelope Valley Dustbusters, 2010)



High winds can create hazardous dust storms in Kern County. Dust storms can damage agricultural crops, property, and create hazardous driving conditions. Dust storms are also a health hazard to residents that are forced to breathe particulates in the air. Dust storms in Kern County are most likely to occur in valley and desert areas.

4.5.8.1 Plans, Policies, and Regulatory Environment

Healthy Soils Action Plan

The California Healthy Soils Action Plan was created by a collaboration of state agencies and departments which are referred to as the Healthy Soils Initiative. They are headed by the California Department of Food and Agriculture. The California Healthy Soils Action Plan is meant to promote the development of healthy soils on California's farm and ranchlands. The benefits of healthy soil include increased plant health and yields, water retention, greenhouse gas sequestration, and reduced sediment erosion and dust. There are five primary actions which the Healthy Soils Initiative promotes:

- the protection and restoration of soil organic matter in California's soils.
- the identification of sustainable and integrated financing opportunities to facilitate healthy soils.
- the provision for research, education, and technical support to facilitate healthy soils.
- increased governmental efficiencies to enhance soil health on public and private lands.
- the promotion of interagency coordination and collaboration to support soils and related state goals.

Kern County General Plan

The 2004 Kern County General Plan includes several policies and implementation measures in the Land Use and Safety Elements that maintain soil stability in development areas and mitigate impacts from such development.

Policies around soil stability include minimizing alteration of the landscape in order maintain soil stability. The Kern County General Plan is currently being updated and will consider this MJHMP Update as it continues to shape policies around soil stability mitigation and protection.

Soil Stabilization: Maintenance of Disturbed Lands in Kern County Code, § 19.80

The Kern County Code includes a provision for the Eastern Kern Desert Region, which regulates any development that results in any surface disturbance. Best management practices are to be used for the minimization of soil erosion by onsite activities, rainfall, flowing water, or wind.

4.5.8.2 Past Events

Land subsidence in the San Joaquin Valley was first noted in 1935 near Delano. Accelerated ground water pumping of the deep aquifer system during the 1950's and 1960's caused about 75 percent of the total volume of land subsidence. The southern end of the Valley has seen the most subsidence, up to 4 to 8 feet in some areas. Some of the direct damages associated with subsidence in the Valley have included



decreased aquifer storage, partial or complete submergence of canals and associated bridges and pipe crossings, collapse of well casings, and disruption of collector drains and irrigation ditches.

Land subsidence in the vicinity of Edwards Air Force Base has been associated with declining ground water levels and the presence of subsurface fine-grained material that is subject to compaction. Groundwater pumping in this area has been extensive to satisfy water demands at the base as well as agricultural needs. Subsidence in this area was first reported in 1926 and by 1992 about 200 square miles of the Antelope Valley, which includes the Base, were affected by as much as 4 feet of subsidence. The average rate of subsidence between 1961 and 1989 has been about a tenth of a foot a year.

Land-use problems at Edwards AFB due to subsidence have included:

- Failure of well casings during compaction of the aquifer,
- Damage to fluid transport systems such as underground water, sewer, and petroleum lines,
- Erosion of drainage channels and formation of new drainage channels on the lakebed,
- Increase in areas subject to flooding as a result of subsidence,
- Development of cracks, fissures, soft spots and depressions that affect the use of runways,
- Rapid drainage of water on the lakebed into fissures and sink-like depressions. (Kern County MJHMP, 2014)

Erosion over time can be difficult to track as a past “event.” This HMP examines dust storms as past events that can be a catalyst for more rapid erosion in the County. Dust storms in Kern County have caused property damage, injuries, and deaths. Table 4-58 summarizes dust storm events in Kern County since 2000, as recorded by the National Oceanic and Atmospheric Administration (NOAA).

Table 4-58 Dust Storm Events 2000-2019

Dust Storm Events			
Date	Deaths	Injuries	Property Damage Value (\$)
10/16/2007	0	0	500,000
10/13/2009	3	0	100,000
6/4/2012	0	0	25,000
6/4/2012	0	0	25,000
7/31/2012	0	0	5,000
1/23/2014	0	1	100,000
1/23/2014	0	0	3,000
3/26/2014	0	0	100,000
6/15/2014	0	0	60,000
11/2/2015	0	15	0
4/13/2017	0	0	100,000
9/3/2017	0	0	10,000
9/3/2017	0	0	10,000
9/3/2017	0	0	10,000



Dust Storm Events			
Date	Deaths	Injuries	Property Damage Value (\$)
9/3/2017	0	0	10,000
9/3/2017	0	0	1,000
9/3/2017	0	0	1,000
9/3/2017	0	0	1,000
9/3/2017	0	0	1,000
9/3/2017	0	0	1,000
Total	3	16	1,062,000

4.5.8.3 Location

Subsidence from groundwater withdrawal affects the San Joaquin Valley, particularly the southwest end of the Valley in the vicinity of the Buena Vista Lakebed. Edwards Air Force Base in the Desert Region has also experienced subsidence problems in the vicinity of the Rogers Dry Lakebed. (Kern County MJHMP, 2014) Figure 4-47 shows subsidence areas in Kern County.

Erosion can occur throughout the County. The San Juaquin Valley and the Mojave Desert region have more rapid erosion events such as dust storms more often.

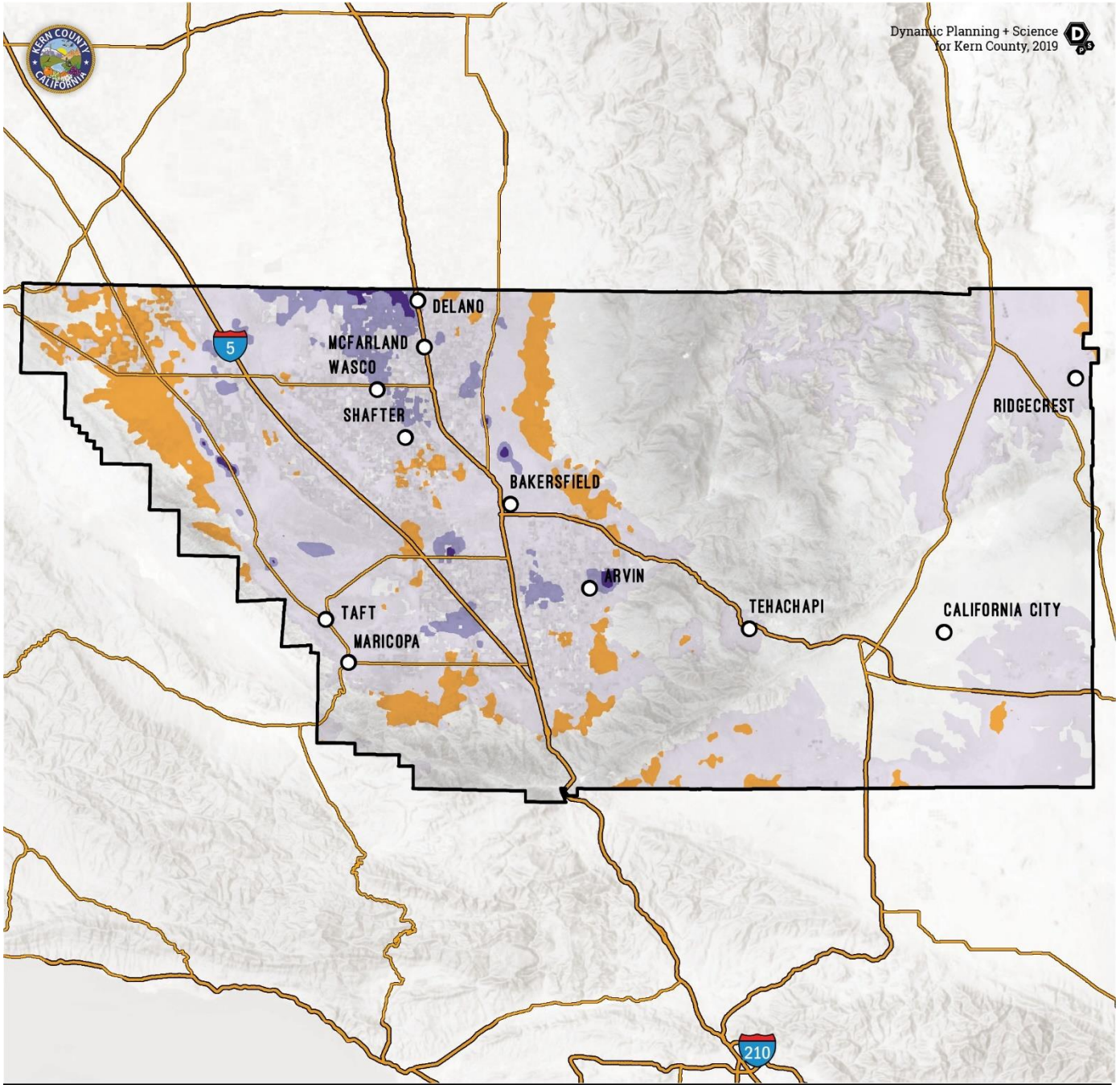
4.5.8.4 Frequency/ Probability of Future Occurrences

Subsidence is occurring in the Valley and Desert regions of Kern County. Now that the hazard is recognized and understood, subsidence from ground water withdrawal has generally slowed since the 1970's in the San Joaquin Valley due to reductions in ground water pumping. Long term subsidence is expected to continue, but at a slower rate than before. Studies indicate that subsidence in the Edwards AFB area will be between 0.5-1.7 feet in the next 25 years, depending on groundwater levels. Even though water levels have stabilized in the past 20 years, subsidence continues due to past stresses on the aquifer system. Continued population growth, water demands, and uncertain water supplies will likely continue the trend of groundwater withdrawal and continued subsidence. (Kern County MJHMP, 2014)

Erosion occurs slowly over time and is expected to continue occurring throughout the County to varying degrees. As drought intensifies and continues intensifying due to climate change, additional dust in the air will increase the probability and frequency of erosion. Dust storms are projected to increase as well.



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**SUBSIDENCE AREAS
KERN COUNTY**

*Data sources: DWR.

MAP LEGEND

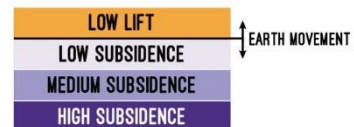


Figure 4-47 Subsidence Areas



4.5.8.5 Severity

Subsidence from any cause accelerates maintenance problems on roads, lined and unlined canals, and underground utilities. All new installations in areas suspected of subsidence should be engineered to withstand such subsidence. The usual remedial action is that of raising the water table by injecting water or by reducing groundwater pumping. This increases the fluid pressure in the aquifer and, in most instances, subsidence decreases or stops after a period of time. Figure 4-48 displays exposure of property and population in Kern County to land subsidence.

Erosion occurs slowly over time and is expected to continue occurring throughout the County to varying degrees. As drought intensifies and continues intensifying due to climate change, additional dust in the air will increase the severity of erosion and dust storms.



Figure 4-48. Subsidence example in San Joaquin Valley.

Source: Matt Ball, Nov. 19, 2013 in *Informed Infrastructure Magazine*, <https://informedinfrastructure.com/6816/land-subsidence-poses-risk-to-water-infrastructure-in-californias-san-joaquin-valley/>

4.5.8.6 Warning Time

Subsidence is a long-term hazard with a slow onset. Subsidence can occur years after groundwater pumping has stopped due to the long-term effects it has on the aquifer. Detailed studies and modeling can predict future subsidence based on past groundwater pumping. **Erosion** likewise occurs slowly over time with the exception of dust storms, which can accelerate erosion and cause damage as an extreme weather event.

4.5.8.7 Secondary Hazards

There are no significant secondary hazards associated with land **subsidence**. However, land subsidence has the possibility to alter floodplains making some areas more prone to flooding. **Erosion** can create secondary slope failure hazards such as landslides and mudflows. See Section 4.5.7 for more information on these secondary hazards.



4.5.8.8 Soil Stability Vulnerability Assessment

4.5.8.8.1 Population

Land subsidence poses a threat to the population of Kern County. Subsidence occurring near residential areas threatens homes and the populations that live in those areas. Figure 4-49 displays the number and percentage of the population which are in areas of the County that are vulnerable to land subsidence.

Wind erosion effects the population of Kern County because it can cause dust clouds. Dust clouds are a source of poor air quality. They have the effect of causing respiratory health problems. Wind erosion can also damage crop production and it can limit visibility, triggering roadway accidents. (Antelope Valley Dustbusters, 2010)

4.5.8.8.2 Critical Facilities

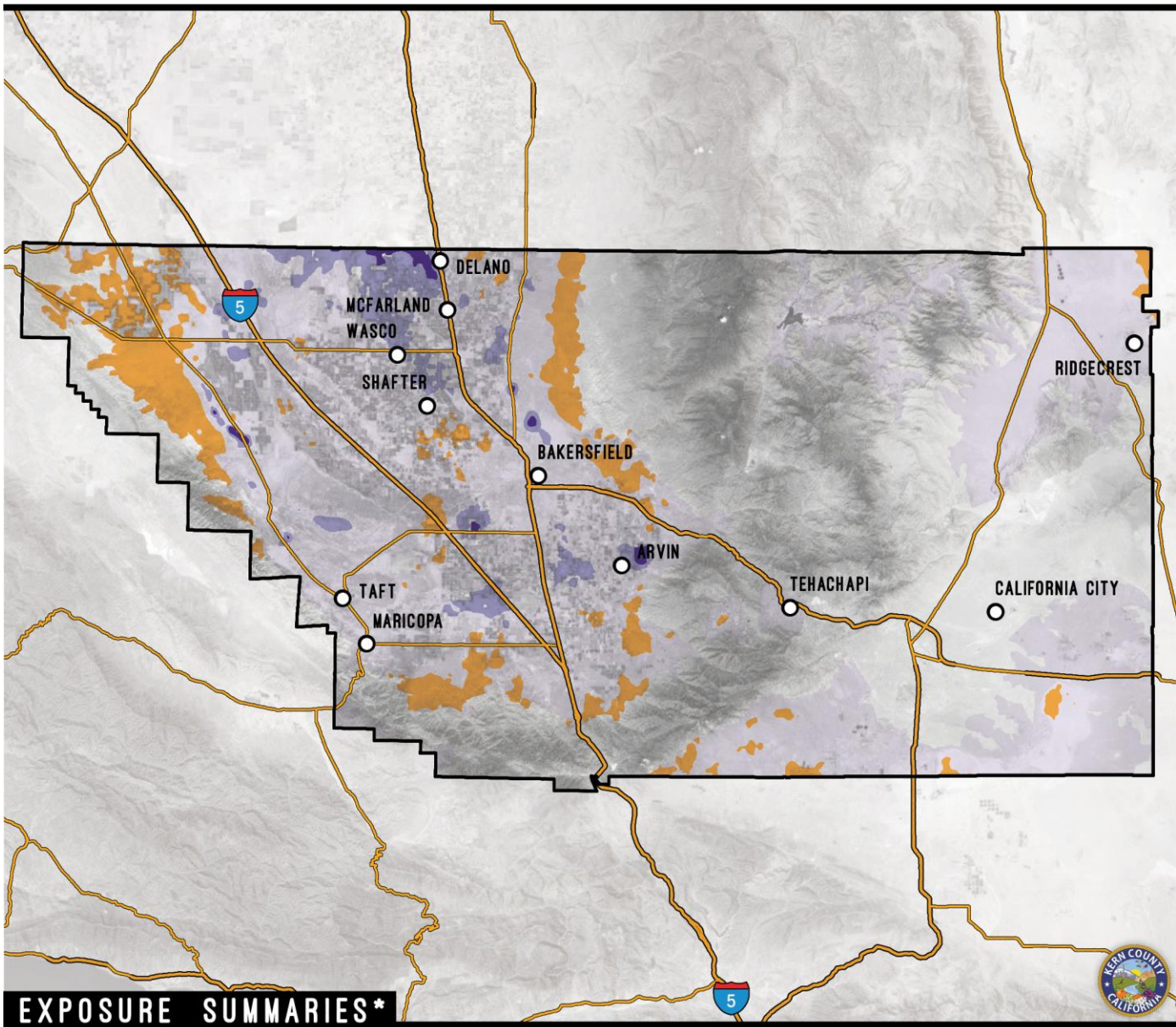
Critical facilities can be affected by land subsidence. Land subsidence creates maintenance problems on roads, lined and unlined canals, and underground utilities that can impact the County as a whole. Figure 4-49 displays the number and percentage of critical infrastructure which is in areas of the County which are vulnerable to land subsidence.

Wind erosion can negatively impact drainage infrastructure, especially in urban and agricultural areas. Erosion causes a continued need to remove sediment from drainage systems and basins. Sedimentation within these systems decreases the volume of flood flows that the system can handle. (Kern County MJHMP, 2014)



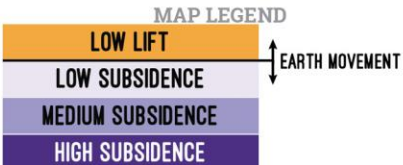
SUBSIDENCE VULNERABILITY & EXPOSURE SNAPSHOT

KERN COUNTY



EXPOSURE SUMMARIES*

POPULATION		PARCEL		PARCEL VALUE		CRITICAL INFRASTRUCTURE			
COUNT		COUNT		IMPROVEMENT		COUNT			
265,101	88%	76,994	84%	\$8,989,026,902	82%	Essential Facilities	35	71%	
				CONTENT		High Potential Loss	632	88%	LINEAR MILEAGE
				\$4,495,077,951	82%	Transportation & Lifeline	4,133	73%	10,707 71%



*Exposure summaries include all classes of earth movement.
Hazard data source: DWR.
(%) - Percent of respective category totals for jurisdiction.

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Figure 4-49 Subsidence Vulnerability & Exposure Snapshot



4.5.8.9 Future Trends in Development

Future development has the potential to increase subsidence issues in Kern County. Private water well drilling during drought years can contribute to subsidence issues as it depletes the aquifer, increasing the amount of areas that are susceptible to subsidence. Kern County Department of Public Health issues permits to construct, reconstruct, and destroy water wells and evaluates the construction and water quality of existing wells. The Kern County General Plan acknowledges subsidence issues throughout Kern County and the County is capable of managing growth and development to avoid high risk subsidence areas. Geologic studies and mapping will enhance the County's understanding of high-risk subsidence areas and trends and help the County manage growth and development to avoid high risk areas.

Increased development in arid areas creates additional dust that can exacerbate erosion. (Robbins, 2017) As farming and other development spreads into arid regions, vegetation is destroyed and the soil is exposed to wind erosion. Expected future increase in droughts compound this issue. (*Id.*) This could affect Kern County in some key areas that may experience growth in already-arid exurban areas.

4.5.8.10 Soil Stability Hazard Problem Statements

As part of the mitigation action identification process, the Planning Committee for the County and for each jurisdiction identified issues and weaknesses, also called problem statements, for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and flood data. Agricultural disaster hazard problem statements are listed in Table 4-59; problem statements for all other participating jurisdictions are accessed in Volume 2 of this plan.

Identifying these common issues and weaknesses assists the Planning Committee in understanding the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. Projects or actions have been developed to mitigate each problem identified. See Table 5-6 for a full list of mitigation actions and corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-59 and Table 5-6.



Table 4-59 Soil Stability Hazard Problem Statements

Problem No.	Hazard	Area of Concern	Mitigation Alternatives	Primary Agency	Problem Description	Related MA
ps-SS-KC-221	Soil Stability	Impact	PRV - Prevention , PE&A - Public Education & Awareness , NRP - Natural Resource Protection	County of Kern	Increased groundwater pumping for private wells can contribute to land subsidence problems.	ma-DR-KC-291
ps-SS-KC-222	Soil Stability	Impact	PPRO - Property Protection , SP - Structural Projects	County of Kern	Bridge at Rock Pile Rd. and Arvin Edison Canal is located in a high risk subsidence area and may need further investigation	ma-SS-KC-300
ps-SS-KC-223	Soil Stability	Impact	PPRO - Property Protection , SP - Structural Projects	County of Kern	There are 13 bridges in Unincorporated Kern County located in medium subsidence area which may require further investigation	ma-SS-KC-300
ps-SS-KC-224	Soil Stability	Impact	PE&A - Public Education & Awareness , NRP - Natural Resource Protection	County of Kern	Wind erosion could lead to soil accumulation on county roadways, creating hazardous driving conditions	ma-SH-KC-298, ma-SS-KC-299
ps-SS-KC-225	Soil Stability	Threat	PE&A - Public Education & Awareness , NRP - Natural Resource Protection	County of Kern	The presence of fallow agricultural fields and ag fields without cover crops contribute to wind erosion	ma-SH-KC-298
ps-SS-KC-226	Soil Stability	Threat	NRP - Natural Resource Protection	County of Kern	A lack of erosion control in areas around steep hillsides will increase the risk of landslide/mudflow/rockslide	ma-AH-KC-158
ps-SF-KC-249	Soil Stability	Impact	PPRO - Property Protection	County of Kern	The Lebec Landfill and Transfer Station site is located at the bottom of a canyon which is surrounded by high steep hills. Runoff from adjacent properties is eroding deep gullies into the hillsides.	Ma-AH-KC-245
ps-SS-KC-250	Soil Stability	Impact	PPRO - Property Protection	County of Kern	Bena Landfill could see future damage caused by precipitation. The following requires mitigation: high water velocity flows in earth ditches, steep grades and limited vegetation on surface slopes.	Ma-AH-KC-39
ps-SS-KC-251	Soil Stability	Impact	PPRO - Property Protection	County of Kern	Kern Valley Landfill and Transfer Station is at risk of erosion from high precipitation	Ma-AH-KC-63



Section 5. Mitigation Strategy

The mitigation strategy is the guidebook to future hazard mitigation administration for the County and all other participating jurisdictions, capturing the key outcomes of the MJHMP planning process. The mitigation strategy is intended to reduce vulnerabilities outlined in the previous section with a prescription of policies and physical projects. These mitigation actions should be compatible with existing planning mechanisms and should outline specific roles and resources for implementation success. The Planning Committee conducted the hazard mitigation planning process through typical problem-solving, as did the Steering Committees for each participating jurisdiction. Those steps included:

- Estimate the impacts (*See Vulnerability Assessment*);
- Describe the problem (*See Problem Statements*);
- Assess what resources exist to lessen impacts and problem (*See Capability Assessment*);
- Develop Goals and Objectives to address the problems (*See Goals and Objectives*); and
- Determine what can be done and develop actions that are appropriate for the community (*See Mitigation Action Matrix*).

5.1 Mitigation Alternatives

During Planning Committee Meeting #4 on November 14th, 2019 the MJHMP Planning Committee developed and reviewed mitigation actions with a wide range of alternatives, using FEMA's six broad categories of mitigation alternatives described below. The MJHMP Planning Committee considered many mitigation alternatives for implementation under each mitigation category, both county-wide and for individual participating jurisdictions.

PREVENTION (PRV):

Preventative activities keep hazard problems from getting worse and typically are administered through government programs or regulations addressing building and land development. Preventative actions are particularly effective in reducing a community's future vulnerability in areas where development has not occurred, or capital improvements have not yet been substantial. Examples of preventative activities include:

- Planning and zoning ordinances;
- Building codes;
- Open space preservation;
- Floodplain regulations;
- Stormwater management regulations;
- Drainage system maintenance;
- Capital improvements programming; and
- Riverine or fault zone setbacks.



PRV ALTERNATIVES:

- Establish ingress/ egress standards for future development.
- Enhance the County's GIS database and capabilities related to hazards information.
- Assist dam owners in updating their Emergency Action Plans.
- Maintain detention basins.
- Conduct detailed study and mapping of floodplains for Kern River and its tributaries, targeting problematic floodplains.
- Update and distribute wildfire risk mapping for Kern County.
- Restrict new development in dam inundation zones.
- Amend or revise water conservation regulations for landscape design for commercial and residential development with the goal of limiting outdoor watering.

PROPERTY PROTECTION (PPRO):

Property protection measures involve the modification of existing buildings and structures to help them better withstand the forces of a hazard, or removal of the structures from hazardous locations. Examples include:

- Building elevation;
- Critical facilities protection;
- Retrofitting (e.g., seismic design techniques, etc.);
- Safe rooms, shutters, shatter resistant glass; and
- Insurance.

PPRO ALTERNATIVES:

1. Continue to work with the County of Kern local Fire Safe Councils to conduct mitigation projects with homeowners. Provide homeowners easily accessible resources for mitigating the risk of wildfire around their homes.
2. Implement additional fuel reduction projects.
3. Remove existing structures from flood areas whenever and to the greatest extent possible; Relocate farm work centers from flood risk areas.
4. Encourage privately owned critical facilities (e.g. Churches, Hotels, other gathering facilities) to evaluate the ability of the buildings to withstand earthquakes and to address any deficiencies identified.
5. Identify and harden critical lifeline systems (i.e., critical public services such as utilities and roads) to meet "Seismic Design Guidelines and Standards for Lifelines" or equivalent standards such as American Lifelines Alliance (ALA) guidance.
6. Increase participation in NFIP.
7. Review construction plans for all bridges to determine their susceptibility to collapse and retrofitting problem bridges.
8. Use flexible piping when extending water, sewer, or natural gas service.



9. Strengthening and retrofitting non-reinforced masonry buildings and non-ductile concrete facilities that are particularly vulnerable to ground shaking
10. Install shutoff valves and emergency connector hoses where water mains cross fault lines.
11. Continue to incentivize drought-tolerant landscape design.

PUBLIC EDUCATION AND AWARENESS (PE&A):

Public education and awareness activities advise students, staff, parents, nearby residents, and elected officials about hazards, hazardous areas, and mitigation techniques they can use to protect themselves and their property. Measures to educate and inform the public include:

- Outreach projects including neighborhood and community outreach;
- Speaker series / demonstration events;
- Hazard mapping;
- Real estate disclosures;
- Materials library;
- School children educational programs; and
- Hazard expositions.

PE&A ALTERNATIVES:

1. Continue to work with the County of Kern local Fire Safe Councils educating homeowners on reducing the risk of wildfire on their property, including understanding their wildfire risk, and free site visits.
2. Distribute public education materials relating to natural hazards as well as emergency notifications in both English and Spanish.
3. Partner with Water Association of Kern County, Eastern Kern County Resource Conservation District, Kern Valley Resource Conservation District, North West Kern Resource Conservation District, and/or Tehachapi Resource Conservation District, and the Kern Valley River Council in their public education and conservation campaigns (in English and Spanish).
4. Encourage businesses to build financial reserves as part of economic development.
5. Improve floodplain management, earthquake preparedness, wildfire mitigation and preparedness, and other information on participating jurisdiction's websites.
6. Distribute National Flood Insurance Program and floodplain development information in County libraries for access by the public
7. Focus a public education program around neighborhoods with egress/ingress issues and narrow roads.
8. Improve interactive hazard mapping resources available to public.
9. Develop a public information campaign on 72-hour kits.
10. Develop a "Natural Hazard Awareness Week" campaign and conduct corresponding outreach to the community and all interested parties.



11. Conduct outreach to builders, architects, engineers, and inspectors about building susceptibility to earthquakes and proper design and building requirements.
12. Educate on the importance of drought-tolerant landscaping, low flow indoor fixtures, and other water savings techniques to better withstand periods of drought.
13. Partner with local organizations such as the Kern River Watershed Coalition Authority and Water Association of Kern County to educate farmers on soil and water conservation practices.
14. Offer agricultural disaster training and networking opportunities for farmers and ag regulatory agencies.

NATURAL RESOURCE PROTECTION (NRP):

Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their protective functions. Such areas include floodplains, wetlands, steep slopes, and sand dunes. Parks, recreation, or conservation agencies and organizations often implement these protective measures. Examples include:

- Floodplain protection
- Watershed management;
- Vegetation management (e.g., fire resistant landscaping, fuel breaks, etc.);
- Erosion and sediment control;
- Wetland and habitat preservation and restoration;

NRP ALTERNATIVES:

1. Continue to implement the Kern County Flood Hazard Mitigation Plan.
2. Protect and restore wetlands, riparian areas, and natural buffers to sea level rise, in particular continuing to implement restoration of Kern County rivers.
3. Continue to implement the County of Kern Storm Water Management Plan.
4. Complete vegetation management projects as prescribed in Community Wildfire Protection Plans.
5. Encourage and incentivize drought-tolerant landscape design.
6. Establish a priority list of slope failure locations and implement slope stabilization projects in the highest risk areas.

EMERGENCY SERVICES (ES):

Although not typically considered a “mitigation” technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:

- Warning systems;
- Construction of evacuation routes;
- Sandbag staging for flood protection; and



- Installing temporary shutters on buildings for wind protection.

ES ALTERNATIVES:

1. Construct/Install back up power generators for fire stations, pump houses, emergency shelters and cooling centers.
2. Utilize website "Smart911," for vulnerable populations to register information such as where the individual in question lives, medications, restrictions, etc. Also, map registrants or tie information to Nixle alert system
3. Focus capital improvements on evacuation or emergency access routes needing attention.
4. Increase the capacity of existing hospitals through retrofits or upgrades such as isolation wings.
5. Construct or improve egress for wildfire emergencies in wilderness-urban interface (WUI) areas.

STRUCTURAL PROJECTS (SP):

Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event through construction. They are usually designed by engineers and managed or maintained by public works staff. Examples include:

- Stormwater diversions / detention / retention infrastructure;
- Utility Upgrades
- Seismic Retrofits

SP ALTERNATIVES:

1. Continue Kern River restoration projects.
2. Improve water supply and delivery systems to be more resilient during times of drought.
3. Construct and develop alternative water supplies to augment single sources of water delivery.
4. Construct rainwater catchment systems to recharge groundwater in government ROWs.
5. Install water monitoring devices and drought-tolerant landscaping on government-owned facilities.
6. Improve stormwater drainage capacity; construct / improve stormwater basins County-wide to accomplish 100-YR protection.
7. Conduct regular maintenance for drainage systems and flood control structures.
8. Construct, install and maintain warning gauges on local dams as the opportunity or need arises.
9. Create an inventory and establish a priority list for culvert replacement that takes into account fish passage, flood depth reduction and future losses avoided.
10. Retrofit critical care facilities with enhanced HVAC and isolation areas.



5.2 Identifying the Problem

As part of the mitigation action identification process, the MJHMP Planning Committee identified the areas of concern and potential impacts of each of the identified hazards on the community. Developing these “problem statements” for areas of concern, which describe the nature of the consequences or effects of a hazard occurrence on the community and its assets, ensures the identified mitigation actions are tailored to the specific problems created by various hazard scenarios and are specific to each participating jurisdiction. Each jurisdiction’s problem statements are available as part of the Mitigation Action Support Tool (MAST), which is summarized in Section 3, Step STEP 3: Develop a Mitigation Strategy, available on mitigatehazards.com, and summarized in individual participating jurisdictions in Volume 2 of this plan.

See Section 5.5 for related Countywide mitigation actions, or related mitigation actions for each participating jurisdiction in Volume 2 of this plan.

5.3 Capabilities Assessment

This section examines the County’s planning and regulatory, administrative, technical, financial, educational, and outreach capabilities to augment known issues and weaknesses from identified natural hazards. Volume 2 of this HMP includes a capabilities assessment for each participating jurisdiction as part of their annexes.

The tables in this section explore various local planning mechanisms, administrative capacity, financial capabilities, and education and outreach initiatives. The columns in each table represent deeper dives into the following questions:

- Is the existing planning or regulatory mechanism used currently? (*Column 1, Status*)
- Has the HMP been integrated into the planning mechanism currently so that the named mechanism is currently used in HMP planning? (*Column 2, Current Mitigation Use*)
- Is there a future opportunity to expand, improve upon, and incorporate this 2020 HMP Update into the planning or regulatory mechanism? (*Column 3, Future Opportunity*)

The capabilities and evaluation is easily-digestible and based on color coding to indicate which policies and plans are adequate, need improvement or in which the HMP could be integrated. Each table includes a legend that explain how each one of these questions are being answered according to the color indicated: green, yellow, and orange.



5.3.1 Planning and Regulatory Mitigation Capabilities

The information in Table 5-1 is used to align mitigation actions with existing planning and regulatory capabilities of the County. Planning and regulatory tools typically used by local jurisdictions to implement hazard mitigation activities are building codes, zoning regulations, floodplain management policies, and other municipal planning documents.

Table 5-1: Kern County Planning and Regulatory Mitigation Capabilities

CAPABILITY ASSESSMENT LEGEND		
Status	Current Mitigation Use	Future Opportunity
Currently in use or present.	Used widely for mitigation.	Opportunity to expand and integrate.
(Sort of) Seldomly used or limited presence.	Limited use in mitigation planning.	Limited opportunity to expand and integrate.
(No) Not present or available.	Not used in mitigation planning.	No opportunity to expand or integrate.

Resource	HMP Integration			Notes / Additional Detail
	Status	Current Mitigation Use	Future Opportunity	
Planning and Regulatory Capabilities				
Construction and Future Development Regulations				
Building Codes				
BCEGS Rating				
Public Protection (ISO Class)				
Hazard Related Development Standards				
Zoning Ordinance				Title 17, Buildings and Construction.
Hazard-Specific Ordinance				
Growth Management Ordinance				
Hazard Reduction Programs (Annually Conducted)				
Capital Improvements Program (CIP) or Plan				
Erosion/Sediment Control Program				
Hazard-Related Public Outreach Program				See Education and Outreach Resource Capabilities.
Stormwater Management Program (Annual Inspections)				
Seismic Safety Program (Non-structural)				
Earthquake Modernization Plan (Building Safety)				



Resource	HMP Integration			Notes / Additional Detail
	Status	Current Mitigation Use	Future Opportunity	
Planning and Regulatory Capabilities				
Hazard Plans				
General Plan Safety Element	Green	Yellow	Green	
Community Wildfire Protection Plan (CWPP)	Yellow	Green	Green	Countywide CWPP expected 2021.
Floodplain Management Plan	Green	Yellow	Green	
Stormwater Management Plan	Green	Yellow	Green	
Emergency Operations Plan	Green	Yellow	Green	
Climate Action Plan	Yellow	Orange	Green	
Ground Water Management Planning / Plans	Green	Orange	Green	Groundwater authorities with plans in Kern include the Kern Groundwater Authority for valley region and Mojave Water Agency
National Flood Protection Program (NFIP)				
Floodplain Management Regulations	Green	Yellow	Green	
Flood Insurance Education and Technical Assist.	Green	Yellow	Green	
Flood Hazard Mapping / Re-Mapping	Green	Orange	Green	
Community Rating System (CRS)	Green	Yellow	Green	CRS Class 7



5.3.2 Financial Capabilities

Table 5-2 identifies the financial tools or resources that the County has used to fund mitigation activities.

Table 5-2: Kern County Fiscal Capabilities Summary

CAPABILITY ASSESSMENT LEGEND		
Status	Current Mitigation Use	Future Opportunity
Currently in use or present.	Used widely for mitigation.	Opportunity to expand and integrate.
(Sort of) Seldomly used or limited presence.	Limited use in mitigation planning.	Limited opportunity to expand and integrate.
(No) Not present or available.	Not used in mitigation planning.	No opportunity to expand or integrate.

Resource	HMP Integration			Notes / Additional Detail
	Status	Current Mitigation Use	Future Opportunity	
Fiscal Capabilities				
Financial Resources for Hazard Mitigation				
Levy for Specific Purposes with Voter Approval				
Utilities Fees				
Benefit assessments				
System Development Fee				
General Obligation Bonds to Incur Debt				
Special Tax Bonds to Incur Debt				
Withheld Spending in Hazard-Prone Areas				
Stormwater Service Fees				
Capital Improvement Project Funding				



5.3.3 Education and Outreach

Table 5-3 lists the local citizen groups that communicate hazard risks.

Table 5-3: Kern County Education/ Outreach Capabilities Summary

Status	CAPABILITY ASSESSMENT LEGEND	
	Current Mitigation Use	Future Opportunity
Currently in use or present.	Used widely for mitigation.	Opportunity to expand and integrate.
(Sort of) Seldomly used or limited presence.	Limited use in mitigation planning.	Limited opportunity to expand and integrate.
(No) Not present or available.	Not used in mitigation planning.	No opportunity to expand or integrate.

Resource	HMP Integration			Notes / Additional Detail
	Status	Current Mitigation Use	Future Opportunity	
Education / Outreach Capabilities				
Education/Outreach Resources				
Website Dedicated to Hazard Topics	Yellow	Orange	Green	https://www.kerncountyfire.org/en/emergency-preparedness-info/emergency-preparedness-links.html
Dedicated Social Media	Orange	Orange	Green	
Hazard Info. Avail. at Library/ Planning Desk	Green	Yellow	Green	
Annual Public Safety Events	Yellow	Orange	Green	Law enforcement "National Night Out", Emergency Preparedness Fair, and September National Preparedness Month
Ability to Field Public Tech. Assistance Requests	Green	Yellow	Green	
Public Safety Newsletters or Printed Outreach	Green	Yellow	Green	
Fire Safe Councils	Green	Yellow	Green	The umbrella organization is the Kern Fire Safe Council.
Resource Conservation Districts	Green	Yellow	Green	
Other	N/A	N/A	N/A	



5.3.4 Administrative and Technical Capabilities

Table 5-4 shows the administrative and technical capabilities of Kern County.

Table 5-4: Kern County Administrative and Technical Capabilities

CAPABILITY ASSESSMENT LEGEND		
Status	Current Mitigation Use	Future Opportunity
Currently in use or present.	Used widely for mitigation.	Opportunity to expand and integrate.
(Sort of) Seldomly used or limited presence.	Limited use in mitigation planning.	Limited opportunity to expand and integrate.
(No) Not present or available.	Not used in mitigation planning.	No opportunity to expand or integrate.

Resource	HMP Integration			Notes / Additional Detail
	Status	Current Mitigation Use	Future Opportunity	
Administrative and Technical				
Community Planning and Development Services				
Community Planner				
Civil Engineer				
Building Code Official (Full time or Augmented)				
Floodplain Administrator				
Fire Marshal				
Dedicated Public Outreach Personnel				
GIS Specialist and Capability				
Emergency Manager				
Full-Time Building Official				
Grant Manager, Writer, or Specialist				
Other	N/A	N/A	N/A	
Warning Systems/Services				
General				
Flood				
Wildfire				
Geological Hazards				



5.3.4.1 Expanding and Improving Existing Policies and Programs

The capabilities assessment presents an opportunity for the County to examine what capabilities it does not currently have and where it makes the most sense to expand and improve upon those capabilities in the future. This assessment effort shaped mitigation actions for all hazards and for specific hazards that focus on expanding and improving existing policies and programs. See mitigation actions in Table 5-6 that relate to policy and program improvements identified by the County.

5.3.5 Federal and State Funding Opportunities

Table 5-5 is a list of available funding sources from state and federal agencies. This includes the FEMA Hazard Mitigation Assistance grant program, which is described in more detail in Section 6.3.5. This list serves as a resource and is not exclusive.

Table 5-5: Federal and State Funding Opportunities

Agency / Grant Name	Potential Programs/Grants
FEMA Hazard Mitigation Assistance Grants	See Section 6 for FEMA/ HMA grant details. For more information on current grants visit https://www.fema.gov/hazard-mitigation-assistance <ul style="list-style-type: none"> ▪ Hazard Mitigation Grant Program (HMGP): https://www.fema.gov/hazard-mitigation-grant-program ▪ Building Resilient Infrastructure and Communities (BRIC): https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities ▪ Flood Mitigation Assistance Grant Program (FMA): https://www.fema.gov/flood-mitigation-assistance-grant-program
FEMA other grant programs	Including: <ul style="list-style-type: none"> ▪ Assistance to Firefighters Grant Program. Assistance to Firefighters Grants, Fire Prevention & Safety, and Staffing for Adequate Fire and Emergency Response. https://www.fema.gov/welcome-assistance-firefighters-grant-program ▪ Emergency Management Performance Grants (EMPG). Good for Equipment, Back Up Generators, Etc. https://www.fema.gov/emergency-management-performance-grant-program ▪ Regional Catastrophic Preparedness Grant Program (RCPGP). Housing and Logistics and Supply Chain Management, encouraging innovative regional solutions to issues related to catastrophic incidents, and building on existing regional efforts. https://www.fema.gov/regional-catastrophic-preparedness-grant-program
U.S. Dept. of Energy / Energy Efficiency and Conservation Block Grant Program	<i>Provides funding for weatherization of structures and development of building codes/ordinances to ensure energy efficiency and restoration of older homes.</i> https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program



Agency / Grant Name	Potential Programs/ Grants
<p>State and County Community Development Dept. Block Grants (CDBG)</p>	<p>Through Cal. Dept. of Housing and Community Development Dept. (HCD) Programs Include:</p> <ul style="list-style-type: none"> ▪ Community Development (CD) ▪ Economic Development (ED) ▪ Disaster Recovery Initiative (DRI) ▪ Neighborhood Stabilization Program (NSP) <p>https://www.hcd.ca.gov/grants-funding/active-funding/cdbg.shtml</p>
<p>Cal OES Proposition 1B Grants Programs</p>	<p>The Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, approved by the voters as Proposition 1B at the November 7, 2006 general election, authorizes the issuance of nineteen billion nine hundred twenty five million dollars (\$19,925,000,000) in general obligation bonds for specified purposes, including grants for transit system safety, security, and disaster response projects.</p> <p>http://www.caloes.ca.gov/cal-oes-divisions/grants-management/homeland-security-prop-1b-grant-programs/proposition-1b-grant</p>
<p>California Proposition 1: the Water Bond (AB 1471)</p>	<p>Authorize \$7.545 billion in general obligation bonds for state water supply infrastructure projects, such as public water system improvements, surface and groundwater storage, drinking water protection, water recycling and advanced water treatment technology, water supply management and conveyance, wastewater treatment, drought relief, emergency water supplies, and ecosystem and watershed protection and restoration.</p> <p>The State Water Resources Control Board (State Water Board) will administer Proposition 1 funds for five programs. The estimated implementation schedule for each is outlined in Five Categories:</p> <ul style="list-style-type: none"> ▪ Small Community Wastewater ▪ Water Recycling ▪ Drinking Water ▪ Stormwater ▪ Groundwater Sustainability <p>http://www.waterboards.ca.gov/water_issues/programs/grants_loans/proposition1.shtml</p>
<p>Assistance to Firefighters Grant Program (AFG); Fire Prevention and Safety (FP&S)</p>	<p>The primary goal of the FP&S Grants is to enhance the safety of the public and firefighters with respect to fire and fire-related hazards. The Grant Programs Directorate administers the FP&S Grants as part of the AFG Program. FP&S Grants are offered to support projects in two activity areas:</p> <ol style="list-style-type: none"> 1). Fire Prevention and Safety (FP&S) Activity Activities designed to reach high-risk target groups and mitigate the incidence of death and injuries caused by fire and fire-related hazards. 2). Research and Development (R&D) Activity To learn more about how to prepare to apply for a project under this activity, please see the FP&S Research and Development Grant Application Get Ready Guide.



Agency / Grant Name	Potential Programs/ Grants
	<p>https://www.fema.gov/fire-prevention-safety-grants</p>
<p>California Housing and Community Development (HCD) Emergency Solutions Grant (ESG) Program</p>	<p><i>To fund projects that serve homeless individuals and families with supportive services, emergency shelter/transitional housing, assisting persons at risk of becoming homeless with homelessness prevention assistance, and providing permanent housing to the homeless population. The Homeless Emergency Assistance and Rapid Transition to Housing (HEARTH) Act of 2009 places new emphasis on assisting people to quickly regain stability in permanent housing after experiencing a housing crisis and/or homelessness.</i></p> <p>http://www.hcd.ca.gov/fa/esg/index.html</p>
<p>CalTrans Division of Local Assistance / Safe Routes to School Program</p>	<p>California Dept. of Transportation. Federal funding administered via Caltrans. Local 10% match is the minimum requirement.</p> <p>http://www.dot.ca.gov/hq/LocalPrograms/saferoutes/saferoutes.htm</p> <p>Active transportation grant program. Creating mobility and connectivity. Prioritize projects, and preparation of PED for active transportation projects.</p>
<p>Property Assessed Clean Energy (PACE) Programs</p>	<p>PACE financing allows property owners to fund energy efficiency, water efficiency and renewable energy projects with little or no up-front costs. With PACE, residential and commercial property owners living within a participating district can finance up to 100% of their project and pay it back over time as a voluntary property tax assessment through their existing property tax bill.</p>
<p>HazMat Emergency Preparedness Grant</p>	<p>The purpose of this grant program is to increase effectiveness in safely and efficiently handling hazardous materials accidents and incidents; enhance implementation of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA); and encourage a comprehensive approach to emergency training and planning by incorporating the unique challenges of responses to transportation situations.</p> <p>http://www.caloes.ca.gov/cal-oes-divisions/fire-rescue/hazardous-materials/hazmat-emergency-preparedness-grant</p>
<p>CERT Program Manager Course</p>	<p>The purpose of this Community Emergency Response Team (CERT) Program Manager course is to prepare CERT Program Managers for the tasks required to establish and sustain an active local CERT program.</p> <p>http://www.californiavolunteers.org/index.php/CERT/PM/</p>
<p>California Residential Mitigation Program</p>	<p>The California Residential Mitigation Program (CRMP) was established to carry out mitigation programs to assist California homeowners who wish to seismically retrofit their houses.</p> <p>http://www.californiarresidentialmitigationprogram.com/</p>



Agency / Grant Name	Potential Programs/ Grants
Earthquake Brace + Bolt (EBB)	EBB, part of the California Residential Mitigation Program, was developed to help homeowners lessen the potential for damage to their houses during an earthquake by offering eligible homeowners up to a \$3,000 incentive to seismically retrofit their homes. https://www.earthquakebracebolt.com/
California Air Resources Board Air Pollution Incentives, Grants and Credit Programs	These programs have hundreds of millions of dollars in grants available over the next several years to reduce emissions from on- and off-road vehicles and equipment. https://www.arb.ca.gov/ba/fininfo.htm
California Department of Water Resources Grants and Loans	https://water.ca.gov/Work-With-Us/Grants-And-Loans Agency offers a variety of grants and loans related to integrated regional water management, flood mitigation, water conservation and efficiency, environmental restoration, groundwater, water quality, and water supply.
US Bureau of Reclamation WaterSMART Grants	Annual funding available for: <ul style="list-style-type: none"> ▪ Water Reclamation and Reuse funding ▪ Drought Resiliency Project funding ▪ Water and Energy Efficiency Grant funding https://www.usbr.gov/watersmart/



5.4 Mitigation Goals

Hazard mitigation plans must identify goals for reducing long-term vulnerabilities to identified hazards (44 C.F.R. § 201.6(c)(3)(i)). The Steering Committee established a set of goals for this plan, based on data from the preliminary risk assessment and the results of the public involvement strategy.

Goals discussed in this section describe what actions should occur. Specific, measurable mitigation actions explain how to accomplish the goals. The goals and actions form the basis for the development of the Mitigation Action Strategy and specific mitigation projects. The process consists of 1) setting goals, 2) considering mitigation alternatives, 3) identifying strategies or “actions”, and 4) developing a prioritized action plan resulting in a mitigation strategy.

The goals, objectives, and mitigation actions in this plan all support each other. Objectives were selected that met multiple goals. Actions were prioritized based on their ability to achieve multiple objectives. A mitigation strategy is considered effective based on how well the goals of the strategy are achieved. The following are the goals for this plan:

Goal 1: Enable residents to mitigate the impacts of hazards and disasters.

Goal 2: Reduce hazard impacts to existing and future development and the natural environment.

Goal 3: Reduce hazard impacts to existing and future critical facilities, infrastructure, and high potential loss facilities.

Goal 4: Improve multi-jurisdiction coordination to reduce risk through mitigation planning and hazard analysis on a continual basis.



5.5 County Wide Mitigation Actions

Mitigation actions were developed based upon planning committee priorities, risk assessment results, and mitigation alternatives. Most importantly, the newly-developed mitigation actions acknowledge updated risk assessment information outlined in the Executive Summary under Risk Assessment.

Mitigation actions are available on MAST linked through mitigatehazards.com; the format allows for regular updating and easy sorting by jurisdiction and hazard. Figure 5-1 illustrates the mitigation actions entered through MAST.

Table 5-6 establishes mitigation actions for the County and Participating Jurisdictions. Each participating jurisdiction developed mitigation actions specifically tailored to their vulnerabilities and capabilities. Those mitigation actions are available as part of the planning process library, which is summarized for Kern County in Table 3-5, available on the Mitigation Action Application, and available for each individual participating jurisdiction in Volume 2 of this plan.

Some mitigation actions support ongoing activities of participating jurisdictions, while other actions are intended to be completed when funding is available. All mitigation actions will be reviewed annually.

Web-Based Mitigation Strategy

PROBLEM STATEMENTS

MITIGATION ACTIONS

PPT Exercise

Problem No.	Problem Description	Problem No.	Problem Description	Problem No.	Problem Description
1	Failure of infrastructure pipeline... (residuals client: Storage tanks)	5	145 Residents in Dam Failure Inundation Zone	6	Large Scale Earthquake near dam
2	Travel to and from Treatment Plant Facility (Road Damage)	6	Volunteer Fire Department within Inundation Zone		
3	Operators would not be able to operate the facility if they are unable to reach it by vehicle	7	Customer's could be without water: Failure of properly treated water		
4	Warning signals/alerts from treatment plant will not function if there is no cell phone service				

Figure 5-1: Mitigation Action Application



5.5.1 Prioritization of Mitigation Actions

Implementing the identified mitigation can be overwhelming for any local jurisdiction or district, especially with limited staffing and fiscal resources; prioritizing the identified mitigation actions can help greatly with this. To ensure this MJHMP realistically reflects available resources, mitigation actions are prioritized by considering benefit cost review, public input, and MJHMP Planning Committee agreement.

5.5.1.1 Cost/ Benefit Review

The action plan must be prioritized according to a benefit/cost analysis of the proposed projects and their associated costs (44 C.F.R. §201.6(c)(3)(iii)). The benefits of proposed projects were weighed against estimated costs as part of the project prioritization process. This review does not meet FEMA Hazard Mitigation Grant Program (HMGP) and Building Resilient Infrastructure and Communities (BRIC) grant program requirements. A less formal, less costly approach was used because some projects may not be implemented for up to 10 years, and associated costs and benefits could change dramatically in that time. Parameters were established for assigning subjective ratings (high, medium, and low) to the costs and benefits of these projects. Cost ratings were defined as follows:

- **High**—Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).
- **Medium**—The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
- **Low**—The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.

Benefit ratings were defined as follows:

- **High**—Project will provide an immediate reduction of risk exposure for life and property.
- **Medium**—Project will have a long-term impact on the reduction of risk exposure for life and property, or project will not provide an immediate reduction in the risk exposure for property.
- **Low**—Long-term benefits of the project are difficult to quantify in the short term.

Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial and are prioritized accordingly. For many of the strategies identified in this action plan, the partners may seek financial assistance under the HMGP or BRIC programs, both of which require detailed benefit/cost analyses. These analyses will be performed on projects at the time of application using the FEMA benefit-cost model. For projects not seeking financial assistance from grant programs that require detailed analysis, the partners reserve the right to define "benefits" according to parameters that meet the goals and objectives of this HMP.



5.5.1.2 Public Input

An 8-question community survey was distributed to the public, yielding 1,156 survey responses and useful insight into the community's perception of natural hazards affecting Kern County. Specific question responses heavily influenced the prioritization of mitigation actions, including:

- 77.9% of participants believe their property is at risk from a natural hazard disaster.
- 66.8% of respondents have experienced earthquakes, 24.9% experienced wildfire, and 38.4% experienced drought. Only 12.9% of respondents (or someone in their household) had not experienced a natural hazard.
- 60.2% of participants considered the risk of naturally occurring hazards when choosing their home.
- 59.6% of respondents felt they were well-informed about the dangers of natural hazards, while 31.1% felt somewhat informed and 9.4% felt not informed.
- When asked what incentives would encourage additional home protection from possible natural hazards, the top responses were insurance premium discounts (67.4%), rebate programs or reimbursement of upfront costs (66.8%), and home improvement cost-share grants (40%).
- Respondents indicated top mitigation projects that local government agencies should focus on:
 - Retrofit and strengthen essential facilities (59.7%)
 - Replace inadequate or vulnerable bridges and roadways (55.8%)
 - Retrofit or upgrade drainage systems (45.9%)
 - Work on improving damage resistance of utilities (68.2%)
 - Ensure emergency shelters, the Emergency Operations Center, and communication towers have backup power generators (57.5%)

The complete survey results can be found in Appendix B.



5.5.2 Mitigation Action Plan

Table 5-6 lists each mitigation action for the unincorporated County. Each participating jurisdiction developed unique mitigation actions as well, targeted at their own unique priorities and vulnerabilities; these are available on MAST and in Vol. 2 of this MJHMP. Each mitigation action identifies the responsible party, time frame, potential funding source, implementation steps and resources needed to implement these priority mitigation actions. As a living document, hazard problem statements and mitigation activities will be updated through MAST.

The detail provided in MAST and captured in Table 5-6 meets the regulatory requirements of FEMA and DMA 2000.

The actions detailed in Table 5-6 and MAST contain both new action items developed for this plan Update as well as old actions that were yet to be completed from the 2012 Plan. The action numbers indicate whether the action is new or from the 2012 plan. A sample of the action number nomenclature is presented in Figure 5-2.

Section 2, What's New, illustrates progress towards new and previous mitigation action and indicates how many actions have been completed, deleted, or are ongoing or pending.

Important to note: The Planning Committee realizes that new needs and priorities may arise as a result of a disaster or other circumstances and reserves the right to support new actions and edit existing actions as necessary as long as they conform to the overall goals of the plan

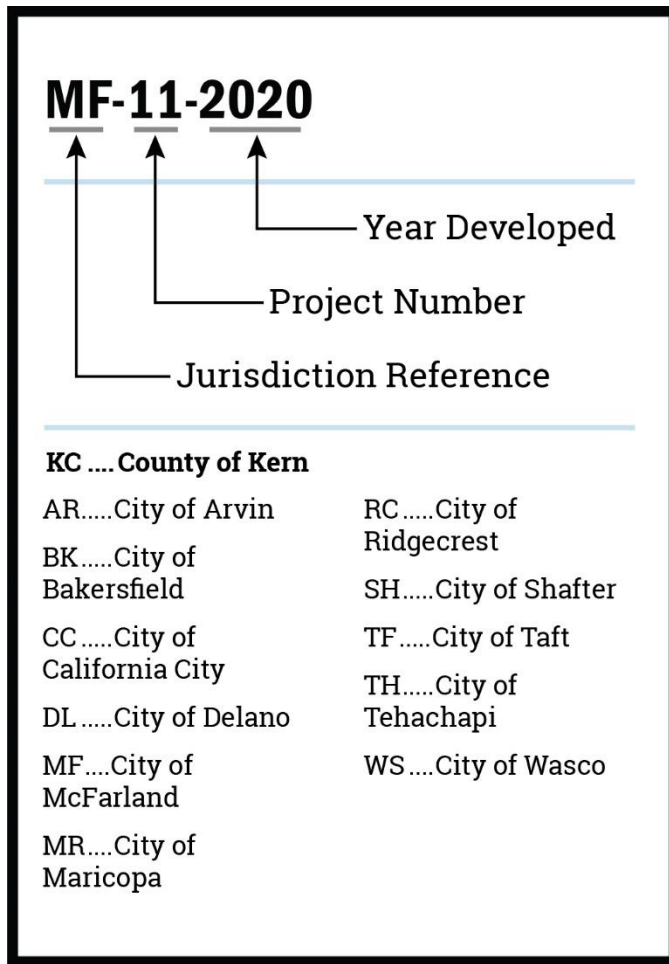


Figure 5-2: Mitigation Action Number Key



Table 5-6: County Wide Mitigation Action Tracker

Mitigation No.	Hazard Type	Mitigation Type	Status	Year	Primary Agency	Title/Description	Responsible Party	Estimated Cost	Estimated Benefit	Time Frame	HMA Activity Type	Potential Grant Source	Priority	Related Problem Statements
ma-AH-KC-201	All Hazard	PE&A - Public Education & Awareness	Ongoing	2005	County of Kern	Hazard Public Education	Kern County Office of Emergency Services	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	Low - Long-term benefits of the project are difficult to quantify in the short term.	Ongoing	5%	EMPG	Low	ps-WF-KC-240
ma-AH-KC-104	All Hazard	ES - Emergency Services	Pending	2005	County of Kern	Remote Automated Weather Station System	Kern FD	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	High - Project will provide an immediate reduction of risk exposure for life and property.	Ongoing	Project	HMGP / BRIC	Medium	ps-WF-KC-238, ps-WF-KC-239
ma-DF-KC-384	Dam Failure	ES - Emergency Services	Pending	2020	County of Kern	Design and implement County-wide warning system program, with all other HMP participating jurisdictions as secondary participants, to warn everyone within a dam inundation zone of impending dam failure	Kern County	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	3-5 Years	Project	FMA	Medium	ps-DF-KC-252, ps-DF-KC-253, ps-DF-KC-254
ma-DR-KC-290	Drought	PE&A - Public Education & Awareness	Ongoing	2020	County of Kern	Develop a public education campaign to encourage water conservation during drought.	Public Works, Planning, Building	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	High - Project will provide an immediate reduction of risk exposure for life and property.	Ongoing	5%	HMGP / BRIC	Medium	ps-DR-KC-215
ma-DR-KC-291	Drought	NRP - Natural Resource Protection	Pending	2020	County of Kern	Install remote monitoring devices on well flow meters on County owned wells	Public Health Services	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	3-5 Years		HMGP / BRIC	High	ps-SS-KC-221, ps-DR-KC-216, ps-DR-KC-217
ma-DR-KC-293	Drought	NRP - Natural Resource Protection	Pending	2020	County of Kern	Amend land use codes to incorporate regulations that encourage and incentive water savings for development	Planning and Natural Resources	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	Medium - Project will have a long-term impact on the reduction of risk exposure for life and property, or project will not provide an immediate reduction in the risk exposure for property.	1-3 Years	Planning	HMGP / BRIC	Medium	ps-DR-KC-219, ps-DR-KC-220
ma-DR-KC-294	Drought	NRP - Natural Resource Protection	Pending	2020	County of Kern	Replace existing turf grass and water intensive landscaping with drought resistant landscaping	General Services	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	3-5 Years	Planning	HMGP / BRIC	Medium	ps-DR-KC-218



Mitigation No.	Hazard Type	Mitigation Type	Status	Year	Primary Agency	Title/Description	Responsible Party	Estimated Cost	Estimated Benefit	Time Frame	HMA Activity Type	Potential Grant Source	Priority	Related Problem Statements
ma-DR-KC-384	Drought	NRP - Natural Resource Protection	Pending	2020	County of Kern	Expand Willow Springs Water Bank to reduce drought and increase water supply flexibility and sustainability	Executive Office	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	High - Project will provide an immediate reduction of risk exposure for life and property.	3-5 Years	Project	HMGP / BRIC	High	ps-DR-KC-216, ps-DR-KC-217
ma-EQ-KC-297	Earthquake	PE&A - Public Education & Awareness	Ongoing	2020	County of Kern	Encourage privately owned critical facilities (e.g. churches, hotels, other gathering facilities) to evaluate the ability of the buildings to withstand earthquakes and to address any deficiencies identified.	Kern County	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	High - Project will provide an immediate reduction of risk exposure for life and property.	Ongoing	5%	HMGP / BRIC	High	ps-EQ-KC-243
ma-AH-KC-111	Earthquake	PPRO - Property Protection	Pending	2005	County of Kern	Mobile Home Foundation Earthquake Retrofitting	Kern County Office of Emergency Services	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	Funding Dependent	Project	HMGP / BRIC	Medium	ps-EQ-KC-242
ma-EQ-KC-102	Earthquake	PPRO - Property Protection	Pending	2005	County of Kern	Formation of Kern County Unreinforced Masonry Task Force	Since 10 communities will be potentially involved, the topic of who facilitates and coordinates the work will have to be decided. Initially options include a committee representing all of the candidate jurisdictions, County OES, or the Kern County Council of Governments.	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	Medium - Project will have a long-term impact on the reduction of risk exposure for life and property, or project will not provide an immediate reduction in the risk exposure for property.	Ongoing	Planning	HMGP / BRIC , CDBG DRI	High	ps-EQ-KC-242



Mitigation No.	Hazard Type	Mitigation Type	Status	Year	Primary Agency	Title/Description	Responsible Party	Estimated Cost	Estimated Benefit	Time Frame	HMA Activity Type	Potential Grant Source	Priority	Related Problem Statements
ma-EQ-KC-305	Earthquake	PPRO - Property Protection	Pending	2020	County of Kern	Participate in seismic studies and needed seismic retrofits on County bridges that are located in high risk areas for earthquake scenarios included in this HMP	Public Works	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	High - Project will provide an immediate reduction of risk exposure for life and property.	5-10 Years	Project	HMGP / BRIC	High	ps-EQ-KC-246, ps-AH-ENCSD-10
ma-EQ-KC-306	Earthquake	PPRO - Property Protection	Pending	2020	County of Kern	Evaluate soil liquefaction potential around County assets in areas with shallow groundwater	Public Works	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	High - Project will provide an immediate reduction of risk exposure for life and property.	3-5 Years	Project	HMGP / BRIC	Medium	ps-EQ-KC-247
ma-EQ-KC-307	Earthquake	PPRO - Property Protection	Pending	2020	County of Kern	Install seismic gas shut-off valves on County buildings to prevent the flow of gas into buildings during a seismic event	General Services	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	1-3 Years	Project	HMGP / BRIC	High	ps-EQ-KC-243, ps-EQ-KC-244, ps-EQ-KC-245
ma-EQ-KC-295	Earthquake	SP - Structural Projects	Pending	2020	County of Kern	Retrofit / Harden County-owned critical facilities and buildings and their ability to withstand earthquakes.	General Services	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	High - Project will provide an immediate reduction of risk exposure for life and property.	5-10 Years	Project	HMGP / BRIC	High	ps-EQ-KC-242, ps-EQ-KC-243, ps-EQ-KC-244, ps-EQ-KC-245
ma-EQ-KC-296	Earthquake	SP - Structural Projects	Pending	2020	County of Kern	Retrofit non-compliant suspended ceilings in County buildings. This includes Non-Structural Suspended Gypsum Dry-Wall & Cement Plaster Ceilings built 1950-1974.	Public Works - Building	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	High - Project will provide an immediate reduction of risk exposure for life and property.	3-5 Years	Project	HMGP / BRIC	High	ps-EQ-KC-243, ps-EQ-KC-244, ps-EQ-KC-245, ps-EQ-KC-248
ma-EW-KC-301	Extreme Weather	PE&A - Public Education & Awareness	Ongoing	2020	County of Kern	Outreach and Education to developers before and during the development process about best management practices to mitigate the effects of the urban heat island effect and stormwater runoff resulting from increased impervious surface	Planning and Natural Resources	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	High - Project will provide an immediate reduction of risk exposure for life and property.	Ongoing	5%	HMGP / BRIC	Medium	ps-EW-KC-229



Mitigation No.	Hazard Type	Mitigation Type	Status	Year	Primary Agency	Title/Description	Responsible Party	Estimated Cost	Estimated Benefit	Time Frame	HMA Activity Type	Potential Grant Source	Priority	Related Problem Statements
ma-EW-KC-435	Extreme Weather	PE&A - Public Education & Awareness	Pending	2020	County of Kern	Develop outreach to educate the public, via County communication channels, on preparedness for driving in winter weather including preparing your vehicle, driving techniques, and what to do if caught in a winter weather event while driving.	Kern County	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	Medium - Project will have a long-term impact on the reduction of risk exposure for life and property, or project will not provide an immediate reduction in the risk exposure for property.	Ongoing	5%	HMGP / BRIC	Medium	ps-EW-KC-338
ma-FL-KC-202	Flood	NRP - Natural Resource Protection	Ongoing	2005	County of Kern	Kern Lake CRMP Master Plan Mitigation Projects	Building and Development	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	High - Project will provide an immediate reduction of risk exposure for life and property.	Funding Dependent	Project	FMA	Low	
ma-FL-KC-283	Flood	PRV - Prevention	Ongoing	2020	County of Kern	Adopt higher regulatory standards (including but not limited to freeboard, comp storage, lower substantial damage thresholds, setback and fill restrictions) as means to reduce future flood risk and support a no-adverse-impact (NAI) philosophy to floodplain management	Public Works - Building and Development	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	High - Project will provide an immediate reduction of risk exposure for life and property.	1-3 Years	Planning	FMA	Medium	ps-FL-KC-214, ps-FL-KC-177, ps-FL-KC-180, ps-FL-KC-181
ma-FL-KC-284	Flood	PRV - Prevention	Ongoing	2020	County of Kern	Routinely inspect storm water channels for vegetation build up or encroachment, trash and debris, silt and gravel build up, and erosion or bank failure	Public Works - Building and Development	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	Medium - Project will have a long-term impact on the reduction of risk exposure for life and property, or project will not provide an immediate reduction in the risk exposure for property.	Ongoing	Project	HMGP / BRIC	High	ps-FL-KC-174, ps-FL-KC-179, ps-FL-KC-204
ma-FL-KC-285	Flood	SP - Structural Projects	Ongoing	2020	County of Kern	Elevate and retrofit bridges and culverts to allow proper stormwater / 100-YR flows	Public Works - Building and Development	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	5-10 Years	Project	FMA	Medium	ps-FL-KC-175, ps-FL-KC-204
ma-AH-KC-153	Flood	PPRO - Property Protection	Pending	2005	County of Kern	Caliente Creek Habitat Mitigation Project	Kern County Engineering and Survey Services	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	High - Project will provide an immediate reduction of risk exposure for life and property.	3-5 Years	Project	FMA	High	ps-FL-KC-209
ma-AH-KC-158	Flood	PPRO - Property Protection	Pending	2005	County of Kern	Cuddy Creek Restoration Project	Kern County Engineering and Survey Services	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	1-3 Years	Project	FMA	High	ps-SS-KC-226



Mitigation No.	Hazard Type	Mitigation Type	Status	Year	Primary Agency	Title/Description	Responsible Party	Estimated Cost	Estimated Benefit	Time Frame	HMA Activity Type	Potential Grant Source	Priority	Related Problem Statements
ma-FL-KC-110	Flood	PPRO - Property Protection	Pending	2005	County of Kern	Flood Mitigation Plan	Public Works - Building and Development	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	Funding Dependent	Planning	FMA	High	ps-FL-KC-173, ps-FL-KC-176, ps-FL-KC-177, ps-FL-KC-178, ps-FL-KC-179, ps-FL-KC-180, ps-FL-KC-181
ma-FL-KC-99	Flood	NRP - Natural Resource Protection	Pending	2014	County of Kern	Streambed Mitigation in Kern River South Fork at Sierra Hwy (north of SR 178)	Kern County Engineering & Surveying Services (Flood Plain Management) and Kern County Roads Department	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	3-5 Years	Project	FMA	Medium	ps-FL-KC-185
ma-FL-KC-70	Flood	PPRO - Property Protection	Pending	2014	County of Kern	Continue to Implement Sound Floodplain Management Practices through Participation in the National Flood Insurance Program	Engineering, Surveying and Permit Services Department	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	High - Project will provide an immediate reduction of risk exposure for life and property.	Ongoing	Planning	HMGP / BRIC	Medium	ps-FL-KC-214, ps-FL-KC-173, ps-FL-KC-176, ps-FL-KC-177, ps-FL-KC-178, ps-FL-KC-179, ps-FL-KC-180, ps-FL-KC-181
ma-FL-KC-97	Flood	PPRO - Property Protection	Pending	2014	County of Kern	Lake Isabella Blvd Box Culvert at Erskine Creek (near Elizabeth Norris Rd)	Kern County Roads Department	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	5-10 Years	Project	HMGP / BRIC	Medium	
ma-FL-KC-82	Flood	SP - Structural Projects	Pending	2014	County of Kern	Bridge on Famoso Road at Poso Creek (approx 1/3 mile east of State Hwy 99)	Kern County Roads Department	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	High - Project will provide an immediate reduction of risk exposure for life and property.	Funding Dependent	Project	FMA	Medium	ps-FL-KC-207
ma-FL-KC-98	Flood	SP - Structural Projects	Pending	2014	County of Kern	Construct a Box Culvert across Redrock Randsburg Road at Redrock Canyon Wash (just east of Hwy 14)	Public Works - Building and Development	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	High - Project will provide an immediate reduction of risk exposure for life and property.	5-10 Years	Project	FMA	High	ps-EW-KC-227
ma-FL-KC-302	Flood	PPRO - Property Protection	Pending	2020	County of Kern	Kern Storm Water Resource Plan Mitigation Projects	Public Works	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	High - Project will provide an immediate reduction of risk exposure for life and property.	Ongoing	Project	FMA	High	



Mitigation No.	Hazard Type	Mitigation Type	Status	Year	Primary Agency	Title/Description	Responsible Party	Estimated Cost	Estimated Benefit	Time Frame	HMA Activity Type	Potential Grant Source	Priority	Related Problem Statements
ma-FL-KC-303	Flood	PPRO - Property Protection	Pending	2020	County of Kern	Kern County Flood Hazard Mitigation Plan - Projects	Public Works	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	High - Project will provide an immediate reduction of risk exposure for life and property.	5-10 Years	Project	FMA	High	ps-FL-KC-210, ps-FL-KC-211, ps-FL-KC-212, ps-FL-KC-213, ps-FL-KC-182, ps-FL-KC-183, ps-FL-KC-184
ma-FL-KC-304	Flood	PPRO - Property Protection	Pending	2020	County of Kern	County of Kern Caliente Creek - Conceptual Plan for Mitigation	Public Works	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	High - Project will provide an immediate reduction of risk exposure for life and property.	3-5 Years	Project	FMA	High	ps-FL-KC-208, ps-FL-KC-209
ma-SF-KC-292	Slope Failure	PPRO - Property Protection	Pending	2020	County of Kern	Establish a priority list of slope failure locations and implement slope stabilization projects in the highest risk areas.	Public Works	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	Low - Long-term benefits of the project are difficult to quantify in the short term.	5-10 Years	Project	HMGP / BRIC	Low	ps-SF-KC-230, ps-SF-KC-231
ma-AH-KC-245	Soil Stability	PPRO - Property Protection	Ongoing	2005	County of Kern	Lebec Landfill and Transfer Station Drainage Improvements and Erosion Control	Kern County Waste Management Department	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	Medium - Project will have a long-term impact on the reduction of risk exposure for life and property, or project will not provide an immediate reduction in the risk exposure for property.	1-3 Years	Project		High	ps-SF-KC-249
ma-AH-KC-63	Soil Stability	PPRO - Property Protection	Pending	2014	County of Kern	Kern Valley Landfill and Transfer Station Drainage Improvements and Erosion Control	County of Kern Waste Management Department	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	Medium - Project will have a long-term impact on the reduction of risk exposure for life and property, or project will not provide an immediate reduction in the risk exposure for property.	1-3 Years	Project	HMGP / BRIC	High	ps-SS-KC-251
ma-SS-KC-299	Soil Stability	NRP - Natural Resource Protection	Pending	2020	County of Kern	Implement wind breaks to prevent wind erosion leading to buildup of soil on County roads and bridges. Wind break erosion mitigation examples include solid fences, porous fences, straw bales, soil surface modification, berms, and landscaping	Public Works	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	High - Project will provide an immediate reduction of risk exposure for life and property.	1-3 Years	Project	HMGP / BRIC	Medium	ps-SS-KC-224



Mitigation No.	Hazard Type	Mitigation Type	Status	Year	Primary Agency	Title/Description	Responsible Party	Estimated Cost	Estimated Benefit	Time Frame	HMA Activity Type	Potential Grant Source	Priority	Related Problem Statements
ma-SS-KC-300	Soil Stability	NRP - Natural Resource Protection	Pending	2020	County of Kern	Conduct subsidence investigations on County bridges located in high subsidence areas	Public Works and Engineering	High - Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).	High - Project will provide an immediate reduction of risk exposure for life and property.	5-10 Years	Project	HMGP / BRIC	Medium	ps-SS-KC-222, ps-SS-KC-223
ma-SH-KC-298	Soil Stability	PE&A - Public Education & Awareness	Pending	2020	County of Kern	Outreach and educational programming to property owners and agricultural growers about wind erosion and mitigation techniques such as introducing cover crops, eliminating tillage, and avoiding over grazing	Agriculture & Administration	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	Medium - Project will have a long-term impact on the reduction of risk exposure for life and property, or project will not provide an immediate reduction in the risk exposure for property.	Ongoing	Project	HMGP / BRIC	Medium	ps-SS-KC-224, ps-SS-KC-225
ma-AH-KC-179	Wildfire	NRP - Natural Resource Protection	Ongoing	2005	County of Kern	Hazard Tree Removal, County Park Lands	Kern County FD, KC Parks	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	Medium - Project will have a long-term impact on the reduction of risk exposure for life and property, or project will not provide an immediate reduction in the risk exposure for property.	Ongoing	Project	HMGP / BRIC	High	ps-WF-KC-241, ps-EW-KC-228
ma-WF-KC-231	Wildfire	NRP - Natural Resource Protection	Ongoing	2005	County of Kern	Roadside Disc Breaks	KCFD	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	Medium - Project will have a long-term impact on the reduction of risk exposure for life and property, or project will not provide an immediate reduction in the risk exposure for property.	Annually	Project	HMGP / BRIC	High	ps-WF-KC-241
ma-WF-KC-183	Wildfire	PE&A - Public Education & Awareness	Ongoing	2005	County of Kern	Defensible Space, Public Education	Kern County FD	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	High - Project will provide an immediate reduction of risk exposure for life and property.	Ongoing	5%	HMGP / BRIC , FP&S	High	ps-WF-KC-232, ps-WF-KC-233, ps-WF-KC-234, ps-WF-KC-235, ps-WF-KC-236, ps-WF-KC-240
ma-WF-KC-184	Wildfire	PE&A - Public Education & Awareness	Ongoing	2005	County of Kern	Education, Fire Department Personnel	KCFD	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	Medium - Project will have a long-term impact on the reduction of risk exposure for life and property, or project will not provide an immediate reduction in the risk exposure for property.	Ongoing	5%	FP&S	Medium	ps-WF-KC-232, ps-WF-KC-233, ps-WF-KC-234, ps-WF-KC-235, ps-WF-KC-236, ps-WF-KC-240
ma-WF-KC-180	Wildfire	PPRO - Property Protection	Ongoing	2005	County of Kern	Greater Tehachapi Area Community Wildfire Protection Plan (was Hazardous Wildland Fuels Mitigation, Greater Tehachapi Area)	KCFD	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	Ongoing	Project	HMGP / BRIC	High	ps-WF-KC-236



Mitigation No.	Hazard Type	Mitigation Type	Status	Year	Primary Agency	Title/Description	Responsible Party	Estimated Cost	Estimated Benefit	Time Frame	HMA Activity Type	Potential Grant Source	Priority	Related Problem Statements
ma-WF-KC-181	Wildfire	PPRO - Property Protection	Ongoing	2005	County of Kern	Mount Pinos Community Wildfire Protection Plan (was Hazardous Wildland Fuels Mitigation, Frazier Mtn Area)	KCFD	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	Ongoing	Project	HMGP / BRIC , FMA	High	ps-WF-KC-234
ma-WF-KC-182	Wildfire	PPRO - Property Protection	Ongoing	2005	County of Kern	Kern River Valley Community Wildfire Protection Plan (formerly Hazardous Wildland Fuels Mitigation, Kern River Valley)	KCFD	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	Ongoing	Project	FP&S	High	ps-WF-KC-233
ma-WF-KC-286	Wildfire	PPRO - Property Protection	Ongoing	2020	County of Kern	Retrofit care facilities (adult care, child care, schools) with fire-resistant materials and or create defensible space around structures.	Kern County Fire	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	3-5 Years	Project	FP&S	High	ps-WF-KC-238, ps-WF-KC-239
ma-WF-KC-287	Wildfire	PPRO - Property Protection	Ongoing	2020	County of Kern	The Alta Sierra CWPP details mitigation needed to protect 7 structure protection groups throughout the WUI in Alta Sierra Community.	Kern County Fire	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	Ongoing	Project	FP&S	High	ps-WF-KC-232
ma-WF-KC-288	Wildfire	PPRO - Property Protection	Ongoing	2020	County of Kern	Myers Canyon CWPP Mitigation Projects	Kern County Fire	Medium - The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.	High - Project will provide an immediate reduction of risk exposure for life and property.	Ongoing	Project	FP&S	High	ps-WF-KC-235
ma-WF-KC-289	Wildfire	PPRO - Property Protection	Ongoing	2020	County of Kern	Make high visibility address markers available to all residents within the WUI	Kern County Fire	Low - The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.	High - Project will provide an immediate reduction of risk exposure for life and property.	1-3 Years	Project	FP&S	High	ps-WF-KC-237

Note: As a living document, project descriptions and actions in the tables above will be modified to reflect current conditions over time in MAST.



Section 6. Plan Implementation and Maintenance

It is important that this plan becomes a usable, used tool for all participating jurisdictions to ensure reductions in possible damage from a natural hazard event. This section discusses adopting, implementing, monitoring, evaluating, and updating the MJHMP, which should help ensure that the MJHMP remains relevant. This section describes incorporation of the MJHMP into existing planning mechanisms, and how the jurisdictions will continue to engage the public.

6.1 Plan Adoption

To comply with DMA 2000, the Kern County Board of Supervisors has officially adopted the Kern County Multi-Jurisdiction Hazard Mitigation Plan. The adoption of the MJHMP recognizes the County's commitment to reducing the impacts of natural hazards within the County. A copy of the MJHMP adoption resolution is included immediately following the Executive Summary.

6.2 Plan Implementation

Over time, implementation strategies for mitigation actions will become more detailed. MAST will be extremely useful to plan for updates to this MJHMP and to update individual mitigation actions as implemented or revised. In conjunction with the progress report processes, implementation strategy worksheets will be extremely useful as a plan of record tool for updates. Each implementation strategy worksheet provides individual steps and resources need to complete each priority mitigation action. The following are considerations for developing future implementation strategies:

- **Use processes that already exist.** Take advantage of tools and procedures identified in the capability assessment in Section 5.3. Using planning mechanisms already in use and familiar to participating jurisdictions will give the planning implementation phase a strong initial boost.
- **Updated work plans, policies, or procedure.** Incorporating hazard mitigation concepts and activities can help integrate the HMP into daily operations. These changes can include how major development projects and subdivision reviews are addressed in hazard prone areas or ensure that hazard mitigation concerns are considered in the approval of major capital improvement projects.
- **Job descriptions.** Working with department or agency heads to revise job descriptions of government staff to include mitigation-related duties, including designating a "mitigation lead" within a department, can further institutionalize hazard mitigation with little financial expenditure or programmatic overhaul.

6.2.1 Steering Committee

The Steering Committee oversaw the development of the plan and made recommendations on key elements of the plan, including the maintenance strategy. The Steering Committee recommended that an



oversight committee, referred to herein as the MJHMP Steering Committee, should have an active role in the plan maintenance strategy. Therefore, it is recommended that the MJHMP Steering Committee become involved in key elements of the plan maintenance strategy. The new MJHMP Steering Committee should strive to include representation from the planning partners, as well as other stakeholders in the planning area.

The new MJHMP Steering Committee will review the annual progress report and provide input to Kern County on possible improvements or action steps to be considered at the next update. Keeping this new MJHMP Steering Committee intact will also jump start future updates. Completion of a progress report is the responsibility of each participating jurisdiction, not the responsibility of the steering committee. It will simply be the MJHMP Steering Committee's role to review the progress report in an effort to identify issues needing to be addressed by future plans.

6.3 Monitoring, Evaluating and Updating the MJHMP

This section describes the schedule and process for monitoring, evaluating, and updating the MJHMP.

6.3.1 Schedule

Monitoring the progress of the mitigation actions will be ongoing throughout the five-year period between the adoption of the MJHMP and the next update effort. The newly-formed MJHMP Steering Committee will meet biannually to monitor the implementation of mitigation actions and develop updates as necessary.

The MJHMP will be updated every five years, as required by DMA 2000. The update process will begin at least one year prior to the expiration of the MJHMP. However, should a significant disaster occur within the County, the MJHMP Steering Committee will reconvene within 30 days of the disaster to review and update the MJHMP as appropriate. The Board of Supervisors will adopt written updates to the MJHMP as a DMA 2000 requirement.

6.3.2 Mitigation Action Support Tool (MAST) Updates

Hazard problem statements and mitigation activities will be updated through a web interface application developed specifically for Kern County, available on project website, (<http://mitigatehazards.com/county-of-kern/>), to ensure this MJHMP stays a living document.

MAST is a web-based interactive tool that enables multiple users to search, view, enter, and update mitigation actions, ideas or projects, and other information. MAST provides participating jurisdiction staff and plan reviewers (Cal OES/FEMA) access to valuable mitigation information that can be leveraged by future planning or other risk reduction efforts. Users can update the status of their mitigation projects throughout the planning lifecycle and this web-based tool will improve participating jurisdiction's ability to apply for FEMA's Hazard Mitigation Assistance (HMA) grant programs including the initial grant application processes through Cal OES.



6.3.3 Process

The MJHMP Steering Committee will coordinate with responsible agencies/organizations identified for each mitigation action. These responsible agencies/organizations will monitor and evaluate the progress made on the implementation of mitigation actions and report to the MJHMP Steering Committee on an annual basis. These responsible departments will assess the effectiveness of the mitigation actions and modify them as appropriate. MAST will assist mitigation project managers in reporting on the status and assessing the effectiveness of the mitigation actions. Most updates to the HMP will occur easily through MAST. Figure 6-1 displays MAST viewing details for problem statements and mitigation actions.

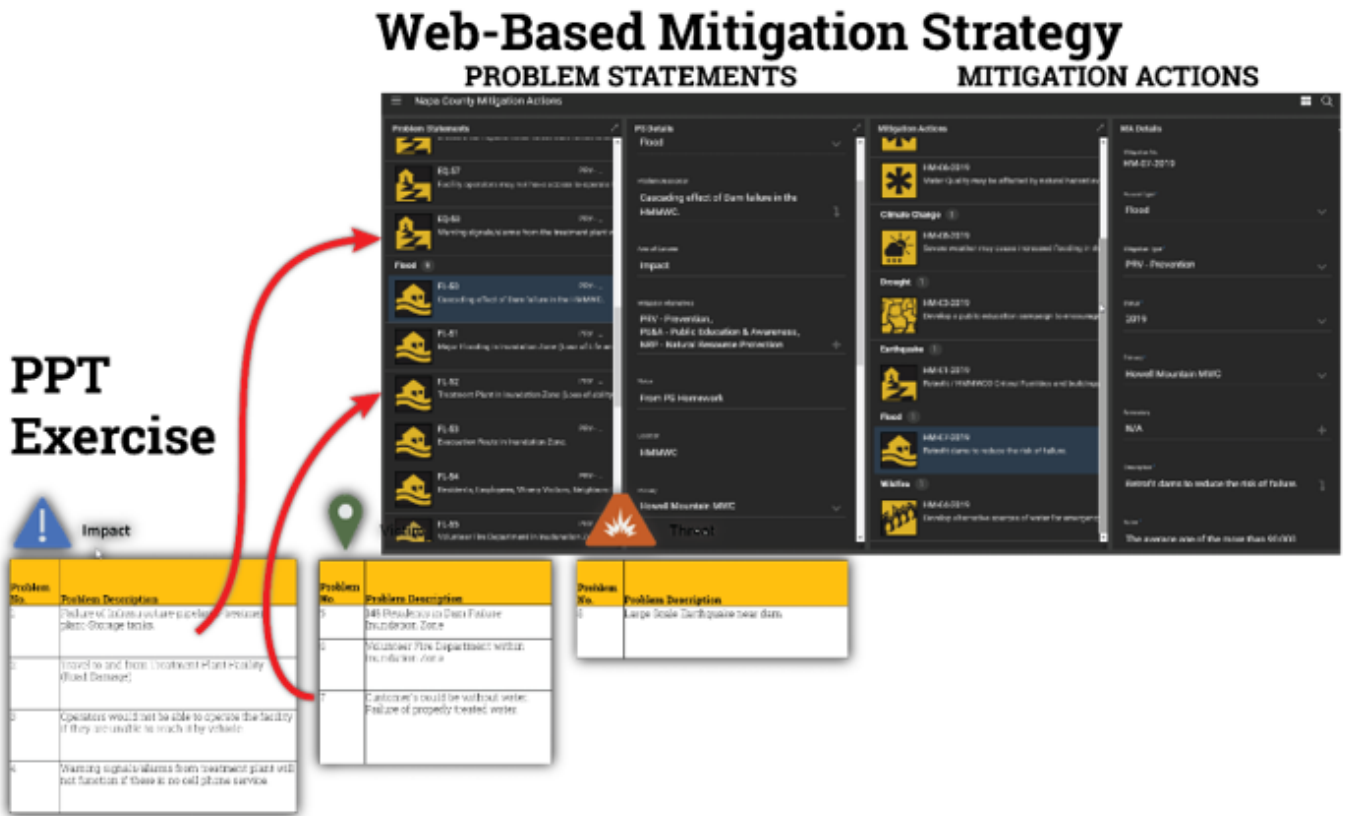


Figure 6-1 Diagram of MAST viewing details



Information from the mitigation leads within responsible departments will be used to monitor mitigation actions and annual evaluation of the MJHMP. The following questions will be considered in evaluating MJHMP effectiveness:

- Has the nature or magnitude of hazards affecting the County and other jurisdictions changed?
- Are there new hazards that have the potential to impact the County and other jurisdictions?
- Do the identified goals and actions address current and expected conditions?
- Have mitigation actions been implemented or completed?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are current resources adequate to implement the MJHMP?
- Should additional local resources be committed to address identified hazards?

Future updates to the MJHMP will account for any new hazard vulnerabilities, special circumstances, or new information that becomes available. Issues that arise or updates made during monitoring and evaluating the MJHMP will be incorporated into the next update of the MJHMP in 2024. The questions identified above would remain valid during the preparation of the 2025 update.

6.3.4 Continuing Public Involvement

During the five-year update cycle, County staff will involve the public through public workshops and meetings. Information on upcoming public events related to the MJHMP or solicitation for comments will be announced via newspapers, mailings, and on the County MJHMP website (<http://mitigatehazards.com/county-of-kern/>). An electronic copy of the current MJHMP document will be accessible through the County website. Hard copies will be placed in each of the open Kern County branch libraries. The MJHMP Planning Committee will, as much as practicable, incorporate the following concepts into its public outreach strategy to ensure continued public involvement in the MJHMP planning process:

- Work with public service clubs, i.e., the Bakersfield Breakfast Lions.
- Collaborate with faith-based organizations, i.e., Kern River Valley Christian Church, Discovery Church, Unitarian Universalist Fellowship of Kern County, Temple Beth El, etc.
- Create story ideas for media outlets, such as newspapers, local radio, and TV
- Distribute emails and postcards/mailers to County/ City/ Town residents about hazard mitigation updates
- Post meeting announcements at City Halls, community centers, coffee houses, grocery stores, etc.
- Educate and collaborate with insurance companies.
- Participate in other existing local community meeting places, i.e., Haggin Oaks Farmers' Market, Valley Farmers' Market, Brimhall Farmers' Market, etc.
- Distribute information through K-12 schools
- Continue to use the County website as a distribution point of hazard mitigation information



6.3.5 HMA Monitoring

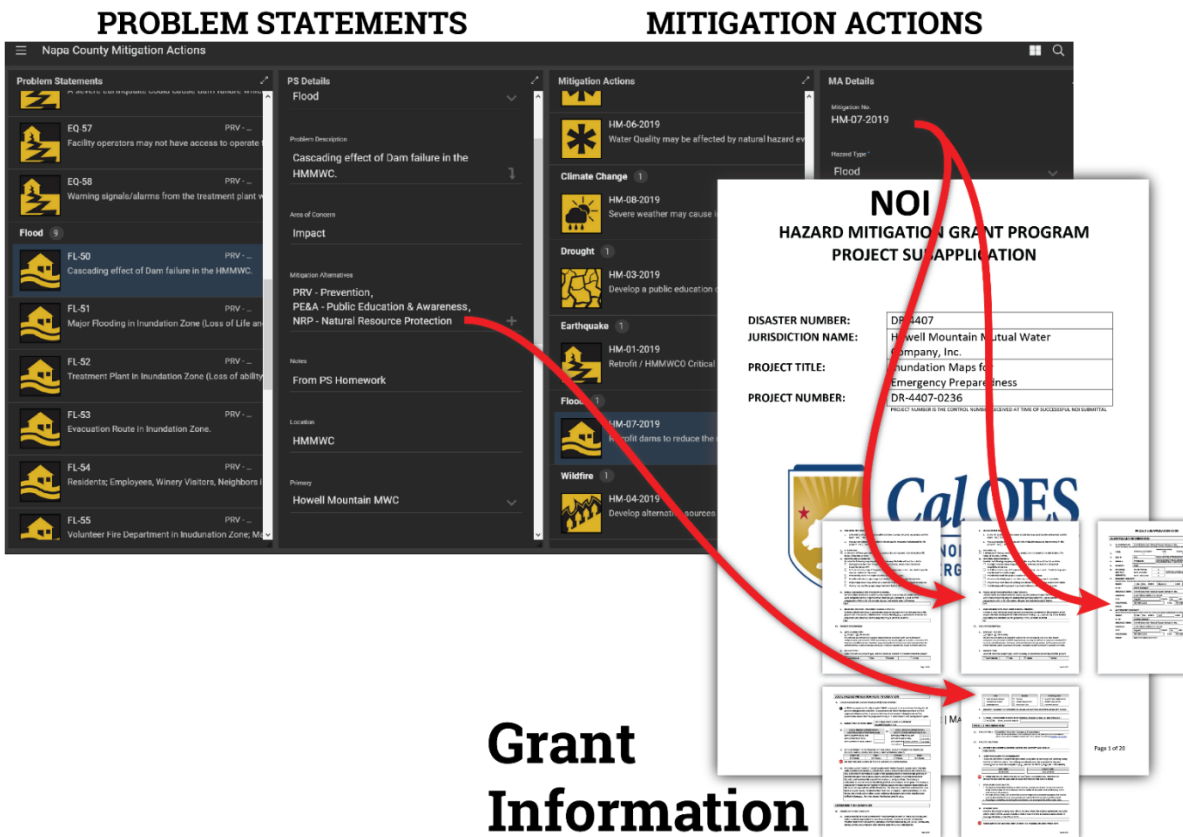
FEMA's Hazard Mitigation Assistance (HMA) Program is the catalyst that drives increased understanding and supports proactive community action to reduce losses from natural hazards. To support this vision, FEMA funds three grant programs under HMA. The three programs are the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) Program, and Building Resilient Infrastructure and Communities (BRIC) Program.⁸

- **HMGP** assists in implementing long-term hazard mitigation planning and projects following a Presidential major disaster declaration
- **BRIC** provides funds for hazard mitigation planning and projects on an annual basis
- **FMA** provides funds for planning and projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP) on an annual basis.

HMGP funding is generally 15% of the total amount of Federal assistance provided to a State, Territory, or federally-recognized tribe following a major disaster declaration. BRIC and FMA funding depends on the amount congress appropriates each year for those programs. The HMGP supports cost-effective post-disaster projects and is the longest running mitigation program among FEMA's three grant programs. A 2017 study by the National Institute of Building Sciences' (NIBS) Multihazard Mitigation Council have shown that every federal dollar spent on mitigation saves six dollars in response and recovery costs.

MAST will be extremely useful in applying for Cal OES funding. Plan maintenance will be primarily done through MAST. Figure 6-2 demonstrates how MAST information will translate into Cal OES NOIs and grant Sub application requests.

⁸ In August of 2020, the BRIC program replaced Pre-Disaster Mitigation (PDM) grant program.



Grant Information

Figure 6-2: MAST and Cal OES Grant Applications

Following a disaster, California Office of Emergency Services (Cal OES) and local Kern County officials, in a joint effort with FEMA, will perform Preliminary Damage Assessments (PDA) of the areas that sustained damage. Cal OES submits, through the FEMA Regional Office, the information collected along with a damage estimate to request a declaration from the President. A Presidential Major Disaster Declaration provides for the availability of HMGP funds at the request of a state’s Governor in eligible communities within a state, tribe, or territory. Figure 6-3 depicts this.

Figure 6-3 shows a timeline of how projects should be developed and administered by local government and FEMA under the HMGP program. HMGP grant recipients will have 36 months from the close of the application period to complete projects.



Figure 6-3: HMGP Timeline

For More information on HMGP project development process visit:
www.fema.gov/hazard-mitigation-grant-program-guide-state/local-governments

6.3.6 Incorporation into Other Planning Mechanisms

For the HMP to be successful, the recommendations and underlying principles of the MJHMP should be incorporated into community planning and development such as capital improvement budgeting, building and zoning codes, general plans and regional plans. Integration into a variety of departments at the County and participating jurisdiction level provides an opportunity to network, identify, and highlight mitigation activities and opportunities at all levels of government. It is also important to monitor funding opportunities which can be leveraged to implement the mitigation actions.

The Capabilities Assessment in Section 5.3 includes an evaluation of which planning processes might incorporate the HMP in the future. For example, the information from this MJHMP can be incorporated into:

- **Kern County and Municipal General Plans:** The MJHMP will provide information that can be incorporated into the Safety, Land Use, and Conservation Elements of General Plans for municipalities and the County as they are updated. Many jurisdictions will update the Safety Element of the General Plan to incorporate the MJHMP in compliance with AB 2140. Specific risk and vulnerability information from the Kern County MJHMP will assist to identify areas where development may be at risk to potential hazards, which in turn can be incorporated into General Plans. For example, jurisdictions may consider instituting a hazard overlay zone that requires additional scrutiny because of close proximity to certain hazards..
- **Building / Development Codes and Zoning Ordinances:** The MJHMP provides information to enable the County and municipalities to make decisions on appropriate building/development codes and ordinances. Appropriate building codes and ordinances can increase resilience against natural disasters. Some County and municipal mitigation actions directly recommend updates or new regulations as mitigation for hazard risks; those mitigation actions indicate priorities for regulatory updates in participating jurisdictions.



- **Community Wildfire Protection Plans (CWPP):** The MJHMP will provide information that can be incorporated into CWPPs and Strategic Fire Plan updates for areas within the County. The MJHMP likewise captured mitigation actions derived from CWPPs.
- **Water/ Flood Management Plans:** The MJHMP will provide information that can be included in updates of the Kern County Groundwater Monitoring Plan, Stormwater Management Plan, the Kern River Flood Management Plan, and other water/ flood management plans. While the process for updating these types of plans will vary by jurisdiction, the flood data developed for the MJHMP can be used in other mechanisms along with exposure and damage estimation information.
- **Planning Mechanisms for Special Districts.** Special districts and other participating jurisdictions likely have specific planning documents that will incorporate elements of the MJHMP as well. These will vary by jurisdiction and are explored more specifically in each Annex Capability Assessment. These include capital improvement plans, maintenance plans, emergency response or operations plans, and other relevant planning documents. Mitigation actions prioritize what plans may need to be updated to reflect this MJHMP information. Valuable information includes exposure and damage estimation and granular spatial footprint information from RAMP.

6.3.7 Planning Integration Processes

With adoption of this plan, Kern County and participating jurisdictions will be responsible for the plan implementation and maintenance. The County and the MJHMP Steering Committee will continue to:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to Kern County communities;
- Ensure hazard mitigation risk assessments and maps remain a consideration for safety decisionmakers;
- Report on plan progress and recommended changes; and
- Inform and solicit input from the public.



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Appendix A. Analysis Methodology

KERN COUNTY

MULTI-JURISDICTION

HAZARD MITIGATION PLAN



A GIS-based vulnerability assessment was conducted for each of the priority hazards identified by the Planning Committee. Several sources of data are necessary to conduct a vulnerability analysis. This appendix presents an outline of the data inputs, processing steps, and outputs used to create the vulnerability analysis results presented in the Hazard Mitigation Plan. The analysis methodology is presented first, followed by an overview of the analysis data.

A.1. Natural Hazard Exposure

The natural hazard exposure analysis (see C. Natural Hazard Exposure in Figure 7-4) is an inventory of population, parcels, critical facilities, and other assets within each natural hazard area. As shown in Figure 7-1, the presence of a structure inside a natural hazard area (the flood zone in this example) qualifies that structure as exposed to the natural hazard.



Figure 7-1: Hazard Exposure

The total counts of parcels, people, facilities, assets and the sum of values within the planning area which could be exposed to a hazard event is referred to as the “exposure” in this plan. A natural hazards overlay was developed to reflect the combination of many known natural hazard spatial footprints. The spatial overlay method enables summarization of building values, parcel counts, population exposure, and critical facility exposure within a hazard’s geographic extents (see C. Natural Hazard Exposure in Figure 7-4). The input data is used to evaluate exposure for earthquakes, landslides, flooding, dam inundation, wildfire, and subsidence.

A.1.1. Damage Estimation with Hazus

FEMA’s Hazus software was implemented to conduct a detailed loss estimation for flood and earthquake. Hazus is a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. Hazus uses Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disasters. For purposes of this planning effort, Hazus was used to generate damage estimations due to possible earthquakes and flooding. The



estimated damage and losses provided by the Hazus Software provides the ability to understand possible widescale damage to buildings and facilities (see D. Hazus Damage Estimations in Figure 7-4).

In the hypothetical geography shown in Figure 7-3, even though both structures are exposed to flooding, it is expected that the structure with a first floor height below the depth of flooding will receive significantly more damage than the structure with a first floor height above the expected water depth. Note that not all building data contains first floor height and first floor height is an example of the type of field utilized by Hazus in calculating damage estimates.

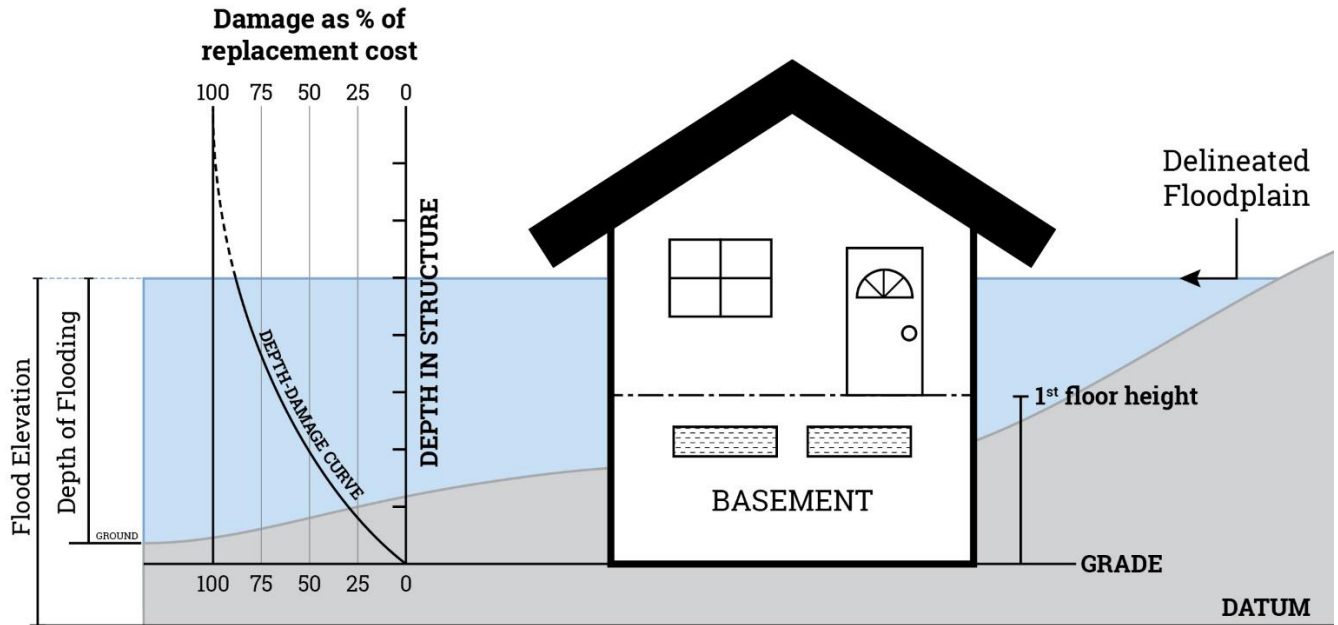


Figure 7-2: Flood Depth and Damage Curves



Figure 7-3: Hazus Damage Estimations

Hazus is a FEMA product with highly detailed documentation provided on the analysis steps and algorithms performed against the input data and associated scenarios in the process of obtaining loss estimates. The explanation in this appendix section is simplified. Refer to the full documentation and technical manuals from FEMA for greater explanation on Hazus specifics.



A.1.2. Distinguishing Results – Natural Hazard Exposure Analysis vs Hazus Results

Table and chart references throughout the hazard mitigation plan are explicitly called out for Hazus results as “Damage Estimates”. There are expected differences in the results between estimations of Natural Hazard overlays and detailed Hazus results. Snapshot tables and Natural Hazard Exposure sections do not contain Hazus estimates.

A.2. Analysis Data

A.2.1. Assets, Value, and Population

A.2.1.1. Parcels

County provided parcel geometry was joined with county assessor data. In some cases, there were multiple building attributed to a single parcel. Centroids were created to represent parcels at a single location. Where multiple building values were represented in the parcel roll, multiple overlapping centroids were created. In situations where building values were duplicated among overlapping points, the points were weighted for equal and accurate representation of the parcel totals. Building type, year built, number of stories, use code, area, and valuation data were all fields that were input into the analyses. Earthquake building design level attribution was based on year built and building code adaptation chronology. Improved residential parcels were chosen for the parcels dataset by a query of improvement value presence and residential construction type codes. The parcel inputs were supplemented with point geometries from the Asset Insurance Schedule.

A.2.1.2. Asset Insurance Schedules

County assessor data does not include detailed information for tax exempt structures, such as federal and local government buildings. This data was added to the GIS utilizing insurance schedule tables for the county. The Insurance Schedule data was consolidated with the county parcel dataset.

A.2.1.3. Population

Population estimates were derived from 2015 5-year Census American Community Survey (ACS) numbers as applied to census block groups and then processed through GIS modeling to break down the proportional population for smaller units of area.

A.2.1.4. Critical Infrastructure

Critical facilities and transportation/lifeline typically include hospitals, fire stations, police stations, storage of critical records, and similar facilities. These data came from a collection of sources including but not limited to: County GIS, County and local jurisdiction insurance data, CDSS, CEC, FCC, Hazus, USACE,



FEMA, and NPS. All data sources have a level of accuracy acceptable for planning purposes. See Table 7-2 for a list of Critical Infrastructure data used in the analysis.

A.2.1.5. Hazus Inputs

Hazus data inputs can be customized in several different ways including hazard scenario data and detailed building data. The GIS team conducted a Level 2 analysis utilizing user-defined buildings with refined building characteristic parameters as inputs for the damage estimation calculations (See A.2.1.1 and A.2.1.2). Both countywide building data and government assets were used as inputs in this level 2 analysis. The customized user defined building dataset allows for more accurate results for damage estimation based upon detailed building characteristics.

Note: FEMA's Hazus software utilizes different user defined building information inputs to develop loss estimates depending on the hazard module. The Hazus flood and earthquake modules use fragility curves based upon the user's definition of building characteristics including but not limited to:

- ***Area***
- ***Year Built***
- ***Construction Type***
- ***Number of Stories***
- ***EQ Design Level***
- ***Occupancy Type (Residential, Government, etc)***
- ***Building Values***

A default set of field values is utilized in lieu of missing values where required by Hazus.

A.2.2. Natural Hazard Data

A.2.2.1. Dam Inundation Zones

Dam inundation zone GIS data were provided by the County. These represent the estimated flood extent in the event of dam failure for individual dams.

A.2.2.2. Earthquake Shaking

The CGS 2 percent chance – 50-yr probability map was used as a qualitative guide in selecting an earthquake epicenter based shakemap scenario for analyses. The South San Andreas Mojave North M7.7 Scenario was chosen for use in Hazus for damage estimations.

A.2.2.3. Subsidence

Obtained from DWR vertical movement subsidence dataset. Classified from low-lift to high-subsidence.



A.2.2.4. Flood Zones

The input parameters for Hazus analysis of Flood exposure included depth grids created with the FEMA Flood Zone data mentioned in section A.2.2.4. 100-YR, 500-YR, and Areas Protected by Levee were all scenarios that were used to analyze the exposure to Hazus inputs as depicted in Figure 7-4.

A.2.2.5. Landslide Susceptibility

GIS layer with geographic boundaries defining the likelihood of deep-seated landslides. Underlying geology and slope angle are used in the creation of this layer by the California Geological Society. High landslide classes were chosen as summary classes for this plan.

A.2.2.6. Wildfire Hazard Severity

A proprietary DP+S composite layer derived from Wildland Urban Interfaces, California Public Utilities Commission fire threat areas and Fire Hazard Severity Zones. See Table 7-1.

Table 7-1 Wildfire Hazard Severity Classification

Hazard	Native Class	Description
Moderate	Tier 1	HHZs are zones in direct proximity to communities, roads, and utility lines, and are a direct threat to public safety.
	1	WUI is the potential treatment zone in which projects could be conducted to reduce wildland fire threats to people.
	1 / Moderate	See Cal Fire FHSZ (State Responsibility Area [SRA] & Local Responsibility Area [LRA])
High	Tier 2	Tier 2 fire-threat areas depict areas where there is an elevated risk (including likelihood and potential impacts on people and property) from utility associated wildfires.
	High	See Cal Fire FHSZ (State Responsibility Area [SRA] & Local Responsibility Area [LRA])
Very High	Tier 3	Tier 3 fire-threat areas depict areas where there is an extreme risk (including likelihood and potential impacts on people and property) from utility associated wildfires.
	Very High	Classification of a zone as moderate, high or very high fire hazard is based on a combination of how a fire will behave and the probability of flames and embers threatening buildings. Each area of the map gets a score for flame length, embers, and the likelihood of the area burning. Scores are then averaged over the zone areas. Final zone class (moderate, high and very high) is based on the averaged scores for the zone.

Source: Moderate - Cal Fire Tree Mortality, WUI, FHSZ; High - CPUC Utility Threat, Cal Fire FHSZ; Very High - High - CPUC Utility Threat, Cal Fire FHSZ (SRA & LRA)



A.2.3. Methodology Overview

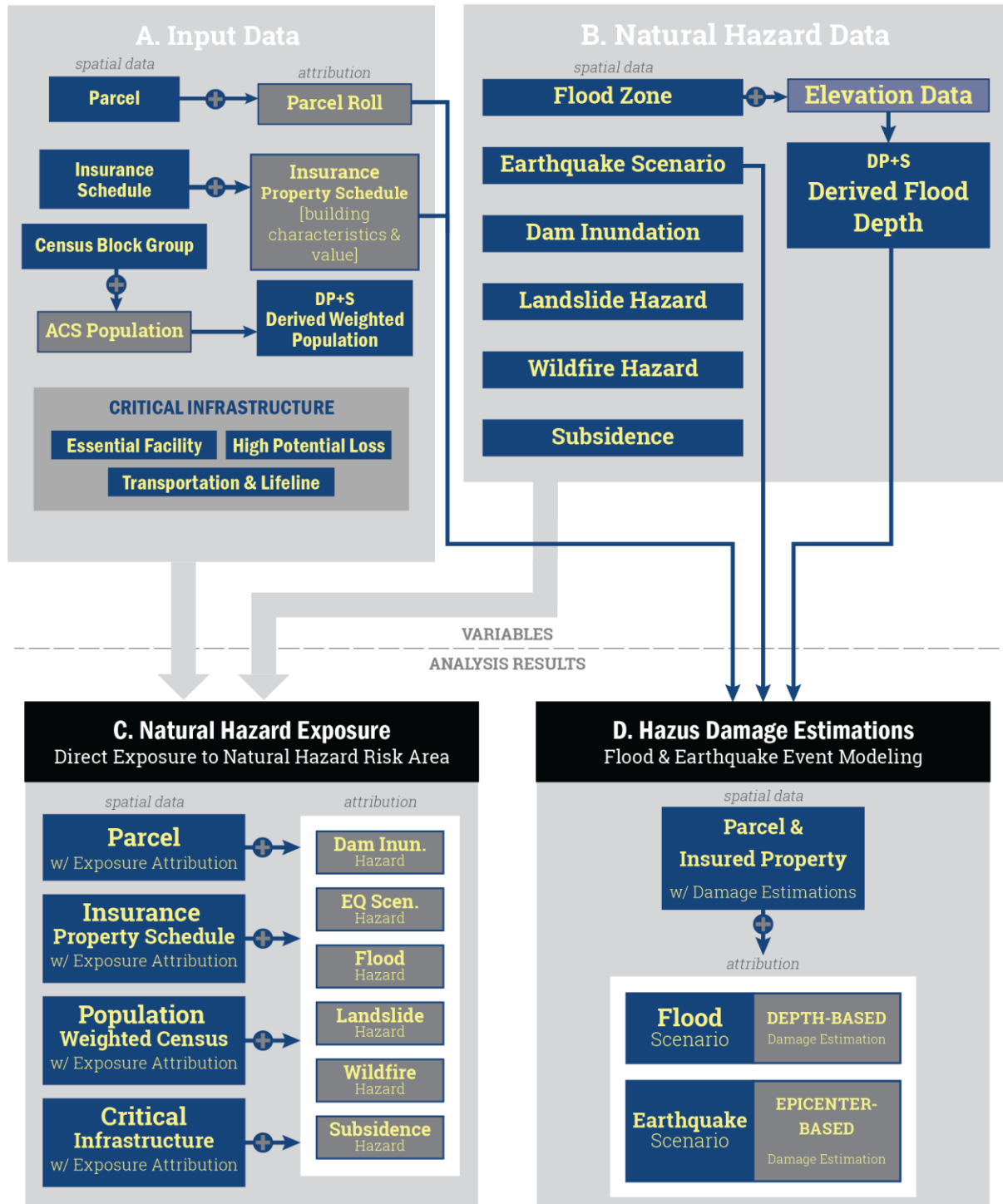


Figure 7-4: Data Analysis Methodology



A.2.4. Data Dictionary

Table 7-2: Data Dictionary

Dataset	Data Steward	Notes
Airport Districts	Local Jurisdiction	Received from local jurisdiction
Community Service Districts	Local Jurisdiction	Received from local jurisdiction
County	Census, Esri	County boundary and planning area extent
Incorporated Cities	Census, Local Jurisdiction	Received from local jurisdiction
Mosquito Abatement District	Local Jurisdiction	Received from local jurisdiction
Recreation And Park Districts	Local Jurisdiction	Received from local jurisdiction
Sanitation Districts	Local Jurisdiction	Received from local jurisdiction
School Districts	Local Jurisdiction	Received from local jurisdiction, consolidated with CDE School Ownership
Water Districts	USBR, Local Jurisdiction	Received from local jurisdiction
DEM	NED	1/3 Arc Second
Place	Census	TIGER dataset
Stream	Esri, NHD	Multiple stream basemap layers for various cartographic products
Water	Esri	Downloaded from Esri dataset
GNIS	USGS	Downloaded from USGS
Parcel Geometry	Local Assessors	Received from local jurisdiction
Parcel Roll	Local Assessors	Received from local assessor office
Building Roll	Local Assessors	Received from local assessor office
Emergency Operations Center	Local Jurisdiction	Geocoded from notes
Fire	Local Jurisdiction	Received from local jurisdiction
Hospital	Local Jurisdiction	Received from local jurisdiction
Police	Hazus, Local Jurisdiction	Reconciled police and sheriff with Hazus and Local data
Sheriff	Local Jurisdiction	Reconciled police and sheriff with Hazus and Local data
Adult Res Facility	CA Department of Social Services	Geocoded with ESRI streetfile
Child Care Center	CA Department of Social Services	Geocoded with ESRI streetfile
Family Child Care Home	CA Department of Social Services	Geocoded with ESRI streetfile
Foster Family Agency	CA Department of Social Services	Geocoded with ESRI streetfile
Home Care Organization	CA Department of Social Services	Geocoded with ESRI streetfile
Res Child Care	CA Department of Social Services	Geocoded with ESRI streetfile
Res Elder Care Facility	CA Department of Social Services	Geocoded with ESRI streetfile
Library	Local Jurisdiction	Received from local jurisdiction
Healthcare Facility	Local Jurisdiction	Received from local jurisdiction
Cooling Center	Local Jurisdiction	Received from local jurisdiction



Dataset	Data Steward	Notes
City Hall	Local Jurisdiction	Received from local jurisdiction
Dam	USACE NID	Have dam locations as provided in NID
Historic Building	NPS	National Park Service Data
Historic Site	NPS	National Park Service Data
Special Needs Facility	Local Jurisdiction	Received from local jurisdiction
School	Local Jurisdiction, CDE	Received from local jurisdiction, reconciled with CDE data
Potable Water Facility	Hazus	Hazus data is limited
Waste Water Facility	Hazus	Hazus data is limited
Airport	Hazus	Hazus data compared to other sources
Bridge	NBI	National Bridge Inventory data
Bus Facility	HAZUS	Hazus data was most complete for this asset
Levee	FEMA	From NFHL
Levee Flood Wall	USACE NLD	From NLD WFS
Levee Levee Centerline	USACE NLD	Do not appear to be any (Also the new WFS does not contain centerlines)
NG Facility	Local Jurisdiction	Open Data
NG Pipeline	Local Jurisdiction	Open Data
Oil Facility	Hazus	Hazus limited
Power Plant	Local Jurisdiction	Open Data
Railroad	Esri	From Esri dataset
Railroad Facility	Hazus	Hazus limited
Street	Esri	Esri for classifications
Substation	Local Jurisdiction	Open Data
Transmission Line	Local Jurisdiction	Open Data
Transmission Line Tower	CEC	have statewide dataset
Wind Turbine	Local Jurisdiction	Open Data
County Insured Assets (Insurance Schedule)	Insurance Provider	Reconcile with CI
Census Block	US Census Bureau	TIGER dataset
Census Block Group	US Census Bureau	TIGER dataset - appended pops
Census Tract	US Census Bureau	TIGER dataset
Awareness Zones	DWR	have statewide dataset
Dam Inundation	Cal OES	Dam inundation from Cal OES zones
EQ Probabilistic MI	USGS, CISON	Used to determine scenarios
EQ Scenarios 1-2	USGS, CISON	Scenarios as determined by Probabilistic composition
Flood Hazard	FEMA	NFHL
Subsidence	DWR	Classified from Low-Lift to High - Subsidence
Landslide Susceptibility	CGS	High class 8-10 from raw data
Wildfire Hazard Severity Zone	Cal Fire / CPUC	Proprietary composite layer for DPS including Cal Fire / CPUC data
200 Year Usace	USACE NLD	From National levee Dataset



Dataset	Data Steward	Notes
EQ Fault Zones	CGS	Used for overview, global source
Fire Perimeter Calfire	Cal Fire	Used for overview, global source
Fire Regime MFRI	USGS	Used for overview, global source
Qfaults	USGS	Used for overview, global source

A.2.5. Insured Assets Roll

Table 7-3 Insured Assets Roll

Asset	Building Count	Building Cost	Content Cost	Total Value
Administrative & Office	68	\$359,226,983	\$118,496,490	\$477,723,473
Admin	26	\$281,036,365	\$2,180,986	\$283,217,351
Building	12	\$22,885,686	\$1,192,850	\$24,078,536
Office	30	\$55,304,932	\$115,122,654	\$170,427,586
Equipment & Storage	51	\$57,237,326	\$5,149,231	\$62,386,557
Equipment	5	\$127,977	\$3,302,171	\$3,430,148
Shop	11	\$41,016,235	\$837,660	\$41,853,895
Storage	20	\$6,039,390	\$446,971	\$6,486,361
Warehouse	6	\$6,387,091	\$526,728	\$6,913,819
Yard	9	\$3,666,633	\$35,701	\$3,702,334
Other Assets	42	\$6,182,000	\$26,036,768	\$32,218,768
Leased	31	\$2,397,883	\$20,982,229	\$23,380,112
Misc	3	\$203,622	\$4,770,874	\$4,974,496
Relay	4	\$154,576	\$21,384	\$175,960
Vacant	4	\$3,425,919	\$262,281	\$3,688,200
Recreation	107	\$48,550,442	\$8,536,674	\$57,087,116
Golf Course	3	\$2,927,248	\$3,000	\$2,930,248
Museum	76	\$19,615,343	\$6,634,355	\$26,249,698
Park	9	\$10,016,887	\$1,409,407	\$11,426,294
Recreation	19	\$15,990,964	\$489,912	\$16,480,876
Services	121	\$438,023,808	\$56,317,933	\$494,341,741
Animal	1	\$528,591	\$1,000	\$529,591
Correctional	27	\$288,265,742	\$193,074	\$288,458,816
Fire	47	\$40,345,749	\$4,818,942	\$45,164,691
Health	5	\$23,063,560	\$3,690,348	\$26,753,908
Library	18	\$57,750,901	\$46,750,699	\$104,501,600
Sheriff	19	\$14,114,343	\$351,792	\$14,466,135
Veterans	1	\$672,868	\$184,792	\$857,660
Warehouse	1	\$1,038,472	\$50,193	\$1,088,665



Asset	Building Count	Building Cost	Content Cost	Total Value
Water	2	\$12,243,582	\$277,093	\$12,520,675
Transportation	10	\$52,335,358	\$5,564,962	\$57,900,320
Airport	9	\$52,334,358	\$5,563,962	\$57,898,320
Bus	1	\$1,000	\$1,000	\$2,000
Grand Total	399	\$961,555,917	\$220,102,058	\$1,181,657,975



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Appendix B. Process Documentation

KERN COUNTY

MULTI-JURISDICTION

HAZARD MITIGATION PLAN



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Appendix B

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Planning Committee Meeting Documentation

Appendix B.1



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Meeting Agenda

Kern Multi-Jurisdiction 2019-20 MJHMP Update Internal Kick-Off Meeting

Friday, April 12, 2019, 10:00 a.m. – 12:00 p.m.

- **Meeting Objectives**
 - SOW Review
 - Project Management
 - Communication Protocols
 - Website Review
 - Schedule
 - Expectations from Participating Jurisdictions
 - Requirements (DMA2000)
 - Cal OES / FEMA Review Tool Grey Areas
 - Tracking Participation
 - Anticipated Public Outreach (I.e. Canvassing, notices, review times)
 - Data Calls / Data Review

Kick-Off-Agenda 1



Kick-Off Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

April 12, 2019
10:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Joe West	NOR/CSA	jwest@norrecreation.org	392-2000	
Paul Anderson	North of the River Rec Park	panderson@norrecreation.org	661 392-2000	



Kick-Off Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

April 12, 2019
10:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Lorelei Oviatt	KC PLANNING	Lorelei@kerncounty.com	66-862-8866	
Jon Lifquist	Assessor/Recorder	lifquist@kerncounty.com	868-3315	
Erica Bain	KCFD	ebain@kerncountyfire.org	391-7068	
Kenny Seals	Kern High SD	Kenny_seals@kernhigh.org	827-3145	
Brianna Carner	City of Bakersfield	bcarner@bakersfieldcity.us	326-3745	



Kick-Off Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

April 12, 2019
10:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
ADRIAN	KERN COUNTY RISK MGMT.			
BRAD ARAGON	RISK MGMT.	baragon@kerncounty.com	661 703-0385	
Nick Cooper	Greenfield County Water District	greenfieldcountywater@gmail.com	661-301-3823	
Kevin Hamilton	Kern County Public Works	kevinh@kerncounty.com	661 862 5071	
BRANDEN Smith	KERN CO. FIRE	BSSMITH@KERNCOUNTYFIRE.ORG	661 330-0181	
Megan Person	CAO	mpersonm@kerncounty.com	661-808-3173 Cell- 703.1770	
Michael Heimer	Kern COG	mheimer@kerncog.org	635-2909	
Jeffrey Utter	Kern County ITS	utterj@kerncounty.com	868-0041	
Troy DePriest	TCCWD	tdepriest@tccwd.com	7603153349	
Chris Hut	City of Bakersfield	chhut@bakersfield.ca.us	661 326 3751	
Alexa Kolosky	Kern County Public Works	akolosky@kerncounty.com	862-5002	



Kick-Off Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

April 12, 2019
10:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Ben Raymond	KERN COG	BRAYMOND@KERN-COG.ORG	635-2911	
Robert Voyles	City of Bakersfield	rvoyles@bakersfieldtx.us	661-326-3105	
Michael Dillenbeck	Public Works County of Kern	dillenbeckm@kerncounty.com	661-8628913	
David Witt	Fire Dep	dwitt@kerncountyfire.org		



Kick-Off Photo



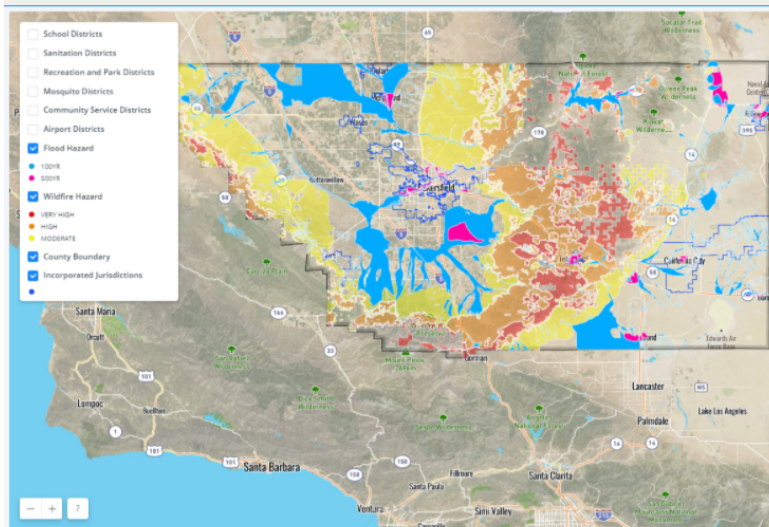
KERN MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE

Planning Committee Meeting #1 Reminder

Thursday, May 23rd, 2019

9:00 a.m. to 12:00 p.m.

Kern County/Operational Area Emergency Operations Center (EOC)
2601 Panorama Drive, Building B
Bakersfield



You are cordially invited to attend the first meeting in the process to update the Kern Multi-Jurisdiction Hazard Mitigation Plan!

May 2019

23

We are beginning the process to update the Kern Multi-Jurisdiction Hazard Mitigation Plan (MJHMP). The purpose of the Kern MJHMP is to reduce property losses and avoid injury and/or casualties resulting from natural disasters. Hazard mitigation is the use of sustained, long-term actions to reduce loss of life, personal injury, and property damage that can result from a disaster. The Plan is multi-jurisdictional in that 63 different Kern County jurisdictions participate in it. As we develop this plan a stakeholder group is necessary and **Your insight is needed (and, for those representing participating jurisdictions, required)** to meet FEMA's strict guidelines for active participation. Under FEMA's guidelines, active participation is a prerequisite for Plan approval.



Meeting 1 MailChimp Notification



Meeting Agenda:

Kern County Multi-Jurisdiction Hazard Mitigation Plan 2019-20 Update
Planning Committee Meeting #1
Thursday, May 23rd, 2019, 9:00 a.m. – 12:00 p.m.

Meeting Objectives

- **Welcome and Introductions**
- **Mitigation Planning Defined**
- **Expectations from Participating Jurisdictions**
- **Planning Process Review**
 - Project Schedule
 - Website Review
- **FEMA Hazard Mitigation Program**
- **2012 Mitigation Plan Review**
- **What has Changed?**
- **Outreach**
- **Next Steps**

Project Website: mitigatehazards.com

Project Webpage: <http://mitigatehazards.com/county-of-kern/>

Website Password: **Kern2020**

Polling Website for Smartphone: www.pollev.com/dynamicplanning



PC #1 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

May 23rd, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
SHANIE DENTON	KERN COUNTY RANGERS	Dentons@kerncounty.com	(661) 381-3189	18 mi
Bindiana Bishop	City of Wasco	bibishop@ci.wasco.ca.us	(661) 396-2601	60 miles
Regina Houchin	Buttont Willow Co. Water Co.	regcenter@bak.rr.com	661-764-5273	60 miles
Justin Gagnon	Los Padres National Forest	justin.gagnon@usda.gov	661-289-0042	
Jana Marquez	KDWD	jmarq@kernadelt.org	661 831/4056	30
John Frando	Bakersfield Fire	jfrando@bakersfieldfire.us	661 326 3652	
JEFF FAHSS	Kern County Public Health	FAHSS@kerncounty.ca.us	661-868 5216	3
Rafael Molina	Cal Water	rmolina@calwater.com	661-827 7606	
Monica Tennant	KCWA	mtennant@kcwa.com	661-634-1419	
David Goodell	Cal City Fire	dgoodell@calcityfire.us	760 643 8981	
JOE ROJAS	CITY OF DEAM	jrojas@ci.adelam.org	661 720-2281	56
Heather Sauer	City of Ridgecrest	hsauer@ridgecrest-ca.gov	760 499 5063	



PC #1 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

May 23rd, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Brianna Carner	City of Bakersfield City Managers office	bcarner@bakersfieldcity.us	661-326-3745	
Jewest	NOR REC & Park Dist	Jwest@NORRECREATION.ca	661-392-2000	
Paul Anderson	NOR REC & Park Dist	panderson@norrecreation.org	661-392-2000	
Phillip Jimenez	Shafter Recreafin & Park Dist	pjimenez@shafterrec.com	661 746-3303	



PC #1 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

May 23rd, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
TERRI MEJORADO	CAL OES	terri.mejorado@caloes.ca.gov	559-259-9890	230
BRACH SMITH	ROSAMOND CSD	BSMITH@ROSAMOND.CSD.COM	661-256-3411	140
MARY PERITO	CALWATER	mperito@calwater.com	661-979-7341	
Kenny Seals	KHSD Kern High	kenny_seals@kernhigh.org	661-827-3100	



Name	Agency	Email	Phone	Miles
Skye Grass	Kern-Tulare Water Dist	Skys@kern-tulare.com	661-327-3132	25



PC #1 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

May 23rd, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Kevin Hamilton	Kern County Public Works	kwham@kerncounty.com	661 862 5071	7 miles
Fernando Ceja	Arvin-Edison Water Storage District	fceja@arvwd.org	661-444-3296	48 20 miles
Todd Noble	Edison School District	tnoble@edison.k12.ca.us	661-340-1150	
Susan Wells	Golden Hills CSD	gm@ghcsd.com	661-822-3064	
Jackie Villa	Lost Hills USD	Javilla@losthills.k12.ca.us	661 797 3003	90
STEVEN SAWTILLAN	Buttawillow Union School District	ssawtillan@buttawillow-school.com	661-770-7180	64
Brandon Welton	Mojave Air & Space Port FIRE	brandon@mojave-airport.com	(661) 221-1138	101
Jeremy Kosick	California City Fire	JKosick JKosick@calcityfire.us	760 808 7546	
Dayne Yancey	PME CERT	kyandly@calheva.org	661-242-1094	130
TOM YANCEY	PME CERT	Tom1YANCEY@GMAIR.com	242-1094	130
Krzysz Gilbert	Tehachas Unified School Dist.	kgilbert@teh.k12.ca.us	661-822-2120	70



PC #1 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

May 23rd, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
JEFF JACKET	CITY OF WASCO	JETACKET@CI.WASCO.CA.US	661-758-7273	40
Wayne Jackson	City of Wasco	Wajackson@ci.wasco.ca.us	661-779-0341	40
Brian Thoburn	So. Cal. Edison	brian.thoburn@sce.com	559-685-3240	160
MARK LEWIS	K.C. LIBRARY	LEWISMA@KERNCOUNTY.CA.GOV	661-868-0710	12
Nick Cullen	KCCAS	collenn@kerncounty.com	661-229-7453	16
Troy Depriest	TCCWD	tdepriest@tccwd.com	760-353-349	60
JOE GRUBBS	KCCD	joseph.grubbs@kccd.edu	(661)336-5019	12
Vargas Humberto	Pond school	hvargas@pond.k12.ca.us	661-778-9764	78
Alexander Lee	CITY of McFarland	alex@mcfarlandcity.org alex@mcfarlandcity.org	661-792-3011	50



PC #1 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

May 23rd, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Isela Medina	semihropic WSP	imedina@semihropic.com	661-758-5113	60mi
Kaler Ayala	Kern CAO	ayalake@kerncounty.com	661-868-3164	10 mi
David Aranda	Stallion Springs CSD	daranda300@gmail.com	661-300-1231	75mi
Kristen Dand	PG&E	kfd5@pge.com	601-398-5989	60 mi.
Bruce White	WSRPD	Bruce@wsrpd.com	661-577-2084	80 miles
PAT OSTLY	North of River SD	postly@norsd.com	661.399.6411	15 m.
Ed Graynolds	KC Dept of Agriculture & Measurement	edgraynolds@kerncounty.com graynolds@kerncounty.com	661-868-6300	10mi
Katie Allen	PG&E	kmaed@pge.com	661-865-8637	60mi.



PC #1 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

May 23rd, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Dennis McNameam	KC Planning	mcnamand@kerncounty.com	(661) 862-8624	
Taylor Schoene	KC planning	schoenet@kerncounty.com	(661) 862-5017	
Jeanie Taylor	KCFD CERT BVCSD DPAC	jtaylor@kerncounty.org JeanieTaylor@gmail.com	805-603-7424	~100
Brian Marsh	Univ of CA Cooperative Extension KC Farm & Home	bmarsh@ucanr.edu	661-868-6210	
Alexa Kolosky	Kern county Public Works	akolosky@kerncounty.com	661-862-5002	



PC #1 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

May 23rd, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Tim Ruiz	East Niles CSD	truize@eastniles.csd.org	661-871-2011	8
Jason Nordine	Kern Sanitation Authority & Ford City Tuff Heights	nordinej@kerncounty.com	661-868-8287	14
Jon Yasin	CAL WATER	yyasin@calwater.com	760-549-3032	90
Frank Trotta	CAI Water	FTrotta@CAIwater.com	(760)549-3268	90
Wayne Claassen	Shafter	wclaassen@shafter.com	(661)746-5002	20



PC #1 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

May 23rd, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
ZACK BITTLE	KERN SHERIFF	BITTLEZ@KERNSHERIFF.ORG	661-392-6092 378-5014	7
Megan Person	Kern CAO	PERSONM@KERNCOUNTY.COM	661-868-3173	
KEVIN KIMMEL	KERN SHERIFF	KIMMEL@KERNSHERIFF.ORG	661-369-0564 245-3440	
Stuart Patteson	City of Bakersfield	spatteso@bakersfieldcity.us	661-326-3575	
STEVE WILLIAMS	KCSO	WILLIAMS@KERNSHERIFF.ORG	661-204-3390	



PC #1 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

May 23rd, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Yuriana Torres	Richland SD	ytorres@rsdshafter.org	746-8621	46
STEVE DOE	DWR	STEVE.DOE@WATER.CA.GOV	559 230-3348	230
Craig Jones	Taft	CJones@CityofTaft.org	661 763-1222	81
Damon McMinns	Taft Pd	dmcminn CityofTaft.org	661-763-3101	81
ERIS LAWRENCE	Westside Water District water authority	Lawrence@hwad.org	661-666-1095	10



PC #1 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

May 23rd, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
* K. Schulman	PMC POA	gm@pmc-poa.com	733 3597	
Christian Buenrostro	USBR	cbuenrostro@usbr.gov	559-200-0361	
Greg Van Nullem	Assessor	vanullem@kerncounty.com	x83390	
* Ed Rieth	Retired Fire Paradise CA	ed@beyondthe-call-of-duty.com	(530) 864-5595	



PC Meeting 1 Photo 1



Kern Multi-Jurisdiction Hazard Mitigation Plan- Planning Committee Meeting #1

The video player shows a presentation slide titled "Grant Program Background" with the following text:

- Hazard Mitigation Grant Program (HMGP) authorized under Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 USC
- The Disaster Mitigation Act (DMA) 2000 provides the legal basis for FEMA mitigation grant and requires local governments as a condition of mitigation grant assistance, 42 USC
- FEMA requires an update every 5 years to maintain grant eligibility!
- This plan is Kern County's update to the 2013 plan (adopted March 2014).
- Current Planning Effort funded by Hazard Mitigation Grant Program (HMGP) DR-4333

The slide also features the HMA (Hazard Mitigation Assistance) logo.

10 watching now

Up next: Grow Your Sales by Developing Intranet users: RJ Grimschaw

PC Meeting 1 Photo 2



PC Meeting 1 Photo 3



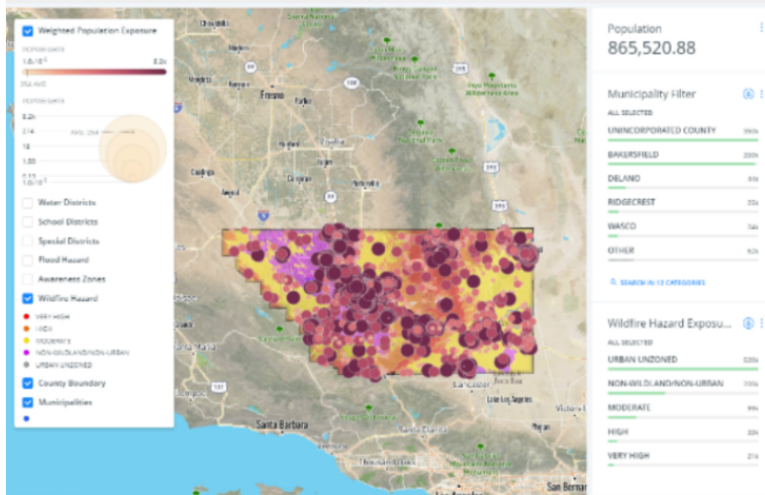
KERN MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE

Planning Committee Meeting #2 Reminder

Thursday, July 18th, 2019

9:00 a.m. to 12:00 p.m.

Kern County/Operational Area Emergency Operations Center (EOC)
2601 Panorama Drive, Building B
Bakersfield



You are cordially invited to attend the second meeting in the process to update the Kern Multi-Jurisdiction Hazard Mitigation Plan!

July 2019
18

We are continuing the process to update the Kern Multi-Jurisdiction Hazard Mitigation Plan (MJHMP). The purpose of the Kern MJHMP is to reduce property losses and avoid injury and/or casualties resulting from natural disasters. Hazard mitigation is the use of sustained, long-term actions to reduce the loss of life, personal injury, and property damage that can result from a disaster. The Plan is multi-jurisdictional in that 63 different Kern County jurisdictions participate in it. As we develop this plan a stakeholder group is necessary and **your insight is needed (and, for those representing participating jurisdictions, required)** to meet FEMA's strict guidelines for active participation. Under FEMA's guidelines, active participation is a prerequisite for Plan approval.



Meeting 2 MailChimp Notification



Meeting Agenda

Kern County Multi-Jurisdiction Hazard Mitigation Plan 2019-20 Update

Planning Committee Meeting #2

Thursday, July 18th, 2019, 9:00 a.m. – 12:00 p.m.

Meeting Objectives

- Welcome and Introductions
- Meeting #1 Recap
- Planning Team Development
- Risk Assessment Data Review
- IRAMP Tool Review
- IRAMP Exercises
- Next Steps

Project Website: mitigatehazards.com

Project Webpage: <http://mitigatehazards.com/county-of-kern/>

Website Password: **Kern2020**

Polling Website for Smartphone: www.pollev.com/dynamicplanning

NOTES:



Kern County Hazard Risk Assessment Criteria Planning Committee Meeting #2, July 18th, 2019

Probability

What is the likelihood of a hazard event occurring in a given year?

Unlikely - less than 1% annual probability

Possible - between 1 & 10% annual probability

Likely - between 10 & 100% annual probability

Highly likely - 100% annual probability

Impact

In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?

Minor - very few injuries, if any. Only minor property damage & minimal disruption on quality of life. Temporary shutdown of critical facilities.

Limited - minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.

Critical - multiple deaths/injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one week.

Catastrophic - high number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.



PC #2 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

July 18th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Joe Rojas	City of Delano	rojasa@cityofdelano.org	661.720-2281	60
Jana Manguez	KTDWD	Jana@Kornadeth.org	661 834 4657	



PC #2 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

July 18th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Chris HICKERNELL	FRONT WATER Authority	chickernell@frontwater.org	559-562-6305 559-631-3628 CELL	
Harrison Favereaux	Lost Hills Union Sch.	hfavere@losthills.k12.ca.us	661 797-3008 cell 661 496-2167	
Micah Clark	Arvin-Edison WSD	mclark@aedwsd.org	661-854-5573	42
Leif Mathiesen	Bureau of Land Management	lmathies@blm.gov	661-391-6055	22



PC #2 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

July 18th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Nick Cooper	G-CWD	Greenfieldcountywater@gmail.com	661 301-3823	
Jebby Utter	ITS	UTTER@KERN-COUNTY.COM	661-868-0041	
BRANDON SMITH	KCRFD	Bsmith@KERNCOUNTYCALIFORNIA.COM	661-330-0181	⊙
Isela Medina	SWSD	imedina@semihropic.com	661-758-5113	60
Kevin Albertson	BFD	Kalbertson@Bakersfieldfire.us	661 496-0410	
FAT OSTLY	NORSO	Postly@norsd.com	661.379.6411	
Brian Marsh	UCCE	bmarsh@ucan.edu	661 868 6210	



PC #2 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

July 18th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Jenny Hanzel	Kern High	Jenny.hanzel@kernhigh.org		
Megan Person	CAO			
Genel Hodges	JFMAD			
VANESSA YAP	KTWD			
Glenn Imke	Panama - Buena Vista USD			
KURBY FLEMING	KC CAO-GS	FLEMINGK	661-868-3049	
Dennis McNamee	KC Planning			



PC #2 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

July 18th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
KARIN Shufman	Pmc POA	gm@pmc-poa.com	242 3788	
Phyllis Throckmorton	Pmc POA	phyllis.throckmorton@gmail.com	805-509-5542	
PEGGY HOYT-VOECKEL	pmcPOA	peggyhv1@gmail.com	818-383-7928	



PC #2 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

July 18th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
BRAH SMITH	ROSAMONDO C.S.D.	BSMITH@ ROSAMONDCSD.COM	661 256 3411	140
Zachary wells	Kern County Fire	zwells@kerncounty fire.org	661-330-0498	300



PC #2 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

July 18th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Wayne Clausen	City of Shafter	wclausen@shafter.com	661-746-5002	24
MONICA Tennant	Kern Co. Water Agency	mtennant@kcwa.com	(local) 634-1419	~10
DAMON McMinn	CITY OF TAFT	dmcminn@cityoftaft.org	(661) 763-3105	90
Lynn Boyer	CITY OF TAFT	lboyer@cityoftaft.org	(661) 763-1222	90
Tim Ruiz	East Niles CSD	truiz@eastniles.csd.org	661-871-2011	5
JOSE DE LEON	KCFD	JDELEONG@KERNCOUNTYFIRE.ORG	661 330 0502	10



PC #2 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

July 18th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Brandon Welton	Mojave AIRE SPACEPORT FIRE	bvandon@mojav airport.com	(661) 824-5240 (261) 221-1130	196
Amardo Gonzalez	Shafter Rec 3 Park District	mando.gonco97 @gmail.com	(661)-746-3303 (661)-900-2386	22 miles
Susan Wells	GHCSO	gm@ghcsd.com	661-822-3064	
ERIC Ziegler	CITY OF MARIPOSA	robison-com @bak.rr.com	(661) 269-8219	?
Ryan Nunneley	NOZ Municipal Water District	rnunneley@ oildalewater.com	(661) 399-5516	—



PC #2 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

July 18th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Curtis Hilliker	Tehachapi Cummings County Water District	chilliker@TCWWD.com	661 565 8224	80 miles
Tim Astlock	BVWSD	tim@bvhd.com	661-746-2901	—
JEFF KARRIS	Public Health		661-301-9465	2 miles
Rob Boyle	City of Bakersfield	rboyle@bakersfield.ca.gov	661-304-2939	5
Regina Hauchin	Buttowanwillow			25
Taylor Schoene	KC Planning Nat. Resources	taylor.schoene@ag	661-862-5017	5
Jeanie Taylor	KCFD CERT	Jetaylor@KernCountyFire.org	661-301 7111	
Paul Brewer	KC GS	brewer.p@KernCounty	661-342-8334	
Eric McDanis	Wheeler Ridge Water District	emcdanis@wrmwd.com emcdanis	661 527 6688	70
ED Korman	KERN H.S. DISTRICT POLICE	ed-korman@KERNHIGH.ORG	661 827-3219	18
STEVEN SANTILLAN	Buttowanwillow Union School District	Ssantillan@ButtowanwillowSchool.com	661 770-7180	25



PC #2 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

July 18th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Kevin Hamblett	Kern County Public Works	kevinh@kerncounty.com	661 862 5071	10 miles
Adrian Nave	Kern County Public Works	NaveA@kerncounty.com	661 - 862-8611	10 miles
JEFF TACKETT	CITY OF WASCO	JTACKETT@CI.WASCO.CA.US	661-750-7273	30
BRAD ARAGON	Kern County Risk Mgmt	braragon@kerncounty.com	661/703-0385	12
Heather Spruice	CITY OF RIDGECREST	hspruice@ridgcrest-ca.gov	760 499 5063	
JOSHUA VILLA	CITY OF RIDGECREST POLICE DEPT	JVILLA@RIDGECREST-CA.GOV	509 455 4000	
Paul ANDERSON	NOR REC & PARK	Panderson@norrecreation.org	661-619 0481	16
Kelly Patterson	Temecula Unified SD	kpatterson@teh.k12.ca.us kpattd@teh.k12.ca.us	661-822-2220	60
JOE WEST	NOR REC & Parks	JWest@norrecreation.org	661-392-2000	10
Adrianna Kessler	DHS	Kessler@kern.dhs.gov	661-7373	10
Laura Bova	CITY OF PATTA	lbova@cityofpatterson.org	763 1222	90



PC #2 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

July 18th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Binidiana Bishop	City of Wasco	bbishop@ci.wasco.ca.us	661-390-2601	60
Wayne Jackson	City of Wasco	wjackson@ci.wasco.ca.us	661-779-0341	60



PC #2 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

July 18th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Ed Gordon	STATION SPRINGS ESD	E.GORDON@SSCSD@GMAIL.COM	818 288 0366	90
MARK LEWIS	LIBRARY	LEWISMA@KERNCOUNTY.CA.GOV	661 868 0740	15



PC Meeting 2 Photo 1



PC Meeting 2 Photo 2



KERN MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE

Planning Committee Meeting #3 Reminder

Thursday, Sept 19th, 2019

9:00 a.m. to 12:00 p.m.

Kern County/Operational Area Emergency Operations Center (EOC)

2601 Panorama Drive, Building B

Bakersfield



You are cordially invited to attend the third meeting in the process to update the Kern Multi-Jurisdiction Hazard Mitigation Plan!

We are continuing the process to update the Kern Multi-Jurisdiction Hazard Mitigation Plan (MJHMP). The purpose of the Kern MJHMP is to reduce property losses and avoid injury and/or casualties resulting from natural disasters. Hazard mitigation is the use of sustained, long-term actions to reduce the loss of life, personal injury, and property damage that can result from a disaster. The Plan is multi-jurisdictional in that 63 different Kern County jurisdictions participate in it. As we develop this plan a stakeholder group is necessary and **your insight is needed (and, for those representing participating jurisdictions, required)** to meet FEMA's strict guidelines for active participation. Under FEMA's guidelines, active participation is a prerequisite for Plan approval.

Sept 2019

19



Meeting 3 MailChimp Notification



Meeting Agenda

Kern County Multi-Jurisdiction Hazard Mitigation Plan 2019-20 Update

Planning Committee Meeting #3

Thursday, September 19th, 2019, 9:00 a.m. – 12:00 p.m.

Meeting Objectives:

- Welcome and Introductions
- Planning Process Recap
- Pinpointing your Vulnerabilities
- Developing a Nexus to HMA Funding
- Next Steps

Project Website: mitigatehazards.com

Project Webpage: mitigatehazards.com/county-of-kern/

Website Password: **Kern2020**

Polling Website for Smartphone: pollev.com/dynamicplanning

NOTES:



PC #3 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

September 19th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Taylor Schoone	KC Planning + Natural Resources Dept.	schoone.taylor@kerncounty.com	661-802-5017	
Glenn Imke	Panama - Buena Vista	gimke@pbvUSD.net	661-699-0172	
MARK LEWIS	LIBRARY	LEWIS.MARK@KERNCOUNTY.COM	661-868-0710	
Monica Tennant	KCUA	mtennant@kcu.com	661-634-1419	10
Ed Gordon	Station Springs CSD	egordon@sscsd.com	818-288-0365	75
Ivan Newberry	VILLAGO SCHOOL DISTRICT		661-337-9610	



PC #3 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

September 19th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
JEFF TACKETT	CITY OF WASCO	JTACKETT@CITY.WASCO.CA.US	661-758-7273	60 miles
MARIS COUNTS	K.C.C.D. B.C.	CCOUNTS@BAKERSFIELD.CALSTATE.EDU	661-337-0852	0.5 miles
Regina Henderson	BWCWS	Rhenderson@wepcenteraccounting.com	661-764-5273	30 miles
MARCOS RODRIGUEZ	BSSD	MRODRIGUEZ@BCSD.COM	661-631-5833	16 miles
BINDIANA BISHOP	wasco	bbishop@ci.wasco.ca.us	661-390-2401	60 miles
Vickie Hight	Wasco Recreation	Vhight@wrpd.net	661-758-3081	40 miles



PC #3 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

September 19th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
BRACH SMITH	R.C.S.D.	BSMITH@rosamondo CSD.COM	661 256 3411	140
Suzanne Forest	City of Shafter	Sforest@ Shafter.com	661 744 0572	∅
Rob Voyle	City of Bakersfield	rvoyles@ bakersfieldcity.us	661-304-2939	



PC #3 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

September 19th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Ed Rieth	AD Retired Pme	Ed @ BeyondTheCallOfDuty.com	530-864-5595	140
Ryan Nunneley	North of the River Municipal Water District	ryan@oildalewater.com	661-399-5516	
Jana Marquez	Kern Delta Water Dist.	Jana@KernDelta.org	661-834-4656	



PC #3 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

September 19th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Brandon Welton	Mojave Airt Space Port	brandon@Mojaveairport.com	(661) 221-1130	196
Benny Wofford	KERN HIGH School Dist.	benny_wofford@kernhigh.org	(661) 827-3428	
Patrick Blake	Kern High	pblake@Kernhigh.org	661-827-3427	
Zachary Wells	Kern Count Fire Dept	zwells@Kerncountyfire.org	661-330 0498	300
Bethann Smith	KCSD	BSSmith " "	661 330-0181	



PC #3 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

September 19th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Alexis	ACSD Arvin Community Services @ Arvin		(661) 852-1226	
Keith Crainey	Mojave USD	keithcrainey@ mojave.k12.ca.us	(661) 824-4001	
Paul Anderson	North of the River Rec+Park	panderson@ norrecreation.org	661-669- 0481	15 miles



PC #3 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

September 19th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Yuriana Torres	Richland School District	ytorres@rsdshatter.org	746-8621	46
ZACK BITTLE	KCSO	BITTLEZ@KCSHERIFF.ORG	378-5014	19



PC #3 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

September 19th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Frank Trotta	Cal Water	FTrotta@CalWater.com	(760)549-3268	100
Michael Mata	Kern Co Probation	michaelmata@kernprobation.org	(661)2055823	10
Kris Lawrence	WDWA	klawrence@hwd.org	661-666-1095	10
Darin Heard	Ag-DA	heard@kerncounty.com		10



PC #3 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

September 19th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Harrison Faveaux	Cost Hills Sch. Dist	hafaver@costhills.k12.ca.us	(661) 797-3008	
Curtis Hilliker	Tehachapi-Cummings County Water District	chilliker@tcwd.com	(661) 565 8224	80
Heather Spurlock	City of Ridgecrest	hspurlock@ridgecrest-ca.gov	760 497 5063	
David Orr	Cal-City F.D.	dorr@calcityfire.us	(661) 476-7170	
Matt Carter	Delano Fire Units	mcarter@djuhsd.org	661-543-9033	60
Adrian Madrona	DJHS D	amadrona@djuhsd.org	661-720-4104	60
PATRICK OSTLY	NORS D	Postly@norsd.com	661.399.4111	20
AMY ROCHA	NRCS	AMY.ROCHA@USDA.GOV		
EMMANUEL GONZALEZ	NRCS	EMMANUEL.GONZALEZ@INDIOSA@USDA.GOV		
JOE ROSAS	CITY OF DELANO	jrosas@cityofdelano.org	661 720 2150	60



PC #3 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

September 19th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Nick Cooper	G-CWD	greenfieldcountywater@gmail.com	661-3013823	
Bill Malinen	Bear Valley CSD	bmalinen@bvcsd.org	661-821-4428	
Brianna Carner	City of Bakersfield	bcarnere@bakersfieldutrci.com	661-326-3745	
John Frando	Bakersfield Fire	jfrando@bakersfieldfire.us	661-326-3652	
Melissa Kielpinski	Tehachapi Unified S.D.	mkielpinske@tec.k12.ca.us	661-822-2102	
Greg VanMullen	Assessor/ITS	vanmullen@kerncounty.com	661-301-2259	
Rafael Molina	Cal Water	rmolina@calwater.com	661-827-7606	
Jose Pena	Cal water service	jpena@calwater.com	661-837-7273	
Tommy Aguilera	Taft City School District	taguilera@taftcity.org	661-213-6817	
Isela Medina	Semitropic WSD	imedina@semitropic.com	661-758-5113	



PC #3 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

September 19th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Jeanne Taylor	Kern Co Fire CERT	jtaylor@KernCountyFire.org	661-391-7108	
Chris Hickmell	FRONT WATER AUTHORITY	chickmell@frontwater.org	559-562-8305	
Brid Aragon	Kern County Risk Mgmt	baragon@kerncounty.com	703-0385	
JEFF FARIS	EMS			
Bryan Auld	Sierra Suds USP Ridgecrest	bauld@ssuds.org	760-608-7174	
Laura Robison	City of Moraga	lrobison@cityofmoraga.com	661-747-3175	
Kelly Patterson	TUSD	KPatterson@ten.k12.ca.us	661-822-2120	
Kirk Wilbert	TUSD	kwilbert@ten.k12.ca.us	661-822-2120	
STEVEN SANTILLAN	Buttows Willow School	Ssantillan@ButtowsWillowSchool.com	(661) 770-7180	70 miles
KIMBERLY FULTON	COUNTY OF KERN-GS	KFULTON@KERN-GS	661-969-3049	



PC #3 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

September 19th, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Fernando Ceja	Arvin-Edison Water Storage District	fceja@acwsd.org	661-444-3246	36 mi
Armando Gonzalez	Shafter Rec & Park District	mandogonco97@gmail.com	661-900-2386	22 miles
Curtis Hilliker	Tehachapi-Cummings County Water District	chilliker@tcwd.com	661-565-8224	80 m



PC Meeting 3 Photo 1



PC Meeting 3 Photo 2



PC Meeting 3 Photo 3



KERN MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE

Planning Committee Meeting #4 (Final Committee Meeting)

Thursday, November 14th, 2019

9:00 a.m. to 12:00 p.m.

Kern County/Operational Area Emergency Operations Center (EOC)

2601 Panorama Drive, Building B

Bakersfield



You are cordially invited to attend the final Planning Committee meeting in the process to update the Kern Multi-Jurisdiction Hazard Mitigation Plan!

We are continuing the process to update the Kern Multi-Jurisdiction Hazard Mitigation Plan (MJHMP). As we update this plan, this stakeholder group is necessary and **your insight is needed (and, for those representing participating jurisdictions, required)** to meet FEMA's strict guidelines for active participation. Under FEMA's guidelines, active participation is a prerequisite for Plan approval.

Nov 2019

14



Meeting 4 MailChimp Notification



Meeting Agenda

Kern County Multi-Jurisdiction Hazard Mitigation Plan 2019-20 Update

Planning Committee Meeting #4

Thursday, November 14th, 2019, 9:00 a.m. – 12:00 p.m.

Meeting Objectives:

- Welcome and Introductions
- Planning Process Recap
- Mitigation Alternatives
- Hazard Areas of Concern
- Goals & Objectives Review (previous plan)
- Updating the mitigation strategy

Project Website: mitigatehazards.com

Project Webpage: mitigatehazards.com/county-of-kern/

Website Password: **Kern2020**

Polling Website for Smartphone: pollev.com/dynamicplanning

NOTES:



PC#4 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

November 14, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Kelly Patterson	TENTACAPI Unified SD	kpatterson@ten-k12.ca.us	661 822 2120	70
Jeffrey Utter	Kern County	utterj@kerncounty.com	661-868-0041	—
Brianne Carter	City of Bakersfield	bcarter@bakersfield.gov	661-324-3745	—
Susan Wells	GHCSO	gm@ghcsd.com	661-822-3064	?
Chris Hickoxell	Ferant Water Authority	chickoxell@ferantwater.org	559-562-6305	—
JEFF BELL	STARTER PD	JBELL@STARTER.COM	661-746-8914	—
Patrick Alster	Kern High School Dist.	palster@kernhigh.org	661-827-3627	—
Dennis McNamee	Kern Co. Planning	dennismc@kerncounty.com	(661) 862-8624	—
JEFF FARISS	EMS Public Health	FARISS@kerncounty.com	661-868-5214	—
Paul Anderson	North of the River Rec & Park District	panderson@norrecreation.org	661-619-0481	—
Mark Dawson	Arvin-Edison Water Storage Dist	mdawson@aedwsd.org	(661) 477-9405	—



PC#4 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

November 14, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Laura Robison	City of Maricopa	lrobison-com@bak.rr.com	661-769-8279	80 miles
Monica Tennant	KCWA	mtennant@kcwa.com	661-634-1419	12 miles
Ed Gordon	STATION SPRINGS CSD	E.GORDON.SSCSD@GMAIL.COM	818-288-0365	76 miles
JOE ROJAS	CITY OF DELANO	jrojas@cityofdelano.org	661.720.2287	60
Alexander	CITY of McFarland	alee@mcfarlandcity.org	661-792-3091	60



PC#4 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

November 14, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
James Langille	KHSD	James.Langille@kernhigh.org	661-827-3174	
Peggy Joy Becker	Pine Mt. Club	PEGGYHVZ@gmail.com	818-383-7928	
Phyllis Throckmorton	Pine Mountain Club	Phyllis.Throckmorton@gmail.com	205-509-5542	
KARIN Shulman	AMEPOA	gm@amepoa.com	661-242-3788	
CHRIS COUNTS	KERN Community College DISTRICT	CCOUNTS@BakersfieldCollege.edu	661-337-0852	10
Yuriana Torres	Richland SD	Ytorres@rsdshafter.org	746-8621	
BRANDON SMITH	KCFD	BSSMITH@Kern.com	330-0181	



PC#4 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

November 14, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
MARK LEWIS	LIBRARY	LEWISMAE@KERNCOUNTY.CA.GOV	661-868-0710	8
JEFF TACKETT	CITY OF WASCO		661-979-5615	60
Ryan Nunneley	Noir Municipal Water District	rnunneley@oildalewater.com	661-399-5516	10
Biridiana Bishop	City of Wasco	bbishop@ci.wasco.ca.us	661-390-2601	60
Wayne Jackson	City of Wasco	wjackson@ci.wasco.ca.us	661-779-0341	60
JOSE DE LEON	KCFD	JDELEON@KERNCOUNTYFIRE.ORG	661-330-0503	8



PC#4 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

November 14, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Roger Sanchez	KERN High School Dist.	roger_sanchez@kernhigh.org	327-3119	
Jeremy Kosick	Cal City	JKosick@CalCityFire.us	762-808-7546	
John Frando	Bakersfield Fire	Jfrando@bakersfieldfire.us	661-326-3652	
Jeremy Amr	Agency Adult Services	amrj@kerncounty.com	805-1034	
KIMBLEY FLEMING	KERN COUNTY GE	FLEMINGK	805-3049	
Ival Alvarado	Vandenberg S.D.		337-9610	
Tommy Aguilera	Taft City Schol		661-767-1521	



PC#4 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

November 14, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Robert Voyles	City of Bakersfield	r.voyles@bakersfieldcity.us	661-326-3105	8
Adrian Nava	KSA & FCTHSD	Nava.A@kerncounty.ca	661-862-8898	10
Kevin Hamilton	Kern County Public Works	KevinH@kerncounty.com	661-862-5071	10



PC#4 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

November 14, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Curtis Hilliker	Tehachapi Cummings County Water District	chilliker@ tccwd.com	661 565 8224	70m
Jeanni Taylor	KCFD	jetaylor@ kerncountyfire.com	661 301-7111	15m
Michael Mata	KC Probation	michaelmata@ kernprobation.org	661. 204-3822	/



PC#4 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

November 14, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Tim Ruiz	East Wiles CSD	truizeeastwiles.csd.org	661-871-2011	
PAT OSTLY	North of River Sanitary District	Postly@norisd.com	661-399-6411	25
David Orr	Cal-City FID	dorrr@calcityfire.us	661-476-7170	70
JOHN LUNA	SEMITROPIC W.S.D.	MLUNA@SEMITROPIC.com	661-809-2840	80



PC#4 Meeting

Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

November 14, 2019
9:00 AM

NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
MARCOS RODRIGUEZ	BCSD	MRODRIGUEZ@BCSD.COM	631-5883	10.0
Wayne Clausen	City of Shafter	wclausen@shafter	746-5002	10
Nick Cooper	GCWD	Greenfieldcountywater@gmail.com	301-3823	10.



PC#4 Meeting

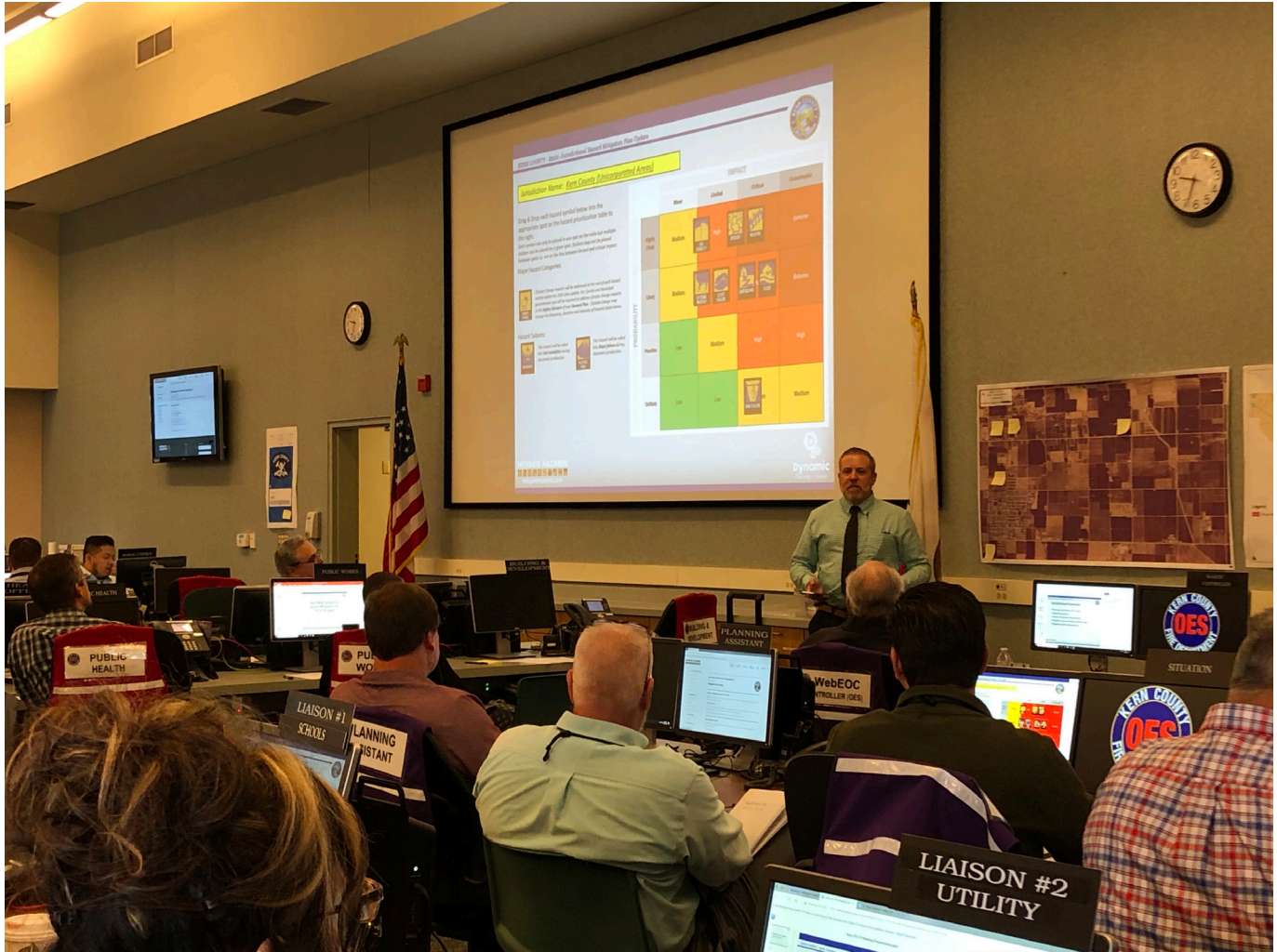
Kern County/Operational Area Emergency Operations Center
2601 Panorama Drive, Building B Bakersfield

November 14, 2019
9:00 AM

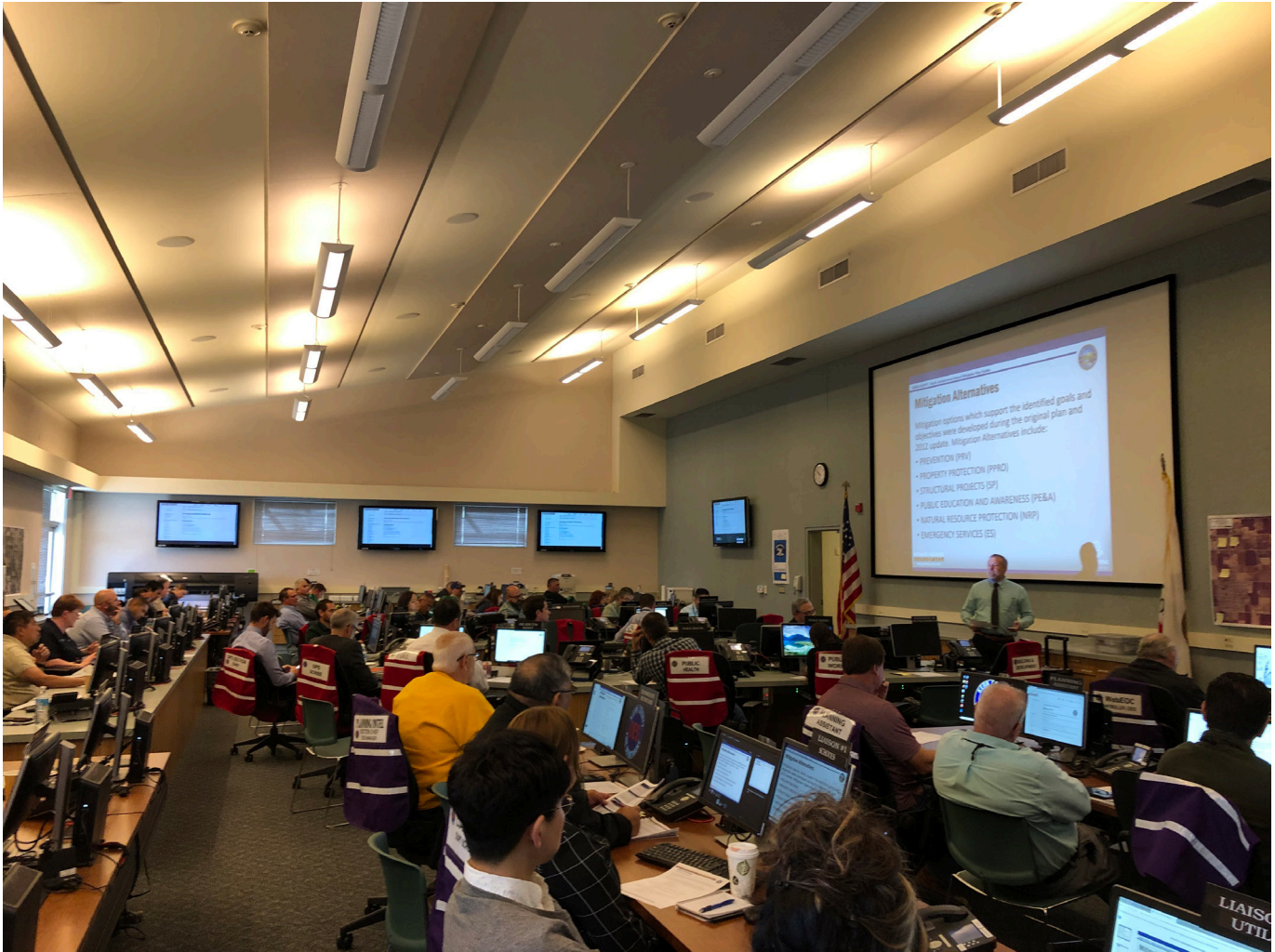
NAME	AGENCY	EMAIL	PHONE	ROUND-TRIP MILEAGE
Jared Bradford	Planning Department	BradfordJ@kerncounty.com	661-862-8653	10 miles
Keith Gainey	Mojave USD	keithgainey@mojave.k12.ca.us	661-810-3251	80 miles
Raul Barraza Jr	Arvin CSD	rbarraza@arvincsd.com	661 205-6432	40



PC Meeting 4 Photo 1



PC Meeting 4 Photo 2



PC Meeting 4 Photo 3



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Public Notice & Press Release Documentation

Appendix B.2



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TAKE THE SURVEY AND ENTER TO



WIN

a \$150 voucher
toward **STIHL**® product
from your local True Value

MITIGATE HAZARDS



WWW.MITIGATEHAZARDS.COM

AND OTHER PRIZES!

Help the County become informed about local hazards and take a survey!!! Be entered to win a hazard mitigation home use item!

GRAND PRIZE
\$150 voucher
toward **STIHL® product**

OTHER PRIZES INCLUDE

- Tree Loppers
- Fire Extinguishers
- & other hazard mitigation tools!!!



SURVEY LINK



www.mitigatehazards.com/county-of-kern/get-involved/

survey graphic



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Survey & Results Documentation

Appendix B.3



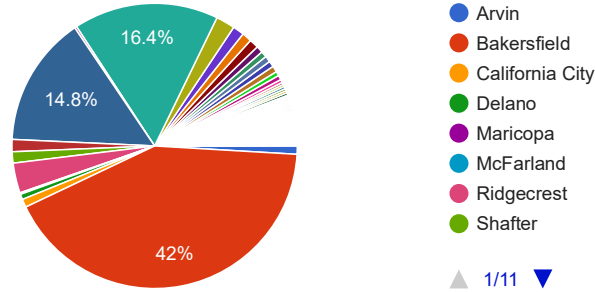
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Please fill out all the survey questions completely. Thanks for your participation.

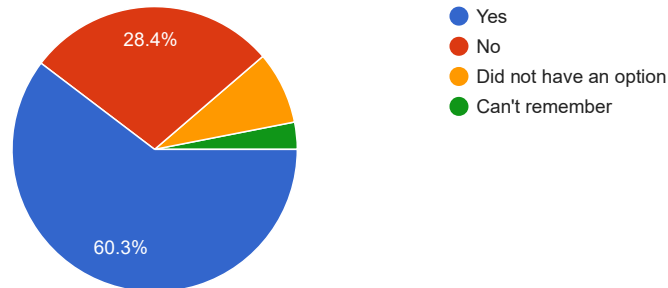
I live in...

1,169 responses



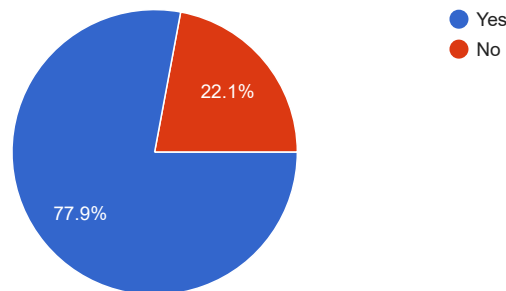
Did you consider the risks of naturally occurring hazards when you chose your home?

1,169 responses



Do you believe your property is at risk from a natural hazard disaster?

1,169 responses

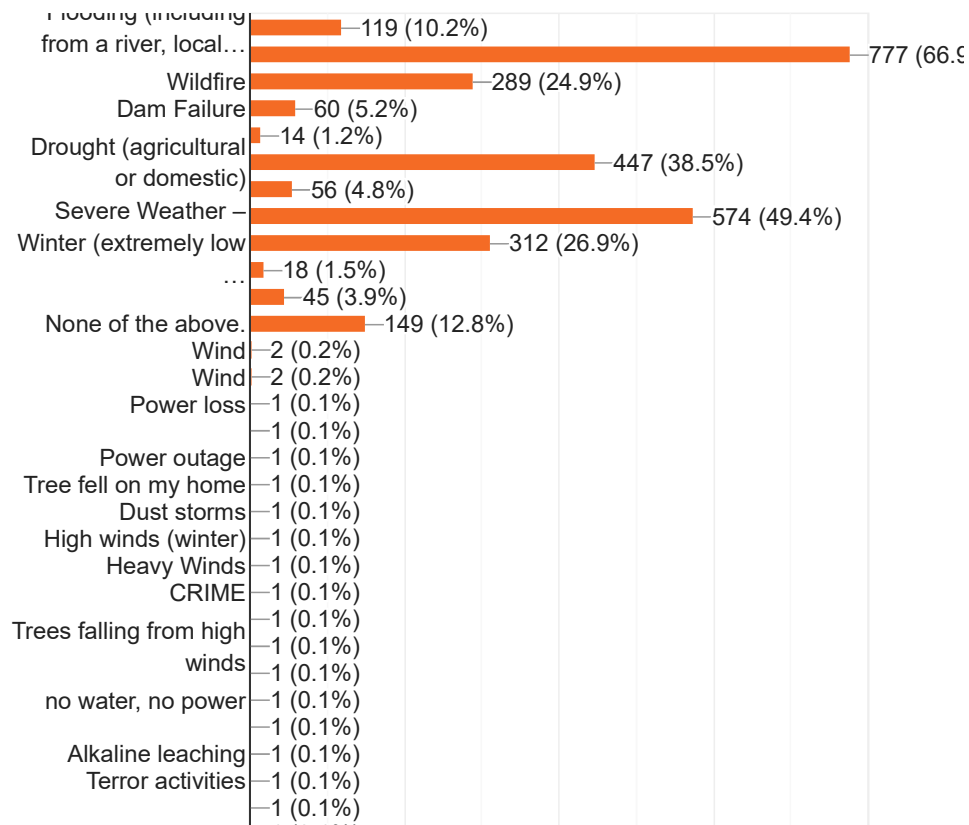


Kern Survey Results Summary



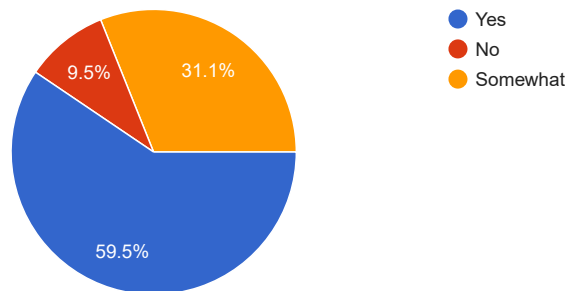
Which of the following types of hazard events have you or someone in your household experienced at your current home?

1,162 responses



Do you think you are well informed about the dangers of natural hazards in this area?

1,169 responses

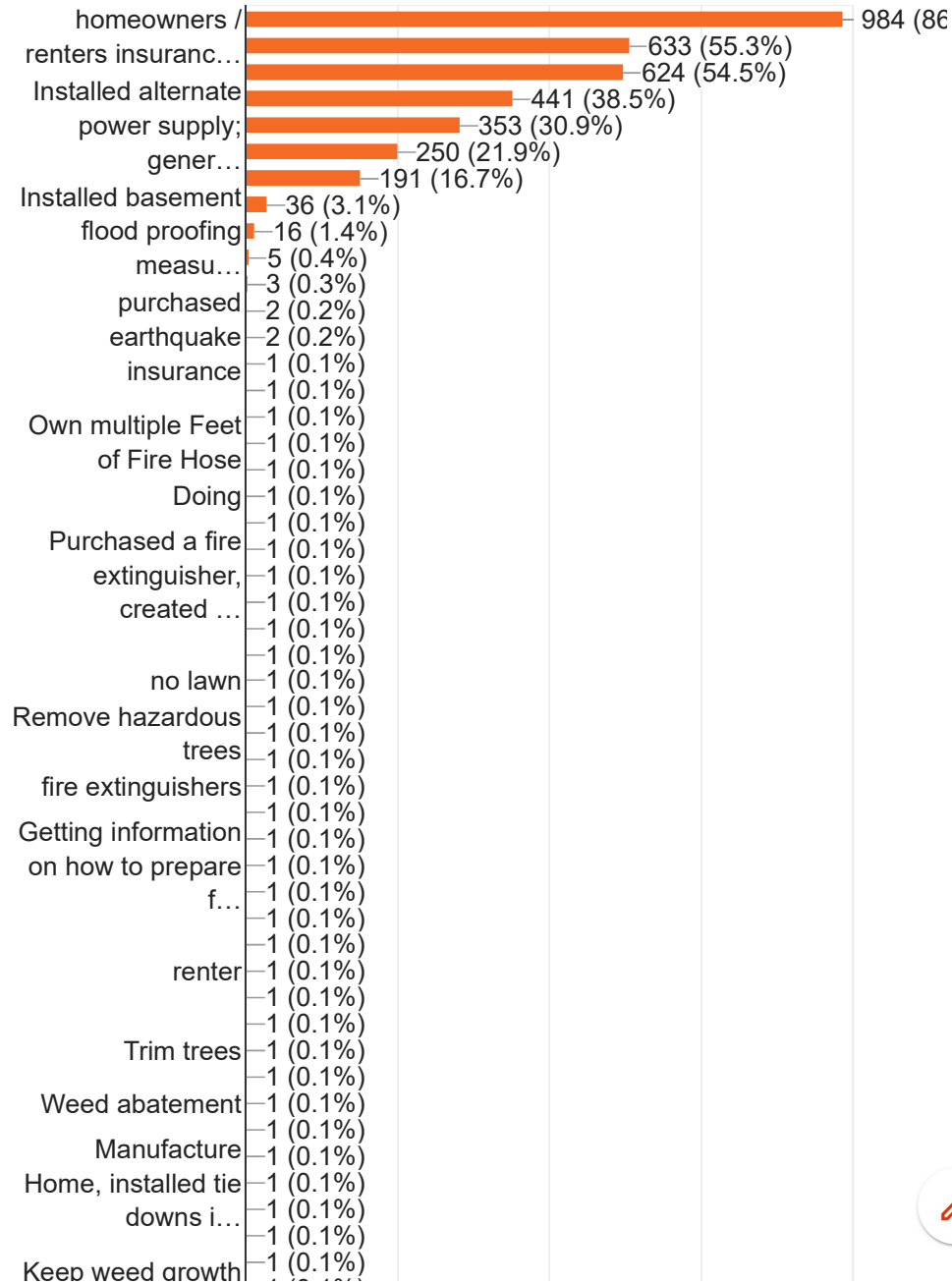


Kern Survey Results Summary



What actions have you taken for your home or property that increase personal safety or reduce risk and injury from potential disasters? (please check all that apply)

1,144 responses

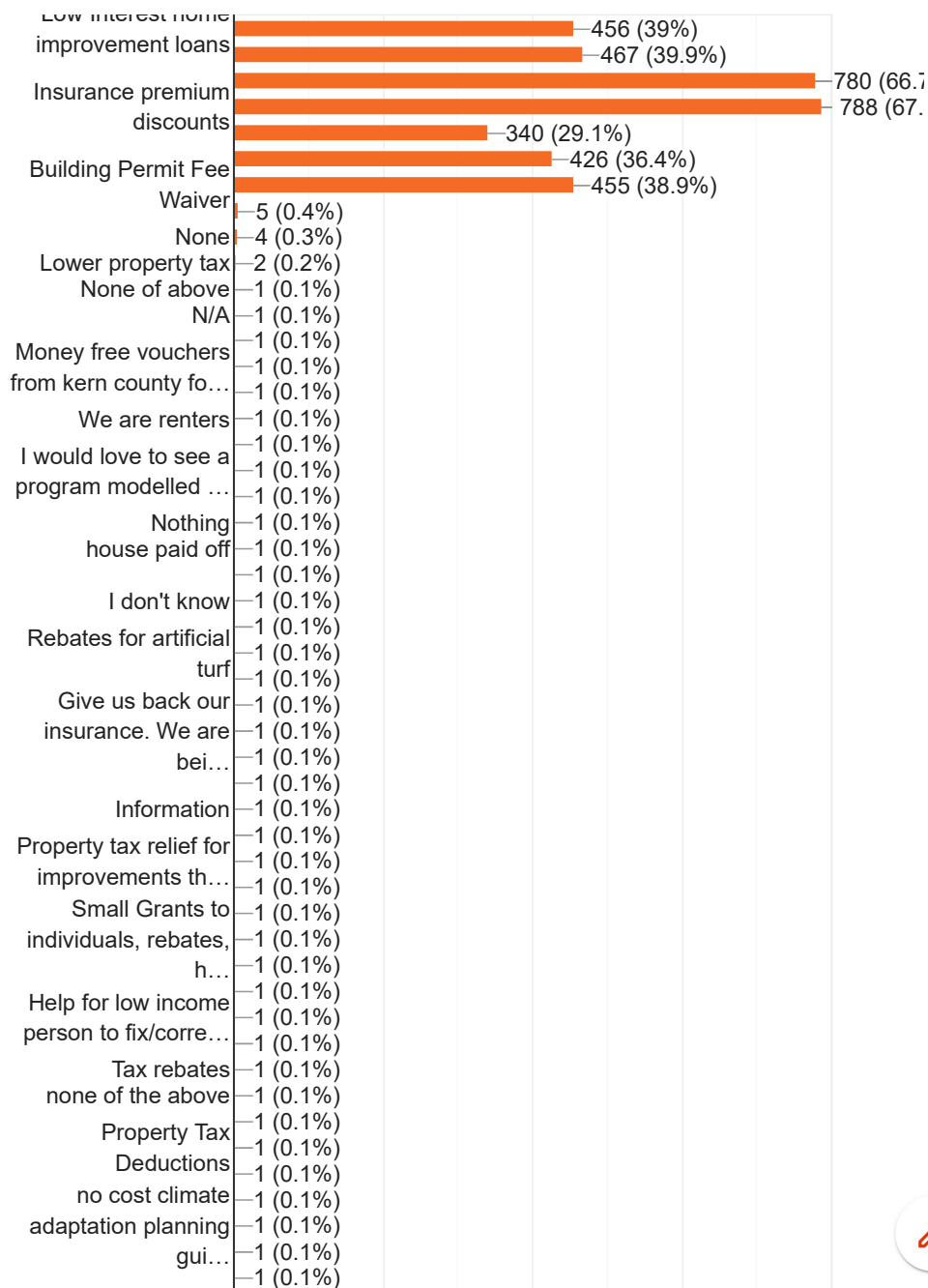


Kern Survey Results Summary



Which of the following incentives would encourage you to protect your home to withstand the impacts of possible natural hazards?

1,169 responses

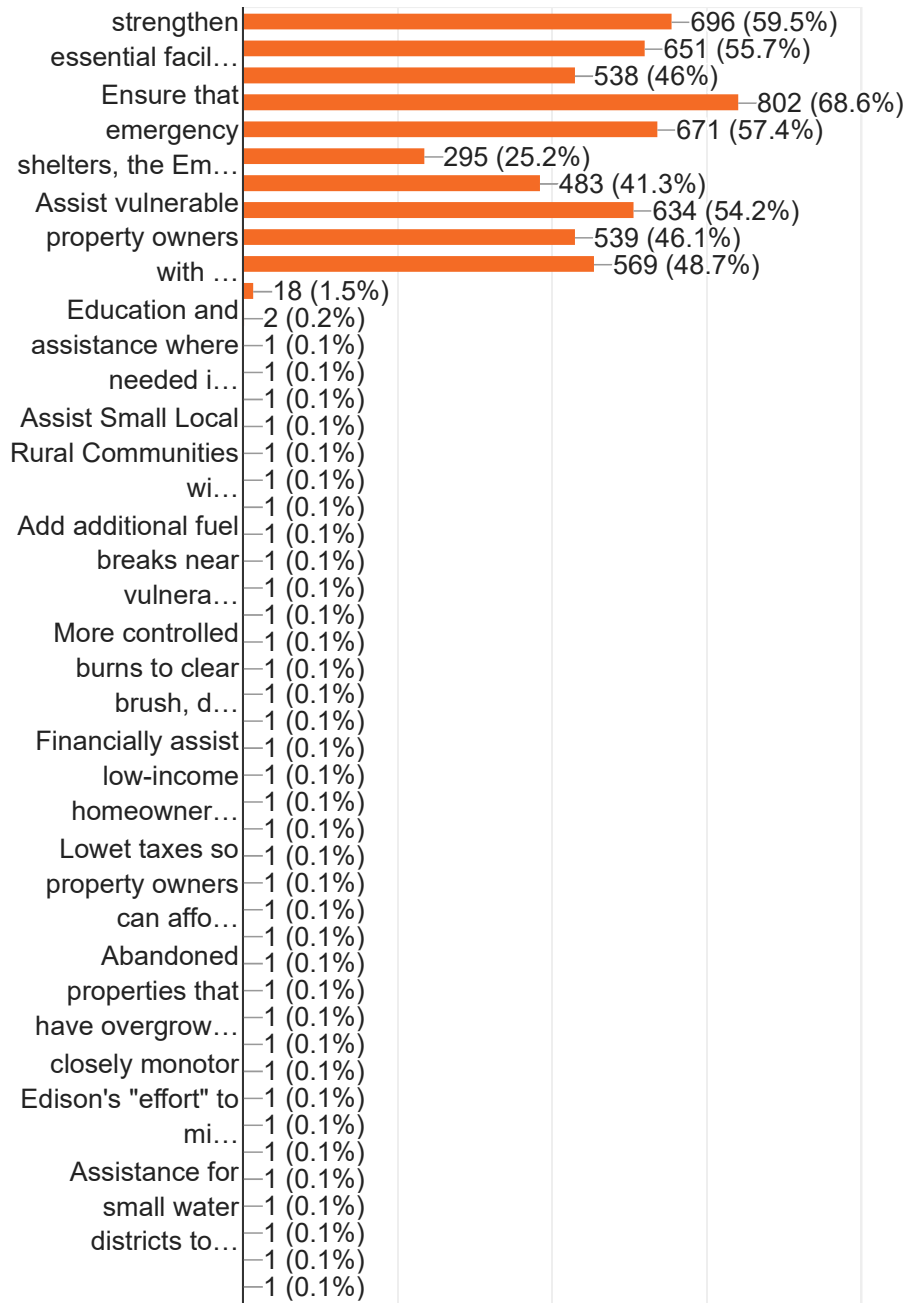


Kern Survey Results Summary



Which of the following mitigation projects do you believe local government agencies should focus on to reduce disruptions of services and to strengthen the community (please check all that apply)

1,169 responses



Kern Survey Results Summary



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Mitigation Strategy Prioritization Process Documentation

Appendix B.4



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Jurisdictions

- All
- County 1
- Municipality 2
- School District 4
- Special District 4
- Water/Wastewater District 2

MA Status Chart

Status

- Completed 33%
- Cancelled 7%
- Pending 46%
- Exten 13%

MA Type Chart

Alternative Type

- PRV - Prevention 48%
- PRC - Property Pre 17%
- PRC - Property Pre 4%
- PRC - Property Pre 6%
- PRC - Property Pre 7%
- PRC - Property Pre 5%
- PRC - Property Pre 12%

MA Priority Chart

Priority

- Low 47%
- Medium 41%
- High 11%
- Exten 1%

Mitigation Actions List

Arvin CSD 1

- ma-EC--260 Ongoing
- ma-FL-AGSD-140 Pending
- Arvin-Edison Water Storage District 11
 - ma-DR-AEWSD-369 Ongoing
 - ma-AH-AEWSD-366 Pending
 - ma-DR-AEWSD-367 Pending
 - ma-DR-AEWSD-368 Pending
 - ma-FL-AEWSD-172 Pending

MA Details

Time Frame

Funding Dependent

HMA Activity Type

Activity Cost (Estimated)

\$ 0.00

Potential Grant Source

HMGP / PDM

Potential Local Match

Mix (Fund/In-kind)

Priority

High

Notes

Indemnification Status

Legend

SYMBOL

Non-Verified Mitigation Action

TEXT STYLE

ma-FL-AWSD-173
Incomplete Details

ma-AH-KC-65
Complete Details

ma-AH-KC-65
No Related Problem Statement

ma-AH-KC-65
Status is Cancelled or Completed

Formating Legend

MAST Priority Field



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Website Documentation

Appendix B.5



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WHY HAVE
A PLAN?

PLANNING
PROCESS

GRANT
FRAMEWORK

FEMA
TOOLS

PROJECTS ▾

RESOURCE LINKS



Kern County MJHMP Update

- Executive Summary
- Mitigation at Home
- Other Planning Documents
- Get Involved
- Learn More

Stakeholder Pages

- Draft HMP Documents
- RAMP (Risk Mapping)
- MAST (Mitigation Strategy)
- Planning Process Library
- Meetings
- Document Upload

PM Team Pages

- PM Team

Project Contacts

Kern County

WENDY J. BENSON
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Dynamic Planning + Science

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Kern Multi-Jurisdiction Hazard Mitigation Plan

2019-20 Update

Executive Summary



Kern County, along with 62 other participating jurisdictions, will develop an update to the 2012-14 Kern Multi-Jurisdiction Hazard Mitigation Plan to reduce losses resulting from natural disasters. Hazard mitigation is the use of sustained, long-term actions to reduce the loss of life, personal injury, and property damage that can result from a disaster. Benefits of mitigation planning include:

- Identifying actions for risk reduction through collaboration with stakeholders and the public,
- Focusing resources on the greatest risks and vulnerabilities,
- Building partnerships by involving citizens, organizations, and businesses,
- Increasing education and awareness of threats and hazards, as well as their risks,
- Communicating priorities to State and Federal officials, and
- Aligning risk reduction with other community objectives.

Planning efforts could include capital projects and other pragmatic activities that can mitigate the impacts of hazards. The 2019-20 MJHMP Update will cover each of the major natural hazards that pose risks to County infrastructure and residents. Recognizing that successful mitigation planning efforts must be communicated and understood by the public, the County approach will include stakeholder participation and input with the use of cutting edge GIS technology to map and update the hazard information for each hazard profiled in the 2019-20 MJHMP.

Participating Jurisdictions

The 2019-20 MJHMP update will include, at a minimum, the jurisdictions listed below. It is understood that the County also encompasses areas of land controlled by Federal and State land management agencies, including the California Department of Forestry and Fire Protection, Bureau of Land Management, and Bureau of Reclamation. While other levels of government have jurisdiction in these parts of the County, the Hazard Mitigation Plan could also be used to document and coordinate mitigation efforts among Federal, State, and local jurisdictions. In addition, it will be important to invite organizations such as public and private utility companies to be stakeholders during the update process.

The following jurisdictions will meet FEMA guidelines and requirements as a formal participating agency:

Municipalities

- City of Arvin
- City of Bakersfield
- City of California City
- City of Delano
- City of Ridgecrest
- City of Shafter
- City of Taft
- City of Tehachapi

Executive Summary



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Kern Multi-Jurisdiction Hazard Mitigation Plan

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Mitigation at Home

Perform Mitigation Around Your Home!

Mitigation around your home can better prepare you and your family for an unexpected emergency or disaster incident, and help you recover more quickly. Here are some resources to get you started.

Assess Your Own Risk

Using Cal OES MyHazards, type in your address to assess your risk to natural hazards including earthquakes, flood, fire and tsunami. Learn what you should do to reduce injuries, protect your life and those of others, and reduce damage to your home and property.

Visit Ready.gov to learn about different hazards and how you can prepare your home or business for these events.

Home Mitigation Ideas

Now that you're familiar with the hazards that have the potential to affect your community, check out some of these mitigation techniques that can be performed around your home.

Wildfire Mitigation Ideas

- Kern County Fire Hazard Reduction Program: Home Inspections, Defensible Space Planning and Preparation Guide and other local mitigation resources.
California Fire Safe Council: Information on grants/ funding programs and community events.
CAL FIRE Why 100?: Video from CAL Fire with defensible space guidelines for your home.
CAL FIRE Ready for Wildfire: CAL Fire website for preparing your home for wildfire.
CAL Fire Ready for Wildfire (Get Ready): CAL Fire tips on defensible space, hardening your home, and fire-resistant landscapes.
CAL Fire Ready for Wildfire (Prevention): CAL Fire "One Less Spark" wildfire prevention tips for equipment use, debris burning, campfires and more.

Earthquake Mitigation Ideas

- FEMA Earthquake Home Hazard Hunt: FEMA recommendations for reducing earthquake hazards in your home.
California Earthquake Brace and Bolt Program: California EBB provides \$3,000 grants to be used toward a code-compliant seismic retrofit for houses that qualify. Find out more about the program and if your house qualifies.

Flood Mitigation Ideas

- FEMA Flood Mitigation: Tips for preparing your home or workplace, collecting sources of information, developing an emergency communications plan and knowing what to do when a flood is approaching your home or business.
California Flood Preparedness Tips: Tips on how to divert water away from your home during a flood including sandbag filling and placement.

Severe Weather Mitigation Ideas

- Severe Storm Mitigation: Tips to equip your home with the accessories it will need to survive a storm from the National Association of Home Builders.

Drought Mitigation Ideas

- Water Association of Kern County: Water conservation tips for homeowners.
Save Our Water: Tips and resources for water conservation in and around the home.

Reduce Personal Risk or Injury

Create a Plan

Every household should have a disaster plan! Meet with your family members and discuss why you need to prepare for a disaster. Discuss and explain the dangers of the various hazards that may impact your home or your community.

Build an Emergency Kit

An emergency kit is assembled so that in case of an emergency you are prepared ahead of time. It is possible that you will need to survive on your own after an emergency and this kit should have all the basic yet essential items you will need for at least 72 hours. Your kit should contain food and water, items in case there is a power shortage, and other items such as personal hygiene supplies and copies of important documents.

Mitigation at Home



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Kern Multi-Jurisdiction Hazard Mitigation Plan

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Other Planning Documents

Hazard Mitigation Plan:

2012 Kern Multi-Jurisdiction Hazard Mitigation Plan

- Part 1: [Executive Summary, TOC, Chapters 1, 2, 3](#)
- Part 2: [Chapter 4, Part 1](#)
- Part 3: [Chapter 4, Part 2](#)
- Part 4: [Chapters 5, 6, 7](#)
- Part 5: [Appendices A through H](#)

Other Local Planning Documents:

- [Kern County General Plan](#)
- [2018 State of California Multi-Hazard Mitigation Plan Draft](#)
- [California Drought Contingency Plan](#)
- [Kern County Fire Department Unit Strategic Fire Plan](#)
- [Kern County Fire Department Wildland Fire Management Plan](#)
- [Kern County and Incorporated Cities Hazardous Waste Management Plan](#)
- [Kern County Flood Hazard Mitigation Plan](#)
- [Kern Lake Coordinated Resource Management and Planning Group Project Master Plan – Preliminary Status Report](#)
- [Metropolitan Bakersfield Habitat Conservation Plan](#)

Community Wildfire Protection Plans (CWPPs):

- [Alta Sierra CWPP](#)
- [Kern River Valley CWPP](#)
- [Mount Pinos CWPP](#)
- [Meyers Canyon CWPP](#)
- [Greater Tehachapi Area CWPP](#)

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Kern Multi-Jurisdiction Hazard Mitigation Plan



2019-20 Update

Get Involved

The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and their property from hazards. The County of Kern developed the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update to make the County, its residents and visitors less vulnerable to future hazard events.

Take a Survey!



COMMUNITY SURVEY

ENCUESTA SOBRE LA COMUNIDAD

Survey Results

Total Surveys...

1,156

Your opinion matters! The information you provide will help us identify and coordinate projects focused on reducing the risk of injury or damage to property from future hazard events (e.g. wildfires, floods, earthquakes).

The survey should take approximately 5 minutes to complete and is anonymous.

REVIEW THE HAZARD MITIGATION PLAN!

Coming soon!

Throughout the planning process, draft sections of the 2020 Kern County Multi- Jurisdictional Hazard Mitigation Plan will be made available for review and comment; documents can be found on the "Documents" page.

Discover County Planning Documents

Does your neighborhood have its own Community Wildfire Protection Plan? Do you know where the flood zones are in the County? There are a lot of great resources available to the public and they can all be found [here](#).

Events

Come take the survey in person and get your mitigation questions answered at one of our upcoming events.

Event details coming soon!

Get Involved



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Kern Multi-Jurisdiction Hazard Mitigation Plan

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Learn More



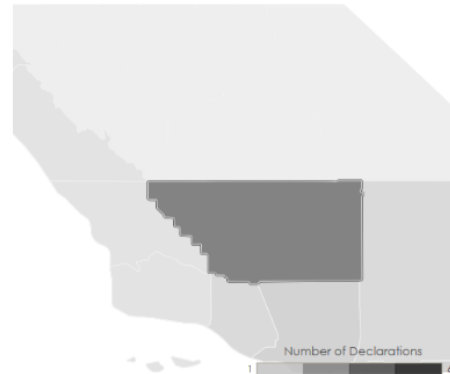
History of the MJHMP

On behalf of the entire County, Kern County's Board of Supervisors adopted the original Multi-Jurisdictional Multi-Hazard Mitigation Plan in 2006. The 2019-20 update will be the County's "third" plan update and a demonstration of the County's continuing effort to reduce or eliminate future loss of life and property resulting from natural disasters.



Disasters in Kern County

- 15 Fire
- 6 Flood
- 5 Severe Storm(s)
- 3 Freezing
- 1 Coastal Storm
- 1 Drought
- 1 Hurricane



There have been 32 declared disasters that have occurred in Kern County since 1953. [Click here](#) for more detail including the types of declared disasters and the months and years that they have occurred.

[Learn More](#)



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Kern Multi-Jurisdiction Hazard Mitigation Plan
 2019-20 Update
Documents



2020 Kern County Multi-Jurisdictional Hazard Mitigation Plan

This is your opportunity to be heard! Click below to open the Public Review PDF's for Volume 1 and find each volume 2 annex of the County's 2020 Hazard Mitigation Plan. For additional help on PDF commenting, use the instructions below in the "How to Comment on the PDF" section. Note the files may take a few moments to load due to the size of the documents and the interactive commenting feature.

The County's Multi-Jurisdictional Hazard Mitigation Plan is available in Volume 1 for review at the link below:



You can also download the PDF and provide comments via the form linked below or by emailing our team directly: [Download MJHMP VOL 1](#)

HOW TO COMMENT!



Option 1

Click the link left to comment on the Draft Volume 1
 For Volume 1

Option 2

Submit a [Comment Form](#).
 For Volume 1 or 2 Annexes

Option 3

[Email your comments!](#)
 For Volume 1 or 2 Annexes

Volume 2 Draft Annexes

The Jurisdictional Annexes to Volume 1 are available in Volume 2 within the groups below:

- + MUNICIPALITIES
- + SPECIAL DISTRICTS
- + SCHOOL DISTRICTS
- + WATER/WASTEWATER DISTRICTS
- + HOW TO COMMENT

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Kern Multi-Jurisdiction Hazard Mitigation Plan

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UPDATES

- 5/1/2020: All RAMP interfaces have been updated to RAMP 2.0 to provide a better user experience - see the user guide link above for more information.
- 7/25/2019: Population Maps updated to improve population summary accuracy within municipal boundaries.

Using RAMP

The links below allow you to access each version of the Risk Assessment Mapping Platform "RAMP". Please see the user documentation for more details on how to use the mapping applications. If you need help navigating these mapping tools, please email brian@dynamicplanning.co



LAUNCH MUNICIPALITIES RAMP



LAUNCH SPECIAL DISTRICTS RAMP



LAUNCH SCHOOL DISTRICTS RAMP



LAUNCH WATER DISTRICTS RAMP

RAMP Resources

The RAMP user guide details RAMP's user interface and how to use the mapping application.

RAMP USER GUIDE

The hazards legend provides full details for each class of hazard portrayed in RAMP and provides data sources.

HAZARDS LEGEND

The GIS data dictionary itemizes the status of each GIS data layer that will be used in the project.

GIS DATA DICTIONARY

If you need additional help navigating these mapping tools or have any questions regarding data sources, analysis methods, etc., please email brian@dynamicplanning.co.

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Kern Multi-Jurisdiction Hazard Mitigation Plan

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Planning Process Library



This library includes links to view map products or exercises completed by each jurisdiction to meet or exceed FEMA planning requirements outlined in 44 CFR § 201.6 – Local Mitigation Plans (44 CFR Part 201 – Mitigation Planning). Most importantly §201.6(c)(2)(iii) requires that in multi-jurisdictional plans, the risk assessment section must assess each jurisdiction’s risks where they vary from the risks facing the entire planning area.

- Risk Assessment – explore or download each hazard exposure & damage estimation map
- Hazard Prioritization – hazard prioritization risk matrices
- Areas of Concern – identifies hazard problem statements
- Capability Assessments – details specific technical, fiscal, and regulatory resources

If you need help navigating these mapping products, please email brian@dynamicplanning.co.

- + COUNTY / MUNICIPALITIES
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Planning Committee Meeting #4

Date: November 14th, 2019
 Time: 9:00 AM-12:00 PM
 Location: Kern County/Operational Area Emergency Operations Center, 2601 Panorama Drive, Building B, Bakersfield, CA

[Livestream](#)

Meeting Materials

- [Live Polling with PolLEV](#)
- [Mitigation Action Application](#)
 username: kernmjhmp@gmail.com
 password: KernHMP2020
- [Kern PC #4 Meeting Slide Deck View | Download](#)
- [Kern County Meeting #4 Agenda View | Download](#)
- [Mitigation Alternatives Handout View | Download](#)
- [2012-14 Mitigation Action Worksheets View | Download](#)

Links

- [Mitigation Ideas Handbook View | Download](#)
- [Wildfire Hazard Mitigation Handbook for Public Facilities View](#)

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Kern Multi-Jurisdiction Hazard Mitigation Plan

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Document Upload

User Document Upload

You can upload your own documents by clicking the button below and following the instructions on page.

DOCUMENT UPLOAD

See all uploaded documents here:

[Participant Uploaded Documents](#)

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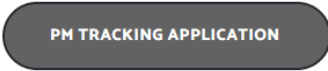
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